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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XF470

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to U.S. Navy 2018 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.

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 United States Department of the Navy (Navy) to incidentally harass, by Level B harassment, marine mammals during Ice Exercise 2018 (ICEX18) activities within the Beaufort Sea and Arctic Ocean north of Prudhoe Bay, Alaska.

The Navy's activities are considered a military readiness activity pursuant to the Marine Mammal Protection Act (MMPA), as amended by the National Defense Authorization Act for Fiscal Year 2004 (NDAA).

DATES: This authorization is applicable from February 1, 2018 through May 1, 2018.

FOR FURTHER INFORMATION CONTACT: Rob Pauline, Office of Protected Resources, NMFS, (301) 427-8408. 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

www.nmfs.noaa.gov/pr/permits/incidental/military.htm. 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.

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, or sheltering (Level B harassment). 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” to read as follows (Section 3(18)(B) of the MMPA): (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 such behavioral patterns are abandoned or significantly altered (Level B Harassment).

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 the proposed action (*i.e.* the issuance of an incidental harassment authorization) with respect to environmental consequences on the human environment.

The Navy has prepared an environmental assessment (EA) titled *Environmental Assessment/Overseas Environmental Assessment for Ice Exercise*. NMFS has adopted the Navy’s EA/OEA, after an independent evaluation of the document found that it included adequate information analyzing the effects on the human environment of issuing incidental take authorizations. NMFS issued a Finding of No Significant Impact (FONSI), which is available for review at <http://www.nmfs.noaa.gov/pr/permits/incidental/military.htm>.

Summary of Request

On April 12, 2017, NMFS received a request from the Navy for the taking of 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 Navy's request is for take of ringed seals (*Pusa hispida hispida*) by Level B harassment. Neither the Navy nor NMFS expects Level A harassment or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Specified Activity

Overview

The Navy proposes to conduct submarine training and testing activities from an ice camp stationed on an ice floe in the Beaufort Sea and Arctic Ocean for six weeks between February and April 2018. Submarine activities associated with ICEX18 are classified, but generally entail safety maneuvers, active sonar use and exercise torpedo use. These maneuvers and sonar use are similar to submarine activities conducted in other undersea environments. They are being conducted in the Arctic to test their performance in a cold environment. A detailed description of the planned project is provided in the *Federal Register* notice for the proposed IHA (82 FR 48683; October 19, 2017). 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 October 19, 2017 (82 FR 48683). That notice describes 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 comments from the Marine Mammal Commission (Commission) and the Office of the Mayor of North Slope Borough (NSB).

Comment 1: The Commission noted that the Navy did not use Bayesian biphasic dose response functions (BRFs) to inform take estimates, but used cut-off distances instead. The Commission stated that the cut-off distances used by the Navy are unsubstantiated and the Navy arbitrarily set a cut-off distance of 10 kilometers (km) which could effectively eliminate a large portion of the estimated numbers of takes. The Commission, therefore, recommended that the Navy refrain from using cut-off distances in conjunction with the Bayesian BRFs.

Response: The derivation of the behavioral response functions and associated cut-off distances is provided in the Phase III technical report (Navy, 2017a). The consideration of proximity (distance cutoff) was part of the criteria developed in consultation with NMFS and was applied within the Navy's acoustic effects model. Distance cutoffs beyond which the potential of significant behavioral responses were considered to be unlikely were used in conducting analysis for ringed seals for ICEX 18.

As stated in the Criteria and Thresholds Technical Report (Navy, 2017a), Southall *et al.* (2007) report that pinnipeds do not exhibit strong reactions to sound pressure levels (SPLs) up to 140 decibels (dB) re 1 micro Pascal (μPa) (which occurs at about 400m from the sources used here) from steady state (non-impulsive) sources. In some cases, pinnipeds tolerate impulsive exposures up to 180 dB re 1 μPa with limited avoidance noted (Southall *et al.*, 2007), and no avoidance noted at distances as close as 42 m (Jacobs & Terhune, 2002). Though there are limited data on pinniped behavioral responses beyond about 3 km in the water, there is evidence that there is a lack of strong reactions at shorter distances. The available data suggest that most

pinnipeds likely do not exhibit significant behavioral reactions to sonar and other transducers beyond a few kilometers, independent of received levels of sound. Further, 160 dB rms, which is used as the behavioral harassment threshold for non-tactical intermittent sonar use, will not be received farther than a couple of hundred meters from the source (140 dB is received at 400m). Therefore, NMFS believes that the 10 km distance cutoff for pinnipeds is both conservative and adequate to evaluate the Level B harassment impacts for military readiness activities.

