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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RTID 0648-XR067

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to U.S. Navy 2020 Ice Exercise Activities in the Beaufort Sea and Arctic Ocean

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

ACTION: Notice; Issuance of an Incidental Harassment Authorization (IHA).

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an IHA to the United States Department of the Navy (Navy) to incidentally harass, by Level B harassment only, marine mammals during submarine training and testing activities associated with Ice Exercise 2020 (ICEX20) north of Prudhoe Bay, Alaska. The Navy's activities are considered military readiness activities pursuant to the MMPA, as amended by the National Defense Authorization Act for Fiscal Year 2004 (NDAA).

DATES: This authorization is effective from February 1, 2020, through January 31, 2021.

FOR FURTHER INFORMATION CONTACT: Amy Fowler, 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/permit/incidental-take-authorizations-under->

marine-mammal-protection-act. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

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

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

The NDAA (Pub. L. 108–136) removed the “small numbers” and “specified geographical region” limitations indicated above and amended the definition of

“harassment” as it applies to a “military readiness activity.” The activity for which incidental take of marine mammals is being requested addressed here qualifies as a military readiness activity. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

Summary of Request

On July 3, 2019, NMFS received a request from the Navy for an IHA to take marine mammals incidental to submarine training and testing activities, including establishment of a tracking range on an ice floe in the Beaufort Sea and Arctic Ocean north of Prudhoe Bay, Alaska. The application was deemed adequate and complete on November 22, 2019. The Navy’s request was for take of ringed seals (*Pusa hispida hispida*) and bearded seals (*Erignathus barbatus*) by Level B harassment. Neither the Navy nor NMFS expect serious injury or mortality to result from this activity. Therefore, an IHA is appropriate.

NMFS previously issued an IHA to the Navy for similar activities conducted in 2018 (83 FR 6522; February 14, 2018). The Navy complied with all the requirements (*e.g.*, mitigation, monitoring, and reporting) of the previous IHA and information regarding their monitoring results may be found in the **Estimated Take** section.

Description of Proposed Activity

The Navy proposes to conduct submarine training and testing activities from an ice camp established on an ice floe in the Beaufort Sea and Arctic Ocean for approximately six weeks beginning in February 2020. The ice camp would be established approximately 100-200 nautical miles (nmi) north of Prudhoe Bay, Alaska. The submarine training and testing activities would occur over approximately four weeks

during the six-week period. Submarine active acoustic transmissions may result in occurrence of temporary hearing impairment (temporary threshold shift (TTS)) and behavioral harassment (Level B harassment) of ringed and bearded seals.

A detailed description of ICEX20 activities is provided in the **Federal Register** notice for the proposed IHA (84 FR 68886; December 17, 2019). Since that time, no changes have been made to the planned activities. Therefore, a detailed description is not provided here. Please refer to that **Federal Register** notice for the description of the specific activity.

Comments and Responses

A notice of NMFS's proposal to issue an IHA to the Navy was published in the **Federal Register** on December 17, 2019 (84 FR 68886). That notice described, in detail, the Navy's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received a comment letter from the Marine Mammal Commission (Commission).

Comment 1: The Commission noted that the Navy used cutoff distances instead of relying on Bayesian biphasic dose response functions (BRFs) to inform take estimates. The Commission asserted that the cutoff distances used by the Navy are unsubstantiated and that the Navy arbitrarily set a cutoff distance of 10 kilometers (km) for pinnipeds, which could effectively eliminate a large portion of the estimated number of takes. The Commission, therefore, recommended that the Navy refrain from using cut-off distances in conjunction with the Bayesian BRFs.

Response: We disagree with the Commission's recommendation. The derivation of the behavioral response functions and associated cutoff distances is provided in the

Navy's Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III) technical report (Navy 2017a). The consideration of proximity (distance cutoff) was part of criteria developed in consultation with NMFS and was applied within the Navy's BRF. Distance cutoffs beyond which the potential of significant behavioral responses were considered to be unlikely were used in conducting analysis for ICEX20. The Navy's BRF applied within these distances is an appropriate method for providing a realistic (but still conservative where some uncertainties exist) estimate of impact and potential take for these activities.

Comment: The Commission recommended that NMFS stipulate that an IHA Renewal is a one-time opportunity in all **Federal Register** notices requesting comments on possibility of a Renewal, on its webpage detailing the Renewal process, and in all draft and final authorizations that include a term and condition for Renewal.

Response: NMFS' website indicates that Renewals are good for "up to another year of the activities covered in the initial IHA." NMFS has never issued a Renewal for more than one year, and in no place have we implied that Renewals are available for more than one year. Any given Federal Register notice considering a Renewal clearly indicates that it is only being considered for one year. Accordingly, changes to the Renewal language on the website, Federal Register notices, or authorizations is not necessary.

