2016.[1] On July 31, 2017, the Department received a timely request from Zekelman Industries (the petitioner) to conduct an administrative review of this CVD order.[2] Pursuant to this request and in accordance with section 751(a) of the Tariff Act of 1930, as amended (the Act), on September 13, 2017, the Department published in the **Federal Register** a notice of initiation of an administrative review of the CVD order on CWP covering the period of January 1, 2016, through December 31, 2016, with respect to 20 individually-named companies.[3] No other party requested an administrative review. On September 29, 2017, the petitioner withdrew its request for an administrative review.[4]

Rescission of Administrative Review

Pursuant to 19 CFR 351.213(d)(1), the Secretary will rescind an administrative review, in whole or in part, if a party who requested the review withdraws the request within 90 days of the date of publication of notice of initiation of the requested review. The petitioner timely withdrew its request for an administrative review by the 90-day deadline. No other parties requested an administrative review of the order. Therefore, in accordance with 19 CFR 351.213(d)(1), we are rescinding the administrative review of the CVD order on CWP from the PRC covering the period January 1, 2016, through December 31, 2016.

Assessment

The Department will instruct U.S. Customs and Border Protection (CBP) to assess countervailing duties on all appropriate entries at rates equal to the cash deposit of estimated countervailing duties required at the time of entry, or withdrawal from warehouse, for consumption, in accordance with 19 CFR 351.212(c)(1)(i). The Department intends to issue appropriate assessment instructions to CBP 15 days after publication of this notice in the **Federal Register**.

[1] *See Antidumping or Countervailing Duty Order, Finding, or Suspended Investigation: Opportunity to Request Administrative Review,* 82 FR 30833 (July 3, 2017).

[2] *See* Letter from the petitioner, ''Circular Welded Carbon Quality Steel Pipe from the People's Republic of China: Request for Administrative Review,'' dated July 31, 2017.

[3] *See Initiation of Antidumping and Countervailing Duty Administrative Reviews,* 82 FR 42974 (September 13, 2017).

[4] *See* Letter from the petitioner, ''Circular Welded Carbon Quality Steel Pipe from the People's Republic of China: Withdrawal of Request for Administrative Review,'' dated September 29, 2017.

Notification Regarding Administrative Protection Order

This notice serves as a reminder to parties subject to administrative protective order (APO) of their responsibility concerning the return or destruction of proprietary information disclosed under APO, in accordance with 19 CFR 351.305(a)(3). Timely written notification of the return or destruction of APO materials or the conversion to judicial protective order is hereby requested. Failure to comply with the regulations and the terms of an APO is a sanctionable violation.

This notice is issued and published in accordance with sections 751 of the Act, and 19 CFR 351.213(d)(4).

Dated: October 13, 2017.

Gary Taverman,

Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, performing the non-exclusive functions and duties of the Assistant Secretary for Enforcement and Compliance.

[FR Doc. 2017–22685 Filed 10–18–17; 8:45 am]

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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: Proposed incidental harassment authorization (IHA); request for comments.

SUMMARY: NMFS has received a request from the United States Department of the Navy (Navy) for authorization to take marine mammals incidental to Ice Exercise 2018 (ICEX18) activities proposed within the Beaufort Sea and Arctic Ocean north of Prudhoe Bay, Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorizations and agency responses will be summarized in the final notice of our decision. 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: Comments and information must be received no later than November 20, 2017.

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service. Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910 and electronic comments should be sent to *ITP.Pauline@noaa.gov.*

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted online at *www.nmfs.noaa.gov/pr/permits/incidental/military.htm* without change. All personal identifying information (*e.g.,* name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: 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 our proposed action (*i.e.,* the issuance of an incidental harassment authorization) with respect to environmental consequences on the human environment.

The Navy is currently preparing an environmental assessment (EA) titled *Environmental Assessment/Overseas Environmental Assessment for Ice Exercise.* Once the EA is finalized, NMFS plans to adopt the Navy's EA, provided our independent evaluation of the document finds that it includes adequate information analyzing the effects on the human environment of issuing the IHA.