Comment 2: Although the Office of Naval Research funded seal tagging studies indicate that most ice seals migrate southward at the onset of winter; NSB is aware of traditional ecological knowledge that provides evidence that there are resident ringed and bearded seal populations in the Beaufort Sea.

Response: The Navy reached out to the Inupiat Community of the Arctic Slope (ICAS), Nuiqsut, and Kaktovic communities on September 28, 2017, providing them a CD containing the draft Environmental Assessment/ Overseas Environmental Assessment (EA/OEA) for ICEX 2018 and also sent emails to tribal representatives with an internet link to the document. The Navy was not provided with any information or data pertaining to resident and bearded seal populations in the Beaufort Sea that far offshore in late winter. There was also a public comment period, which ran from September 29 to October 16, 2017. A complete discussion of potential impacts from ICEX 18 is contained in the ICEX 2018 (EA/OEA) (<http://www.aftteis.com/ICEX>). The Navy used the best available science and data to assess potential impacts in the EA/OEA. NMFS also used best available science and data to make their determination regarding the issuance of the IHA. The Navy and NMFS are not aware of other data that would alter their findings.

Furthermore, the Navy is funding Duke University to develop species density models for the Arctic region and would welcome any data the NSB and Arctic research community have available to incorporate into density models and impacts analysis.

Comment 3: NSB expressed concern that potential creation of unseasonal leads due to submarine surfacing, possible destruction of winter lairs of ringed seals during encampment preparation, and use of motorized vehicles during the exercises may impact seals.

Response: As part of the planned ICEX18 activities submarines will surface through the ice. In the area where the submarines will surface, ice leads are a frequent and natural occurrence, opening up and refreezing due to ocean currents and shifting ice. Submarine surfacing will occur in either open leads or first year ice as there is less potential to damage a submarine. While surfacing submarines may create small leads in some instances, each U.S. Navy submarine will surface no more than five times per ICEX. Therefore, potential impacts to seals would be minor and temporary. Furthermore, seal lairs are not expected to occur close to open leads or on first year ice. Additionally, mitigation and monitoring requirements listed in the IHA (*e.g.* no ice camp construction near ice ridges; avoidance of pressure ridges by snowmobiles and researchers) should prevent destruction of lairs and adverse impacts to seals. These issues were also evaluated in the EA/OEA were not found to be not significant.

Comment 4: NSB feels that the lack of available species-specific data (*e.g.* ice seal, arctic fish species, polar bears) precludes assessment of the consequences of sonar use on Arctic protected marine mammal species.

Response: The Navy conducts numerous types of research to better understand how sound may affect marine mammals, and though not specifically Arctic species, the knowledge gained from those studies is transferable to Arctic species. This type of research has focused on

the development of better tags and attachment mechanisms for monitoring, development and testing of new autonomous hardware platforms for detection of marine mammals, and ways to better understand and characterize the behavioral, physiological (hearing and stress response), and potentially population-level consequences of sound exposure on marine life.

The Navy uses the best available science when analyzing the impacts of training and testing on the environment, including animals. To do this the Navy continually reviews published scientific literature, incorporates data from regulatory agencies such as National Oceanic and Atmospheric Administration and U.S. Fish and Wildlife Service, and funds or conducts research where data gaps exist. Furthermore, NMFS utilizes the best available science when making determinations regarding the issuance of IHAs and concluded that there was adequate information available to support the findings.

Comment 5: NSB is concerned that the planned submarine exercises, which will employ sonar, have the potential to negatively impact marine mammals and affect the food chain. As a result, the Inupiaq subsistence life style may also be affected. Therefore, NSB recommends that the Navy initiate engagement with the North Slope leadership and the Arctic research community to develop studies that address the missing information needed for a better understanding of the effects of military sonar use on Arctic marine mammals and their prey.