Changes from the Proposed IHA to Final IHA

NMFS has added specific elements that must be reported in the Navy's post-activity monitoring report. These requirements are detailed in the **Monitoring and Reporting** section of this notice.

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 ringed and bearded seals. Additional information regarding population trends and threats may be found in NMFS's 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's website (<https://www.fisheries.noaa.gov/find-species>).

Table 1 lists all species with expected potential for occurrence in the project area and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2018). 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's SARs). While no mortality or serious injury is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this notice 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's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that

comprise that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS’s U.S. Alaska SARs (Muto *et al.*, 2019). All values presented in Table 1 are the most recent available at the time of publication and are available in the 2018 Alaska SARs (Muto *et al.*, 2019).

Table 1 -- Marine Mammal Species Potentially Present in the Project Area

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
<i>Bowhead whale</i>	<i>Balaena mysticetus</i>	Western Arctic	E/D;Y	16,982 (0.058, 16,091, 2011)	161	44
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
<i>Beluga whale</i>	<i>Delphinapterus leucas</i>	Beaufort Sea	-/-;N	39,258 (0.229, 32,453, 1992)	649	166
Order Carnivora – Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Ringed seal	<i>Pusa hispida hispida</i>	Alaska	T/D;Y	170,000 (-, 170,000, 2013) (Bering Sea and Sea of Okhotsk only)	5,100 (Bering Sea-U.S. portion only)	1,054
Bearded seal	<i>Erignathus barbatus</i>	Alaska	T/D;Y	299,174 (-, 273,676, 2012) (Bering Sea-U.S. portion only)	8,210 (Bering Sea-U.S. portion only)	557

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

ESA is automatically designated under the MMPA as depleted and as a strategic stock.

2- NMFS marine mammal stock assessment reports online at: www.nmfs.noaa.gov/pr/sars/. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable.

3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

NOTE: *Italicized species are not expected to be taken.*

All species that could potentially occur in the proposed survey areas are included in Table 1. However, the temporal and/or spatial occurrence of bowhead whales and beluga whales is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here. Bowhead whales migrate annually from wintering areas (December to March) in the northern Bering Sea, through the Chukchi Sea in the spring (April through May), to the eastern Beaufort Sea, where they spend much of the summer (June through early to mid-October) before returning again to the Bering Sea (Muto *et al.*, 2017). They are unlikely to be found in the ICEX20 study area during the February through April ICEX20 timeframe. Beluga whales follow a similar pattern, as they tend to spend winter months in the Bering Sea and migrate north to the eastern Beaufort Sea during the summer months.

In addition, the polar bear (*Ursus maritimus*) may be found in the project area. However, polar bears are managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

A detailed description of the species likely to be affected by ICEX20, 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 (84 FR 68886; December 17, 2019). 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 NFMS's website (<https://www.fisheries.noaa.gov/find-species>) for generalized species accounts.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

The effects of underwater noise from submarine training and testing activities have the potential to result in behavioral harassment of marine mammals in the vicinity of the study area. The notice of proposed IHA (84 FR 68886; December 17, 2019) included a discussion of the effects of anthropogenic noise on marine mammals and the potential effects of underwater noise from ICEX20 activities on marine mammals and their habitat. That information and analysis is incorporated by reference in to this final IHA determination and is not repeated here; please refer to the notice of proposed IHA (84 FR 68886; December 17, 2019).

Estimated Take

This section provides an estimate of the number of incidental takes authorized through this IHA, which will inform NMFS' negligible impact determination.

Harassment is the only type of take expected to result from these activities. For this military readiness activity, the MMPA defines *harassment* as (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) Any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where the behavioral patterns are abandoned or significantly altered (Level B harassment).

Authorized takes are by Level B harassment only, in the form of disruption of behavioral patterns and TTS, for individual marine mammals resulting from exposure to acoustic transmissions. Based on the nature of the activity, Level A harassment is neither anticipated nor authorized, and as described previously, no serious injury or mortality is anticipated or authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take from exposure to sound by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) the number of days of activities. For this IHA, the Navy employed a sophisticated model known as the Navy Acoustic Effects Model (NAEMO) for assessing the impacts of underwater sound.