We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On 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 take or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed 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. Active acoustic transmissions (low, mid, and high-frequency) may result in the occurrence of temporary hearing impairment (temporary threshold shift (TTS)) and behavioral harassment of ringed seals.

Dates and Duration

The proposed action would occur over approximately a six-week period from February through April 2018, including deployment and demobilization of the ice camp. The submarine training and testing activities would occur over approximately four weeks during the six-week period. The proposed IHA would be valid from February 1, 2018 through May 1, 2018.

Specific Geographic Region

The ice camp would be established approximately 100–200 nmi (185–370 kilometers (km)) north of Prudhoe Bay, Alaska. The exact location cannot be identified ahead of time as required conditions (*e.g.,* ice cover) cannot be forecasted until exercises are expected to commence. The vast majority of submarine training and testing would occur near the ice camp. The ice camp action area is comprised of 27,171 square miles (mi^2) or 70,374 square kilometers (km^2) of ice and open water. However, limited submarine training and testing may occur intermittently throughout the deep Arctic Ocean basin near the North Pole, within the total study area of 1,109,858 mi^2 (2,874,520 km^2) as shown in Figure 2–1 in the Application). The ice camp itself will be no more than 1 mi (1.6 km) in diameter and 0.77 mi^2 (2 km^2) in area.

Detailed Description of Specific Activities

ICEX18 includes the deployment of a temporary camp situated on an ice floe. The camp will consist of a series of portable tents. In the past, the Navy would construct temporary wooden structures at ICEX camps, but they no longer do so. A portable tracking range for submarine training and testing would be installed near the ice camp. Eight hydrophones, located on the ice and extending to 30 meters (m) below the ice, would be deployed by drilling holes in the ice and lowering the cable down into the water column. Four hydrophones would be physically connected to the command hut via cables (Figure 1–2 in Application) while the remaining four would transmit data via radio frequencies. Additionally, tracking pingers would be configured aboard each submarine to continuously monitor the location of the submarines. Acoustic communications with the submarines would be used to coordinate the training and testing schedule with the submarines; an underwater telephone would be used as a backup to the acoustic communications.

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.

Submarine training and testing activities generate acoustic transmissions that may impact marine mammals. Some acoustic sources either are above the known hearing range of marine species or have narrow beam widths and short pulse lengths that would not result in effects to marine species. Potential effects from these *de minimis* sources are analyzed qualitatively in accordance with current Navy policy. Navy acoustic sources are categorized into ''bins'' based on frequency, source level, and mode of usage, as previously established by the Navy (Department of the Navy 2015). The acoustic transmissions associated with submarine training fall within bins HF1 (hull-mounted submarine sonars that produce high-frequency (greater than 10 kilohertz (kHz) but less than 200 kHz) signals)), M3 (mid-frequency (1–10 kHz) acoustic modems greater than 190 decibel (dB) re 1micropascal (μPa)), and TORP2 (heavyweight torpedo). As, described below, transmissions are associated with discrete events that may last up to 24 hours. Time between events would not have acoustic transmissions.

Active buoys and moored sources would be used during ICEX18. One active buoy would be the Autonomous Reverberation Measurement System, which would be attached to the bottom of the ice and may be active for up to 30 days of ICEX18. Additionally, a Massachusetts Institute of Technology/Lincoln Lab vertical line array would be deployed through a hole in the ice to a source depth of 150 meters (m). This array would have continuous wave and chirp transmission capability. The continuous wave and chirp transmissions would both be active for no more than 8 days during ICEX18. Over one day of testing (*i.e.,* 24-hour period), he continuous wave source will continuously transmit for 4 hours, the chirp will then transmit for 15 seconds on and 45 seconds off for 4 hours, and the sources will then be silent for 16 hours.