Response: The Navy's marine species monitoring website provides information on current and past monitoring projects and allows for the submittal of ideas or concepts for projects to be considered under the U.S Navy's Marine Species Monitoring Program at: <https://www.navy-marine-species-monitoring.us/project-submission-form/>. The Navy's Living Marine Resources Program also solicits proposals for funding of research projects (<http://greenfleet.dodlive.mil/environment/lmrproposals/>), as well as the Office of Naval

Research (<https://www.onr.navy.mil/Science-Technology/Departments/Code-32/All-Programs/Atmosphere-Research-322/Marine-Mammals-Biology>). These sites include a list of research projects the Navy is currently funding to improve the Navy's understanding of marine species and how Navy activities may affect those species. These websites offer NSB and the Arctic research community the opportunity to engage with the Navy through the submission of research proposals.

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 seals (*Pusa hispida hispida*), which is the only potentially affected species. Total sea ice coverage is expected across the study area during the study period which precludes the presence of other arctic marine mammal species. Ringed seals temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and therefore we have authorized take after considering the anticipated amount and type of take and making the required findings.

Additional information regarding population trends and threats may be found in NMFS’s Stock Assessment Reports (Muto *et al.*, 2016; www.nmfs.noaa.gov/pr/sars/) and more general information about this species (*e.g.*, physical and behavioral descriptions) may be found on NMFS’s website (www.nmfs.noaa.gov/pr/species/mammals/).

Table 2. 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 Balaenidai						

<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	-/-;N	170,000 (Bering Sea and Sea of Okhotsk only) - 2013)	5,100 (Bearing Sea-U.S. portion only)	1,054
<i>Bearded seal</i>	<i>Erignathus barbatus nauticus</i>	Alaska	-/-;N	299,174 (- ,273,676, 2012) (Bearing Sea- U.S. portion only)	8,210 (Bearing Sea-U.S. portion only)	1.4

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 [explain if this is the case]

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

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

The effects of underwater noise from Navy's testing and training activities have the potential to result in behavioral harassment of marine mammals in the vicinity of the action area.

The *Federal Register* notice for the proposed IHA (82 FR 48683; October 19, 2017) included a discussion of the effects of anthropogenic noise on marine mammals and no new information has

been received since publication of the proposed IHA, therefore that information is not repeated here; please refer to the *Federal Register* notice (82 FR 48683; October 19, 2017) for that information.

Estimated Take

This section provides an estimate of the number of incidental takes anticipated to occur and therefore authorized through this IHA, which will inform the 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 such behavioral patterns are abandoned or significantly altered (Level B Harassment).

Authorized takes would be 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. In addition, no serious injury or mortality is anticipated or authorized for this activity. Source levels of acoustic transmission will not be at levels which would cause serious injury, or mortality. Deployment of the ice camp could potentially affect ringed seal habitat by physically damaging or crushing subnivean lairs, resulting in seal injury or mortality. However, seals usually choose to locate lairs near pressure ridges and the ice camp will be deployed in an area without pressure ridges in order to allow operation of an aircraft runway. Further, portable

tents will be erected for lodging and operations purposes. Tents do not require building materials or typical construction methods. The tents are relatively easy to mobilize and will not be situated near areas featuring pressure ridges. Finally, the camp buildup will be gradual, with activity increasing over the first five days. This approach allows seals to move to different lair locations outside the ice camp area. Based on this information, we do not anticipate any damage to subnivean lairs that could result in ringed seal injury or mortality.

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 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) and the number of days of activities. For the proposed 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 recommends acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to incur PTS of some degree (equated to Level A harassment), TTS, or behavioral harassment (Level B harassment). The thresholds used to predict occurrences of each type of take are described below.