Acoustic Thresholds

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

Level B Harassment for non-explosive sources—In coordination with NMFS, the Navy developed behavioral thresholds to support environmental analyses for the Navy's testing and training military readiness activities utilizing active sonar sources; these behavioral harassment thresholds are used here to evaluate the potential effects of the active sonar components of the proposed action. The response of a marine mammal to an

anthropogenic sound will depend on the frequency, duration, temporal pattern and amplitude of the sound as well as the animal's prior experience with the sound and the context in which the sound is encountered (*i.e.*, what the animal is doing at the time of the exposure). The distance from the sound source and whether it is perceived as approaching or moving away can also affect the way an animal responds to a sound (Wartzok *et al.* 2003). For marine mammals, a review of responses to anthropogenic sound was first conducted by Richardson *et al.* (1995). Reviews by Nowacek *et al.* (2007) and Southall *et al.* (2007) address studies conducted since 1995 and focus on observations where the received sound level of the exposed marine mammal(s) was known or could be estimated.

Multi-year research efforts have conducted sonar exposure studies for odontocetes and mysticetes (Miller *et al.* 2012; Sivle *et al.* 2012). Several studies with captive animals have provided data under controlled circumstances for odontocetes and pinnipeds (Houser *et al.* 2013a; Houser *et al.* 2013b). Moretti *et al.* (2014) published a beaked whale dose-response curve based on passive acoustic monitoring of beaked whales during U.S. Navy training activity at Atlantic Underwater Test and Evaluation Center during actual Anti-Submarine Warfare exercises. This new information necessitated the update of the behavioral response criteria for the U.S. Navy's environmental analyses.

Southall *et al.* (2007) synthesized data from many past behavioral studies and observations to determine the likelihood of behavioral reactions at specific sound levels. While in general, the louder the sound source the more intense the behavioral response, it was clear that the proximity of a sound source and the animal's experience, motivation, and conditioning were also critical factors influencing the response (Southall *et al.* 2007). After examining all of the available data, the authors felt that the derivation of thresholds

for behavioral response based solely on exposure level was not supported because context of the animal at the time of sound exposure was an important factor in estimating response. Nonetheless, in some conditions, consistent avoidance reactions were noted at higher sound levels depending on the marine mammal species or group allowing conclusions to be drawn. Phocid seals showed avoidance reactions at or below 190 decibels (dB) referenced to 1 microPascal (μPa) @ 1 m; thus, seals may actually receive levels adequate to produce TTS before avoiding the source.

The Navy's Phase III proposed pinniped behavioral threshold has been updated based on controlled exposure experiments on the following captive animals: hooded seal, gray seal, and California sea lion (Götz *et al.* 2010; Houser *et al.* 2013a; Kvadsheim *et al.* 2010). Overall exposure levels were 110-170 dB re 1 μPa for hooded seals, 140-180 dB re 1 μPa for gray seals and 125-185 dB re 1 μPa for California sea lions; responses occurred at received levels ranging from 125 to 185 dB re 1 μPa . However, the means of the response data were between 159 and 170 dB re 1 μPa . Hooded seals were exposed to increasing levels of sonar until an avoidance response was observed, while the grey seals were exposed first to a single received level multiple times, then an increasing received level. Each individual California sea lion was exposed to the same received level 10 times. These exposure sessions were combined into a single response value, with an overall response assumed if an animal responded in any single session. Because these data represent a dose-response type relationship between received level and a response, and because the means were all tightly clustered, the Bayesian biphasic Behavioral Response Function for pinnipeds most closely resembles a traditional sigmoidal dose-response function at the upper received levels and has a 50 percent probability of

response at 166 dB re 1 μ Pa. Additionally, to account for proximity to the source discussed above and based on the best scientific information, a conservative distance of 10 km is used beyond which exposures would not constitute a take under the military readiness definition. NMFS used this dose response function to predict behavioral harassment of pinnipeds for this activity.

Level A harassment and TTS—NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive).

These thresholds were developed by compiling the best available science and soliciting input multiple times from both the public and peer reviewers to inform the final product. The references, analysis, and methodology used in the development of the thresholds are described in the Technical Guidance, which may be accessed at <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance>.

The Navy's PTS/TTS analyses begins with mathematical modeling to predict the sound transmission patterns from Navy sources, including sonar. These data are then coupled with marine species distribution and abundance data to determine the sound levels likely to be received by various marine species. These criteria and thresholds are applied to estimate specific effects that animals exposed to Navy-generated sound may experience. For weighting function derivation, the most critical data required are TTS onset exposure levels as a function of exposure frequency. These values can be estimated

from published literature by examining TTS as a function of sound exposure level (SEL) for various frequencies.