The Naval Research Laboratory would also utilize an unmanned underwater vehicle for the deployment of a synthetic aperture source (SAS), which would transmit for 24 hours per day for up to 4 days. The SAS would be used to make measurements of the acoustic interaction with the ice/water interface. Source parameters, including active sonar transmissions from submarines and torpedoes, are classified. Additional details for the active sources described above can be found in Table 1.

TABLE 1—ACTIVE ACOUSTIC PARAMETERS FOR ICEX18 TRAINING AND TESTING ACTIVITIES

Command or research institution	Source name	Frequency range (kHz)	Source level (dB)	Pulse length (milli-seconds)	Duty cycle (percent)	Source type
U.S. Fleet Forces	Exercise Torpedo	Classified.				
Office of Naval Research	Autonomous Reverberation Measurement System.	3 to 6	200	1,000	1.67	Moored.
Naval Research Laboratory	SAS	Classified				Unmanned Underwater Vehicle (UUV).
Massachusetts Institute of Technology/Lincoln Labs.	Continuous Wave *	0.20 to 1.2	190	continuous	100	Moored.
	Chirp *	0.25 to 1.2	190	15,000	25	Moored.

* Both sources are located on the Massachusetts Institute of Technology/Lincoln Labs deployed vertical line array.

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

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of ringed seals (*Pusa hispida hispida*), which is the only potentially affected species. Other marine mammal species that may occur in the study area include bowhead whales (*Balaena mysticetus*), beluga whales (*Delphinapterus leucas*), and bearded seals (*Erignathus barbatus*). 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 ICEX18 study area during the February through April ICEX18 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 the fall and winter, Bearded seals also move south with the advancing ice edge through the Bering Strait into the Bering Sea where they spend the winter (Muto *et al.* 2016). While these species are often observed in areas of sea ice, they require access to some open water (*e.g.* leads, polynyas) in order to breath. The Navy proposes to establish its ice camp and conduct operations in late winter when the extent and thickness of the Arctic ice pack is peaking. The ice camp will be located on a multi-year ice floe without cracks or leads that can support a runway for aircraft. Only ringed seals are able to create and maintain their own breathing holes and, therefore, may inhabit areas featuring thick multi-year ice. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SAR; *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 Web site (*www.nmfs.noaa.gov/pr/species/mammals/*).

Table 2 lists all of the species that could occur in the project area and summarizes information related to the population or stock, including regulatory status under the MMPA and the Endangered Species Act (ESA) and potential biological removal (PBR). Only the ringed seal, however, is expected to occur in the project area during the time of year when project activities would take place. For taxonomy, we follow Committee on Taxonomy (2016). 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 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.

The marine mammal abundance estimates presented in this document represents 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 comprises that stock. For some species, this geographic area may extend beyond U.S. waters. The managed stocks in this region are assessed in NMFS's U.S. Alaska SARs (Muto *et al.,* 2017). All values presented in Table 2 are the most recent available at the time of publication and are available in the 2016 SARs (Muto *et al.,* 2017) (available online at: *www.nmfs.noaa.gov/pr/sars/*)

The only species that could potentially occur in the proposed survey area is the ringed seal. Total sea ice coverage is expected across the study area during the study period which precludes the presence of other arctic marine mammal species. As described below, ringed seals temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and therefore we have proposed authorizing take.

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						
Bowhead whale	*Balaena mysticetus*	Western Arctic	E/D;Y	16,982 (0.058, 16,091, 2011).	161	44
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Beluga whale	*Delphinapterus leucas*	Beaufort Sea	-/-;N	39,258 (0.229, 32,453, 1992).	649	166
Order Carnivora—Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Ringed seal	*Pusa hispida hispida*	Alaska	-/-;N	170,000 (Bering Sea and Sea of Okhotsk only)—2013).	5,100 (Bearing Sea-U.S. portion only).	1,054
Bearded seal	*Erignathus barbatus nauticus.*	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; N_{min} 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 or proposed for authorization.