Behavioral harassment – In coordination with NMFS, the Navy developed behavioral harassment thresholds to support Phase III environmental analyses for the Navy’s testing and training military readiness activities; these behavioral harassment thresholds are used here to

evaluate the potential effects of this planned 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 Navy's behavioral response criteria for the Phase III 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 dB re 1 μ Pa @1m; 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 μ Pa for hooded seals, 140-180 dB re 1 μ Pa for gray seals and 125-185 dB re 1 μ Pa for California sea lions; responses occurred at received levels ranging from 125 to 185 dB re 1 μ Pa. However, the means of the response data were between 159 and 170 dB re 1 μ Pa. 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 ten 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. Additional details regarding the Phase III criteria may be found in the technical report, Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (2017a) which may be

found at:

http://afteis.com/Portals/3/docs/newdocs/Criteria%20and%20Thresholds_TR_Submittal_05262017.pdf. This technical report was as part of the Navy's Atlantic Fleet Training and Testing Draft Environmental Impact Statement / Overseas Environmental Impact Statement (EIS/OEIS) (Navy 2017b) which is located at: <http://www.afteis.com/>. NMFS is proposing the use of 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 (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).

These thresholds were developed by compiling and synthesizing 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 NMFS 2016 Technical Guidance, which may be accessed at: <http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>.

The 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 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 3 below provides the weighted criteria and thresholds used in this analysis for estimating quantitative acoustic exposures of marine mammals from the planned action.

Table 3. Injury (PTS) and Disturbance (TTS, Behavioral) Thresholds for Underwater Sounds.

Group	Species	Behavioral Criteria	Physiological Criteria	
			Onset TTS	Onset PTS
Phocid (in water)	Ringed 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 planned action. Inputs to the quantitative analysis included marine mammal density estimates, marine mammal depth occurrence distributions (Navy 2017a), 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 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 animals per km² in the cold season (defined as December through May). 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 planned ice camp action area during the late winter/early springtime period.

Note that while other surveys by Frost *et al.* (2004) and Bengston *et al.* (2005) provided ringed seal density estimates for areas near or within the Beaufort Sea, the Navy felt that those findings were not applicable to the planned action area. Frost *et al.* (2004) only surveyed ringed seals out to 40 km from shore in the Beaufort Sea. A small portion of the surveys from Bengston *et al.* (2005) were out to a maximum extent of 185 km (100 nm) from shore, but the surveys were located within the Chukchi Sea, not the Beaufort Sea. Frost *et al.* (2004) also stated the highest densities of ringed seals were in water depths from 5-25 m (1-1.33 seals per km²). Lower densities were seen in waters greater than 35 m in depth (0-0.77 seals per km²). The planned action area where acoustic transmissions would occur is 3,000 to 4,000 m deep (International Bathymetric Chart of the Arctic Ocean 2015), which makes the bathymetric nature of the areas different enough to be non-comparable. Furthermore, the ice camp is located on multi-year ice and would not be located near the ice edge. Frost *et al.* (2004), and Bengston *et al.* (2005) both

had a high percentage of fast or pack ice in their survey area which would not be present in the planned action area. Additionally, there were areas of cracked ice that were part of the surveys. As previously noted, the ice camp needs to be situated in an area without cracks in the ice. After reviewing both Frost *et al.* (2004) and Bengston *et al.* (2005) NMFS agrees with the Navy that the density data from the RES model provides the most appropriate density values to be assessed for acoustic transmissions during ICEX18.

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 planned active acoustic sources, the sound received by animat (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, animats are distributed non-uniformly based on species-specific density, depth distribution, and group size information and animats record energy received at their location in the water column. A fully three-dimensional environment is used for calculating sound propagation and animat 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:

- Animals 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);
- Animals 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 acoustic effects on marine mammals.

For non-impulsive sources, NAEMO calculates the sound pressure level (SPL) and SEL for each active emission over the entire duration of an event. These data are then processed using a bootstrapping routine to compute the number of animats exposed to SPL and SEL in 1 dB bins across all track iterations and population draws. (Bootstrapping is a type of resampling where large numbers of smaller samples of the same size are repeatedly drawn, with replacement, from a single original sample.) SEL is checked during this process to ensure that all animats are grouped in either an SPL or SEL category. A mean number of SPL and SEL exposures are computed for each 1 dB bin. The mean value is based on the number of animats exposed at that

dB level from each track iteration and population draw. The behavioral risk function curve is applied to each 1 dB bin to compute the number of behaviorally exposed animats per bin. The number of behaviorally exposed animats per bin is summed to produce the total number of behavior exposures.