To estimate TTS onset values, only TTS data from behavioral hearing tests were used. To determine TTS onset for each subject, the amount of TTS observed after exposures with different sound pressure levels (SPLs) and durations were combined to create a single TTS growth curve as a function of SEL. The use of (cumulative) SEL is a simplifying assumption to accommodate sounds of various SPLs, durations, and duty cycles. This is referred to as an “equal energy” approach, since SEL is related to the energy of the sound and this approach assumes exposures with equal SEL result in equal effects, regardless of the duration or duty cycle of the sound. It is well known that the equal energy rule will over-estimate the effects of intermittent noise, since the quiet periods between noise exposures will allow some recovery of hearing compared to noise that is continuously present with the same total SEL (Ward 1997). For continuous exposures with the same SEL but different durations, the exposure with the longer duration will also tend to produce more TTS (Finneran *et al.*, 2010; Kastak *et al.*, 2007; Mooney *et al.*, 2009a).

As in previous acoustic effects analysis (Finneran and Jenkins 2012; Southall *et al.*, 2007), the shape of the PTS exposure function for each species group is assumed to be identical to the TTS exposure function for each group. A difference of 20 dB between TTS onset and PTS onset is used for all marine mammals including pinnipeds. This is based on estimates of exposure levels actually required for PTS (*i.e.*, 40 dB of TTS) from the marine mammal TTS growth curves, which show differences of 13 to 37 dB between

TTS and PTS onset in marine mammals. Details regarding these criteria and thresholds can be found in NMFS' Technical Guidance (NMFS 2016).

Table 2 below provides the weighted criteria and thresholds used in this analysis for estimating quantitative acoustic exposures of marine mammals from the proposed action.

Table 2 -- Injury (PTS) and Disturbance (TTS, Behavioral) Thresholds for Underwater Sounds

Group	Species	Behavioral Criteria	Physiological Criteria	
			Onset TTS	Onset PTS
Phocid (in water)	Ringed/Bearded seal	Pinniped Dose Response Function	181 dB SEL cumulative	201 dB SEL cumulative

Quantitative Modeling

The Navy performed a quantitative analysis to estimate the number of mammals that could be harassed by the underwater acoustic transmissions during the proposed action. Inputs to the quantitative analysis included marine mammal density estimates, marine mammal depth occurrence distributions (U.S Department of the Navy, in prep), oceanographic and environmental data, marine mammal hearing data, and criteria and thresholds for levels of potential effects.

The density estimate used to estimate take is derived from habitat-based modeling by Kaschner *et al.*, (2006) and Kaschner (2004). The area of the Arctic where the planned action will occur (100-200 nm north of Prudhoe Bay, Alaska) has not been surveyed in a manner that supports quantifiable density estimation of marine mammals. In the absence of empirical survey data, information on known or inferred associations between marine habitat features and (the likelihood of) the presence of specific species have been used to

predict densities using model-based approaches. These habitat suitability models include relative environmental suitability (RES) models. Habitat suitability models can be used to understand the possible extent and relative expected concentration of a marine species distribution. These models are derived from an assessment of the species occurrence in association with evaluated environmental explanatory variables that results in defining the RES suitability of a given environment. A fitted model that quantitatively describes the relationship of occurrence with the environmental variables can be used to estimate unknown occurrence in conjunction with known habitat suitability. Abundance can thus be estimated for each RES value based on the values of the environmental variables, providing a means to estimate density for areas that have not been surveyed. Use of the Kaschner's RES model resulted in a value of 0.3957 ringed seals per km² in the cold season (defined as December through May) and a maximum value of 0.0332 bearded seals per km² in the cold and warm seasons. The density numbers are assumed static throughout the ice camp action area for this species. The density data generated for this species was based on environmental variables known to exist within the ice camp action area during the late winter/early springtime period.

The quantitative analysis consists of computer modeled estimates and a post-model analysis to determine the number of potential animal exposures. The model calculates sound energy propagation from the proposed sonars, the sound received by animal (virtual animal) dosimeters representing marine mammals distributed in the area around the modeled activity, and whether the sound received by a marine mammal exceeds the thresholds for effects.

The Navy developed a set of software tools and compiled data for estimating acoustic effects on marine mammals without consideration of behavioral avoidance or Navy's standard mitigations. These tools and data sets serve as integral components of NAEMO. In NAEMO, animals are distributed non-uniformly based on species-specific density, depth distribution, and group size information, and animals record energy received at their location in the water column. A fully three-dimensional environment is used for calculating sound propagation and animal exposure in NAEMO. Site-specific bathymetry, sound speed profiles, wind speed, and bottom properties are incorporated into the propagation modeling process. NAEMO calculates the likely propagation for various levels of energy (sound or pressure) resulting from each source used during the training event.