Ringed Seal

Ringed seals are found in seasonally and permanently ice-covered waters of the Northern Hemisphere (North Atlantic Marine Mammal Commission 2004). The Alaska stock of ringed seals is found in the study area. Though a reliable population estimate for the entire Alaska stock is not available, research programs have recently developed new survey methods and partial, but useful, abundance estimates. In spring of 2012 and 2013, U.S. and Russian researchers conducted aerial abundance and distribution surveys of the entire Bering Sea and Sea of Okhotsk (Moreland *et al.,* 2013). The data from these image-based surveys are still being analyzed, but Conn *et al.* (2014), using a very limited sub-sample of the data collected from the U.S. portion of the Bering Sea in 2012, calculated an abundance estimate of about 170,000 ringed seals in the U.S. EEZ of the Bering Sea in late April. This estimate does did not account for availability bias, and did not include ringed seals in the shorefast ice zone, which were surveyed using a different method. Thus, the actual number of ringed seals in the U.S. sector of the Bering Sea is likely much higher, perhaps by a factor of two or more. Using data from surveys by Bengtson *et al.* (2005) and Frost *et al.* (2004) in the late 1990s and 2000, Kelly *et al.* (2010) estimated the total population in the Alaska Chukchi and Beaufort seas to be at least 300,000 ringed seals (Muto *et al.,* 2017). This is likely an underestimate since the Beaufort Sea surveys were limited to within 40 km of shore. Current and reliable data on trends in population abundance for the Alaska stock of ringed seals are unavailable. A minimum population estimate (N_{min}) and PBR value are also unavailable. A PBR for only those ringed seals in the U.S. portion of the Bering Sea is 5,100 ringed seals. The total estimated annual level of human-caused mortality and serious injury is 1,062 (Muto *et al.,* 2016). Since the level of human-caused mortality is considerably less than the PBR, the stock is not likely to be declining due to direct human actions (*e.g.* subsistence hunting) and the stock is not listed under the MMPA as strategic. Note, however, that other non-anthropogenic factors (*e.g.* disease, decline is sea ice coverage) may influence overall stock abundance and population trends.

Throughout their range, ringed seals have an affinity for ice-covered waters and are well adapted to occupying both shore-fast and pack ice (Kelly 1988b). Ringed seals can be found further offshore than other pinnipeds since they can maintain breathing holes in ice thickness greater than 2 m (Smith and Stirling 1975). Breathing holes are maintained by ringed seals' sharp teeth and claws on their fore flippers. They remain in contact with ice most of the year and use it as a platform for molting in late spring to early summer, for pupping and nursing in late winter to early spring, and for resting at other times of the year.

Ringed seals have at least two distinct types of subnivean lairs: haul-out lairs and birthing lairs (Smith and Stirling 1975). Haul-out lairs are typically single-chambered and offer protection from predators and cold weather. Birthing lairs are larger, multi-chambered areas that are used for pupping in addition to protection from predators. Ringed seal populations pup on both land-fast ice as well as stable pack ice. Lentfer (1972) found that ringed seals north of Barrow, Alaska (west of the ice camp), build their subnivean lairs on the pack ice near pressure ridges. Since subnivean lairs were found north of Barrow, Alaska, in pack ice, they are also assumed to be found within the sea ice in the ice camp proposed action area. Ringed seals excavate subnivean lairs in drifts over their breathing holes in the ice, in which they rest, give birth, and nurse their pups for 5–9 weeks during late winter and spring (Chapskii 1940; McLaren 1958; Smith and Stirling 1975). Snow depths of at least 50–65 centimeters (cm) are required for functional birth lairs (Kelly 1988a; Lydersen 1998; Lydersen and Gjertz 1986; Smith and Stirling 1975), and such depths typically are found only where 20–30 cm or more of snow has accumulated on flat ice and then drifted along pressure ridges or ice hummocks (Hammill 2008; Lydersen *et al.,* 1990; Lydersen and Ryg 1991; Smith and Lydersen 1991). Ringed seals are born beginning in March, but the majority of births occur in early April. About a month after parturition, mating begins in late April and early May.