Mean 1 dB bin SEL exposures are then summed to determine the number of PTS and TTS exposures. PTS exposures represent the cumulative number of animats exposed at or above the PTS threshold. The number of TTS exposures represents the cumulative number of animats exposed at or above the TTS threshold and below the PTS threshold. Animats exposed below the TTS threshold were grouped in the SPL category.

Platforms such as a submarine 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. For analysis purposes, the Navy uses distance cutoffs, which is the maximum distance a Level B take would occur, beyond which the potential for significant behavioral responses is considered unlikely. For animals located beyond the range to effects, no significant behavioral responses are predicted. This is based on the Navy's Phase III environmental analysis (Navy 2017a). The Navy referenced Southall *et al.* (2007) who reported that pinnipeds do not exhibit strong reactions to SPLs up to 140 dB re 1 μ Pa from steady state (non-impulsive) sources. In some cases, pinnipeds tolerate impulsive exposures up to 180 dB re 1 μ Pa with limited avoidance noted (Southall *et al.*, 2007), and no avoidance noted at distances as close as 42 m (Jacobs & Terhune 2002). While limited data exists on pinniped behavioral responses beyond 3 km in the water, the data that is available suggest that most pinnipeds likely do not exhibit significant behavioral reactions to sonar and other transducers beyond a few kilometers, independent of received levels of sound (Navy

2017a). Therefore, in the Navy’s Phase III environmental analysis, the range to effects for pinnipeds is set at 5 km for moderate source level, single platform training and testing events and 10 km for all other events with multiple sonar platforms or sonar with source levels at or exceeding 215 dB re 1 μ Pa @1 m. Regardless of the source level, take beyond 10 km is not anticipated. These ranges are expected to reasonably contain the anticipated effects predicted by the behavioral response dose curve threshold reference above.

For ICEX18 unclassified sources (*i.e.* Autonomous Reverberation Measurement System and MIT/Lincoln Labs continuous wave/chirp), the Navy models calculated a propagation loss measurement of 13.5 km from the source to the 120 dB re 1 μ Pa SPL isopleth; 1.5 km from the source to the 130 dB re 1 μ Pa SPL isopleth; and 400 m from the source to the 140 dB dB re 1 μ Pa SPL isopleth. Propagation loss measurements cannot be provided for classified sources. However, the ranges in Table 4 provide realistic maximum distances over which the specific effects from the use of all active acoustic sources during the planned action would be possible. Based on the information provided, NMFS is confident that the 10km zone safely encompasses the area in which Level B harassment can be expected from all active acoustic sources.

Table 4. Range to Temporary Threshold Shift and Behavioral Effects in the ICEX18 Study Area.

Source/Exercise	Maximum Range to Level B Takes Cold Season (m)	
	Behavioral	TTS
Submarine Exercise	10,000	100
Autonomous Reverberation Measurement System	10,000	<50
Massachusetts Institute of Technology/Lincoln Labs Continuous Wave/chirp	10,000	<50
Naval Research Laboratory Synthetic Aperture Sonar	10,000	90

As discussed above, within NAEMO animats 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 planned action, the implementation of avoidance and mitigation factors were not included in this analysis.

Utilizing the NAEMO model, the Navy projected that there will be 1,665 behavioral Level B harassment takes and an additional 11 Level B takes due to TTS for a total of 1,676 takes of ringed seals. All takes would be underwater. Note that these quantitative results should be regarded as conservative estimates that are strongly influenced by limited marine mammal population data.

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. 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)). 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 adverse 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, we carefully weigh two primary factors:

1) The manner in which, and the degree to which, implementation of the measure(s) is expected to reduce impacts to marine mammal species or stocks, their habitat, and their availability for subsistence uses (where relevant). This analysis will consider such things as the nature of the potential adverse impact (such as likelihood, scope, and range), the likelihood that the measure will be effective if implemented, and the likelihood of successful implementation; and

2) The practicability of the measures for applicant implementation. Practicability of implementation may consider such things as cost, impact on operations, and, in the case of a

military readiness activity, specifically considers personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity (16 U.S.C. 1371(a)(5)(A)(ii)).