NAEMO then records the energy received by each animal within the energy footprint of the event and calculates the number of animals having received levels of energy exposures that fall within defined impact thresholds. Predicted effects on the animals within a scenario are then tallied and the highest order effect (based on severity of criteria; *e.g.*, PTS over TTS) predicted for a given animal is assumed. Each scenario or each 24-hour period for scenarios lasting greater than 24 hours is independent of all others, and therefore, the same individual marine animal could be impacted during each independent scenario or 24-hour period. In few instances, although the activities themselves all occur within the study area, sound may propagate beyond the boundary of the study area. Any exposures occurring outside the boundary of the study area are counted as if they occurred within the study area boundary. NAEMO provides the initial estimated impacts on marine species with a static horizontal distribution.

There are limitations to the data used in the acoustic effects model, and the results must be interpreted within these context. While the most accurate data and input assumptions have been used in the modeling, when there is a lack of definitive data to support an aspect of the modeling, modeling assumptions believed to overestimate the number of exposures have been chosen:

- Animats are modeled as being underwater, stationary, and facing the source and therefore always predicted to receive the maximum sound level (*i.e.*, no porpoising or pinnipeds' heads above water);
- Animats do not move horizontally (but change their position vertically within the water column), which may overestimate physiological effects such as hearing loss, especially for slow moving or stationary sound sources in the model;
- Animats are stationary horizontally and therefore do not avoid the sound source, unlike in the wild where animals would most often avoid exposures at higher sound levels, especially those exposures that may result in PTS;
- Multiple exposures within any 24-hour period are considered one continuous exposure for the purposes of calculating the temporary or permanent hearing loss, because there are not sufficient data to estimate a hearing recovery function for the time between exposures; and
- Mitigation measures that are implemented were not considered in the model. In reality, sound-producing activities would be reduced, stopped, or delayed if marine mammals are detected by submarines via passive acoustic monitoring.

Because of these inherent model limitations and simplifications, model-estimated results must be further analyzed, considering such factors as the range to specific effects, avoidance, and the likelihood of successfully implementing mitigation measures. This analysis uses a number of factors in addition to the acoustic model results to predict effects on marine mammals.

For non-impulsive sources, NAEMO calculates the sound pressure level (SPL) and sound exposure level (SEL) for each active emission during an event. This is done by taking the following factors into account over the propagation paths: bathymetric relief and bottom types, sound speed, and attenuation contributors such as absorption, bottom loss and surface loss. Platforms such as a ship using one or more sound sources are modeled in accordance with relevant vehicle dynamics and time durations by moving them across an area whose size is representative of the training event’s operational area. Table 3 provides range to effects for active acoustic sources proposed for ICEX20 to phocid pinniped specific criteria. Phocids within these ranges would be predicted to receive the associated effect. Range to effects is important information in not only predicting acoustic impacts, but also in verifying the accuracy of model results against real-world situations and determining adequate mitigation ranges to avoid higher level effects, especially physiological effects to marine mammals.

Table 3 -- Range to Behavioral Effects, TTS, and PTS in the ICEX Study Area

Source/Exercise	Range to Effects (m)		
	Behavioral	TTS	PTS
Submarine Exercise	10,000 ^a	4,025	15

^a Empirical evidence has not shown responses to sonar that would constitute take beyond a few km from an acoustic source, which is why NMFS and Navy conservatively set a

distance cutoff of 10 km. Regardless of the source level at that distance, take is not estimated to occur beyond 10 km from the source.

As discussed above, within NAEMO animals do not move horizontally or react in any way to avoid sound. Furthermore, mitigation measures that are implemented during training or testing activities that reduce the likelihood of physiological impacts are not considered in quantitative analysis. Therefore, the current model overestimates acoustic impacts, especially physiological impacts near the sound source. The behavioral criteria used as a part of this analysis acknowledges that a behavioral reaction is likely to occur at levels below those required to cause hearing loss (TTS or PTS). At close ranges and high sound levels approaching those that could cause PTS, avoidance of the area immediately around the sound source is the assumed behavioral response for most cases.

In previous environmental analyses, the Navy has implemented analytical factors to account for avoidance behavior and the implementation of mitigation measures. The application of avoidance and mitigation factors has only been applied to model-estimated PTS exposures given the short distance over which PTS is estimated. Given that no PTS exposures were estimated during the modeling process for this proposed action, the implementation of avoidance and mitigation factors were not included in this analysis.

Table 4 shows the exposures expected for bearded and ringed seals based on NAEMO modeled results.