Mitigation for Marine Mammals and their Habitat

The following general mitigation actions are planned for ICEX18 to avoid any take of ringed seals on the ice floe:

- Camp deployment would begin in mid-February and would 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 ICEX18. 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;
- Passengers on all on-ice vehicles would observe for marine and terrestrial animals; any marine or terrestrial animal observed on the ice would 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 would 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) would be removed from the ice floe upon completion of ICEX18.

The following mitigation actions are planned for ICEX18 activities involving acoustic transmissions:

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

Based on our evaluation of the applicant's planned measures, NMFS has determined that the planned 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 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 action area. Effective reporting is critical both to compliance as well as to ensuring that the most value is obtained from the required monitoring.

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

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

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 has been created in direct response to Navy permitting requirements established in various MMPA Final Rules, ESA consultations, Biological Opinions, 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. ICEX18 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 ICEX18 activity, the Navy will immediately halt the activity and report the incident consistent with the stranding and reporting protocol in the Atlantic Fleet Training and Testing stranding response plan (Navy 2013). This approach is also consistent with other Navy documents including the Atlantic Fleet Training and Testing Environmental Impact

Statement/Overseas Environmental Impact Statement.

The Navy will provide NMFS with a draft exercise monitoring report within 90 days of the conclusion of the planned activity. The draft exercise monitoring report will include data regarding sonar use and any mammal sightings or detection will be documented. The report will also include information on the number of sonar shutdowns recorded. 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.

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 ICEX18, as outlined previously, have the potential to result in Level B harassment of ringed 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 ringed seals' likely behavioral response. NMFS anticipates that there will be 11 Level B takes due to TTS and 1,665 Level B behavioral harassment takes, for a total of 1,676 ringed seal takes.

Note that there are only 11 Level B takes due to TTS since the TTS range to effects is small at only 100 meters or less while the behavioral effects range is significantly larger extending up to 10 km. 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. Though TTS may occur in up to 11 animals out of a stock of 170,000 animals, the overall fitness of these individuals is unlikely to be affected and negative impacts to the entire stock 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 simply 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 four weeks. The Autonomous Reverberation Measurement System would be active for up to 30 days; the vertical line array would be active for up to four hours per day for no more than eight days, and; the unmanned underwater vehicle used for the deployment of a synthetic aperture source would transmit for 24 hours per day for up to eight days.

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-meter avoidance distance from any arctic animals. Implementation of these measures should ensure that ringed seal lairs are not crushed or damaged during ICEX18 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 haul-out lairs would allow the mother and pup to move to a new lair.

The estimated population of the Alaska stock of ringed seals in the Bering Sea is 170,000 animals (Muto *et al.*, 2016). The estimated population in the Alaska Chukchi and Beaufort Seas is at least 300,000 ringed seals, which is likely an underestimate since the Beaufort Sea surveys

were limited to within 40 km from shore (Kelly *et al.*, 2010). Given these population estimates, only a limited percent of the stock affected would be taken (*i.e.* between 0.98 and 0.56 percent).

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;
- A small percentage (<1 percent) of the Alaska stock of ringed seals would be subject to Level B harassment;
- TTS is expected to affect only a limited number of animals;
- There will be no loss or modification of ringed 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 planned monitoring and mitigation measures, NMFS finds that the total marine mammal take from the planned 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 100-200 nmi seaward of known subsistence use areas. Harvest locations for ringed seals extend up to 80 nmi from shore during the summer months while winter harvest of ringed seals typically occurs closer to shore. Based on this information, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from the Navy's planned activities.

Endangered Species Act (ESA)

Section 7(a)(2) of the ESA of 1973 (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 with our ESA Interagency Cooperation Division whenever we propose to authorize take for endangered or threatened species.

No incidental take of ESA-listed species is authorized or expected to result from this activity. Therefore, NMFS has determined that consultation under section 7 of the ESA is not required for this action.

Authorization

NMFS has issued an IHA to the Navy for the potential harassment of ringed seals incidental to the ICEX18 submarine test and training activities in the Beaufort Sea and Arctic Ocean, provided the previously described mitigation, monitoring and reporting requirements are incorporated.

Dated: February 8, 2018.

Donna S. Wieting,
Director, Office of Protected Resources,
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