Table 4 – Authorized Take for ICEX Activities

Species	Level B Harassment		Level A Harassment	Total
	Behavioral	TTS		
Bearded seal	3	1	0	4
Ringed seal	1,395	11	0	1,406

Effects of Specified Activities on Subsistence Uses of Marine Mammals

Subsistence hunting is important for many Alaska Native communities. A study of the North Slope villages of Nuiqsut, Kaktovik, and Barrow identified the primary resources used for subsistence and the locations for harvest (Stephen R. Braund & Associates 2010), including terrestrial mammals (caribou, moose, wolf, and wolverine), birds (geese and eider), fish (Arctic cisco, Arctic char/Dolly Varden trout, and broad whitefish), and marine mammals (bowhead whale, ringed seal, bearded seal, and walrus). Of these species, only bearded and ringed seals would be located within the study area during the proposed action.

The study area is at least 100-150 mi (161-241 km) from land, well seaward of known subsistence use areas and the planned activities would conclude prior to the start of the summer months, during which the majority of subsistence hunting would occur. In addition, the specified activity would not remove individuals from the population, therefore there would be no impacts caused by this action to the availability of bearded seals or ringed seals for subsistence hunting. Therefore, subsistence uses of marine mammals would not be impacted by this action.

Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses. NMFS regulations require applicants for incidental take authorizations to include information

about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)). The NDAA for FY 2004 amended the MMPA as it relates to military readiness activities and the incidental take authorization process such that “least practicable impact” shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

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, 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, 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.

Mitigation for Marine Mammals and their Habitat

The following general mitigation actions are required for ICEX20 to minimize impacts on ringed and bearded seals on the ice floe:

- Camp deployment will begin in mid-February and must be completed by March 15. Based on the best available science, Arctic ringed seal whelping is not expected to occur prior to mid-March. Construction of the ice camp would be completed prior to whelping in the area of ICEX20. As such, pups are not anticipated to be in the vicinity of the camp at commencement, and mothers would not need to move newborn pups due to construction of the camp. Additionally, if a seal had a lair in the area they would be able to relocate. Completing camp deployment before ringed seal pupping begins will allow ringed seals to avoid the camp area prior to pupping and mating seasons, reducing potential impacts;

- Camp location will not be in proximity to pressure ridges in order to allow camp deployment and operation of an aircraft runway. This will minimize physical impacts to subnivean lairs;

- Camp deployment will gradually increase over five days, allowing seals to relocate to lairs that are not in the immediate vicinity of the camp;

- Personnel on all on-ice vehicles must observe for marine and terrestrial animals; any marine or terrestrial animal observed on the ice must be avoided by 328 ft (100 m). On-ice vehicles would not be used to follow any animal, with the exception of actively deterring polar bears if the situation requires;

- Personnel operating on-ice vehicles must avoid areas of deep snowdrifts near pressure ridges, which are preferred areas for subnivean lair development; and

- All material (*e.g.*, tents, unused food, excess fuel) and wastes (*e.g.*, solid

waste, hazardous waste) must be removed from the ice floe upon completion of ICEX20.

The following mitigation actions are required for ICEX20 activities involving acoustic transmissions:

- For activities involving active acoustic transmissions from submarines and torpedoes, passive acoustic sensors on the submarines must listen for vocalizing marine mammals for 15 minutes prior to the initiation of exercise activities. If a marine mammal is detected, the submarine must delay active transmissions, and not restart until after 15 minutes have passed with no marine mammal detections. If there are no animal detections, it may be assumed that the vocalizing animal is no longer in the immediate area and is unlikely to be subject to harassment. Ramp up procedures are not proposed as Navy determined, and NMFS accepts, that they would result in an unacceptable impact on readiness and on the realism of training.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has determined that the required 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, and on the availability of such species or stock for subsistence uses.

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 in the proposed 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.

The U.S. Navy has coordinated with NMFS to develop an overarching program plan in which specific monitoring would occur. This plan is called the Integrated Comprehensive Monitoring Program (ICMP) (U.S. Department of the Navy 2011). The ICMP was created in direct response to Navy permitting requirements established in various MMPA rules, ESA consultations, and applicable regulations. As a framework document, the ICMP applies by regulation to those activities on ranges and operating areas for which the Navy is seeking or has sought incidental take authorizations. The ICMP is intended to coordinate monitoring efforts across all regions and to allocate the most appropriate level and type of effort based on set of standardized research goals, and in acknowledgement of regional scientific value and resource availability.

The ICMP is focused on Navy training and testing ranges where the majority of Navy activities occur regularly as those areas have the greatest potential for being impacted. ICEX20 in comparison is a short duration exercise that occurs approximately every other year. Due to the location and expeditionary nature of the ice camp, the number of personnel onsite is extremely limited and is constrained by the requirement to be able to evacuate all personnel in a single day with small planes. As such, a dedicated monitoring project would not be feasible as it would require additional personnel and equipment to locate, tag and monitor the seals.

The Navy is committed to documenting and reporting relevant aspects of training and research activities to verify implementation of mitigation, comply with current permits, and improve future environmental assessments. All sonar usage will be collected via the Navy's Sonar Positional Reporting System database and reported. If any injury or death of a marine mammal is observed during the ICEX20 activity, the Navy must

immediately halt the activity and report the incident to the Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinator, NMFS. The following information must be provided:

- Time, date, and location of the discovery;
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal(s) was discovered (*e.g.*, during submarine activities, observed on ice floe, or by transiting vessel).

The Navy will provide NMFS with a draft exercise monitoring report within 90 days of the conclusion of the planned activity. The proposed IHA required the monitoring report to include data regarding sonar use and any mammal sightings or detection will be documented. The report would also include information on the number of sonar shutdowns recorded. NMFS has revised this requirement since the notice of proposed IHA was published to specify that the draft exercise monitoring report must include the number of marine mammals sighted, by species, and any other available information about the sighting(s) such as date, time, and approximate location (latitude and longitude). The draft report must be submitted to NMFS within 90 days of the end of ICEX20 activities. If no comments are received from NMFS within 30 days of submission of the draft final report, the draft final report will constitute the final report. If comments are received, a final report must be submitted within 30 days after receipt of comments. As the information is classified, the Navy must also provide data regarding

sonar use and the number of shutdowns during monitoring in the Atlantic Fleet Training and Testing (AFTT) Letter of Authorization annual classified report due in February 2021. The Navy must also analyze any declassified underwater recordings collected during ICEX20 for marine mammal vocalizations and report that information to NMFS, including the types and natures of sounds heard (*e.g.*, clicks, whistles, creaks, burst pulses, continuous, sporadic, strength of signal) and the species or taxonomic group (if determinable). This information must be submitted to NMFS with the annual AFTT declassified monitoring report due in April 2021.

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).

Underwater acoustic transmissions associated with ICEX20, as outlined previously, have the potential to result in Level B harassment of ringed and bearded seals in the form of TTS and behavioral disturbance. No serious injury, mortality or Level A takes are anticipated to result from this activity. At close ranges and high sound levels approaching those that could cause PTS, avoidance of the area immediately around the sound source would be seals' likely behavioral response.

NMFS estimates 11 takes of ringed seals and 1 take of bearded seals due to TTS from the submarine activities. TTS is a temporary impairment of hearing and TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, however, hearing sensitivity recovers rapidly after exposure to the sound ends. This activity has the potential to result in only minor levels of TTS, and hearing sensitivity of affected animals would be expected to recover quickly. Though TTS may occur in up to 11 ringed seals and 1 bearded seal, the overall fitness of these individuals is unlikely to be affected and negative impacts to the entire stocks are not anticipated.

Effects on individuals that are taken by Level B harassment could include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight. More severe behavioral responses are not anticipated due to the localized, intermittent use of active acoustic sources and mitigation by passive acoustic monitoring which will limit exposure to sound sources. Most likely, individuals will be temporarily displaced by moving away

from the sound source. As described previously in the behavioral effects section, seals exposed to non-impulsive sources with a received sound pressure level within the range of calculated exposures, (142–193 dB re 1 μ Pa), have been shown to change their behavior by modifying diving activity and avoidance of the sound source (Götz *et al.*, 2010; Kvadsheim *et al.*, 2010). Although a minor change to a behavior may occur as a result of exposure to the sound sources associated with the planned action, these changes would be within the normal range of behaviors for the animal (*e.g.*, the use of a breathing hole further from the source, rather than one closer to the source, would be within the normal range of behavior). Thus, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in fitness for the affected individuals, and would not result in any adverse impact to the stock as a whole.

The Navy's planned activities are localized and of relatively short duration. While the total project area is large, the Navy expects that most activities will occur within the ice camp action area in relatively close proximity to the ice camp. The larger study area depicts the range where submarines may maneuver during the exercise. The ice camp will be in existence for up to six weeks with acoustic transmission occurring intermittently over approximately four weeks.

The project is not expected to have significant adverse effects on marine mammal habitat. The project activities are limited in time and would not modify physical marine mammal habitat. While the activities may cause some fish to leave a specific area ensonified by acoustic transmissions, temporarily impacting marine mammals' foraging opportunities, these fish would likely return to the affected area. As such, the impacts to

marine mammal habitat are not expected to cause significant or long-term negative consequences.

For on-ice activity, serious injury and mortality are not anticipated. Level B harassment could occur but is unlikely due to mitigation measures followed during the exercise. Foot and snowmobile movement on the ice will be designed to avoid pressure ridges, where ringed seals build their lairs; runways will be built in areas without pressure ridges; snowmobiles will follow established routes; and camp buildup is gradual, with activity increasing over the first five days providing seals the opportunity to move to a different lair outside the ice camp area. The Navy will also employ its standard 100-m avoidance distance from any arctic animals. Implementation of these measures should ensure that ringed seal lairs are not crushed or damaged during ICEX20 activities and minimize the potential for seals and pups to abandon lairs and relocate.

The ringed seal pupping season on the ice lasts for five to nine weeks during late winter and spring. Ice camp deployment would begin in mid-February and be completed by March 15, before the pupping season. This will allow ringed seals to avoid the ice camp area once the pupping season begins, thereby reducing potential impacts to nursing mothers and pups. Furthermore, ringed seal mothers are known to physically move pups from the birth lair to an alternate lair to avoid predation. If a ringed seal mother perceives the acoustic transmissions as a threat, the local network of multiple birth and haulout lairs would allow the mother and pup to move to a new lair.

There is an ongoing unusual mortality event (UME) for ice seals, including ringed and bearded seals. Elevated strandings have occurred in the Bering and Chukchi Seas since June 2018. Though elevated numbers of seals have stranded during this UME, this

event does not provide cause for concern regarding population-level impacts, as the population abundance estimates for each of the affected species number in the hundreds of thousands. The study area for ICEX20 activities is in the Beaufort Sea and Arctic Ocean, well north and east of the primary area where seals have stranded along the western coast of Alaska (see map of strandings at:

<https://www.fisheries.noaa.gov/national/marine-life-distress/2018-2019-ice-seal-unusual-mortality-event-alaska>). The location of the ICEX20 activities, combined with the short duration and low-level potential effects on marine mammals, suggest that the planned activities are not expected to contribute to the ongoing UME.

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:

- No serious injury or mortality is anticipated or authorized;
- Impacts will be limited to Level B harassment, primarily in the form of behavioral disturbance;
- Anticipated TTS is only of a low degree, and expected to affect only a limited number of animals;
- The numbers of takes proposed to be authorized are low relative to the estimated abundances of the affected stocks;
- There will be no loss or modification of ringed or bearded seal habitat and minimal, temporary impacts on prey;
- Physical impacts to ringed seal subnivean lairs will be avoided; and

- Mitigation requirements for ice camp activities would minimize impacts to animals during the pupping season.

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 finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Unmitigable Adverse Impact Analysis and Determination

Impacts to subsistence uses of marine mammals resulting from the planned action are not anticipated. The planned action would occur outside of the primary subsistence use season (*i.e.*, summer months), and the study area is 100-150 mi (161-241 km) seaward of known subsistence use areas. Harvest locations for ringed seals extend up to 80 nmi (148 km) from shore during the summer months while winter harvest of ringed seals typically occurs closer to shore. Additionally, no mortality or serious injury is expected or authorized, and therefore no marine mammals would be removed from availability for subsistence. Based on this information, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from the Navy's activities.

National Environmental Policy Act

In compliance with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*), as implemented by the regulations published by the Council on Environmental Quality (CEQ; 40 CFR parts 1500-1508), the Navy prepared a Supplemental Environmental Assessment/Overseas Environmental Assessment (Supplemental EA/OEA) to consider the direct, indirect, and cumulative effects to the

human environment resulting from ICEX20. NMFS provided a link to the Navy's Supplemental EA/OEA (at <http://www.nepa.navy.mil/icex>) for the public to review and comment, concurrently with the publication of the proposed IHA, in relation to its suitability for adoption by NMFS in order to assess the impacts to the human environment of issuance of an IHA to the Navy. Also in compliance with NEPA and the CEQ regulations, as well as NOAA Administrative Order 216-6, NMFS has reviewed the Navy's Supplemental EA/OEA, determined it to be sufficient, and adopted that Supplemental EA/OEA and signed a Finding of No Significant Impact (FONSI) on January 30, 2020.

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 the NMFS Alaska Regional Office (AKR), whenever we propose to authorize take for endangered or threatened species.

There are two marine mammal species (ringed seals and bearded seals) with confirmed presence in the project area that are listed under the ESA. The NMFS Alaska Regional Office Protected Resources Division issued a Biological Opinion on January 27, 2020, which concluded that the Navy's activities and NMFS's issuance of an IHA are not likely to jeopardize the continued existence of the Arctic ringed seal or Beringia DPS bearded seal.

Authorization

As a result of these determinations, NMFS has issued an IHA to the Navy for conducting submarine training and testing activities in the Beaufort Sea and Arctic Ocean beginning in February 2020, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: January 30, 2020.

Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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