In Alaskan waters, during winter and early spring when sea ice is at its maximal extent, ringed seals are abundant in the northern Bering Sea, Norton and Kotzebue Sounds, and throughout the Chukchi and Beaufort Seas (Frost 1985; Kelly 1988b) and, therefore, are found in the study area (Figure 2–1 in Application). Passive acoustic monitoring of ringed seals from a high frequency recording package deployed at a depth of 240 m in the Chukchi Sea 120 km north- northwest of Barrow, Alaska, detected ringed seals in the area between mid- December and late May over the four year study (Jones *et al.,* 2014). With the onset of the fall freeze, ringed seal movements become increasingly restricted and seals will either move west and south with the advancing ice pack with many seals dispersing throughout the Chukchi and Bering Seas, or remain in the Beaufort Sea (Crawford *et al.,* 2012; Frost and Lowry 1984; Harwood *et al.,* 2012). Kelly *et al,* (2010) tracked home ranges for ringed seals in the subnivean period (using shorefast ice); the size of the home ranges varied from less than 1 up to 27.9 km^2; (median is 0.62 km^2 for adult males and 0.65 km^2 for adult females). Most (94 percent) of the home ranges were less than 3 km^2 during the subnivean period (Kelly *et al.,* 2010). Near large polynyas, ringed seals maintain ranges up to 7,000 km^2 during winter and 2,100 km^2 during spring (Born *et al.,* 2004). Some adult ringed seals return to the same small home ranges they occupied during the previous winter (Kelly *et al.,* 2010). The size of winter home ranges can, however, vary by up to a factor of 10 depending on the amount of fast ice; seal movements were more restricted during winters with extensive fast ice, and were much less restricted where fast ice did not form at high levels. Ringed seals may occur within the study area throughout the year and during the proposed action.

In general, ringed seals prey on fish and crustaceans. Ringed seals are known to consume up to 72 different species in their diet; their preferred prey species is the polar cod (Jefferson *et al.,* 2008). Ringed seals also prey upon a variety of other members of the cod family, including Arctic cod (Holst *et al.,* 2001) and saffron cod, with the latter being particularly important during the summer months in Alaskan waters (Lowry *et al.,* 1980). Invertebrate prey seems to become prevalent in the ringed seals diet during the open-water season and often dominates the diet of young animals (Holst *et al.,* 2001; Lowry *et al.,* 1980). Large amphipods (*e.g., Themisto libellula*), krill (*e.g., Thysanoessa inermis*), mysids (*e.g., Mysis oculata*), shrimps *(e.g., Pandalus* spp., *Eualus* spp., *Lebbeus polaris,* and *Crangon septemspinosa*), and cephalopods (*e.g., Gonatus* spp.) are also consumed by ringed seals.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.,* Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans). Subsequently, NMFS (2016) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. The functional groups and the associated frequencies are indicated below (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group):

- Low-frequency cetaceans (mysticetes): Generalized hearing is estimated to occur between approximately 7 Hz and 35 kHz, with best hearing estimated to be from 100 Hz to 8 kHz;
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): Generalized hearing is estimated to occur between approximately 150 Hz and 160 kHz, with best hearing from 10 to less than 100 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera Kogia and Cephalorhynchus; including two members of the genus Lagenorhynchus, on the basis of recent echolocation data and genetic data): Generalized hearing is estimated to occur between approximately 275 Hz and 160 kHz;
- Pinnipeds in water; Phocidae (true seals): Generalized hearing is estimated to occur between approximately 50 Hz to 86 kHz, with best hearing between 1–50 kHz;
- Pinnipeds in water; Otariidae (eared seals): Generalized hearing is estimated to occur between 60 Hz and 39 kHz, with best hearing between 2–48 kHz.

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.,* 2006; Kastelein *et al.,* 2009b; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2016) for a review of available information. As noted previously a single phocid species, ringed seal, has the reasonable potential to co-occur with the proposed survey activities.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The ''Estimated Take by Incidental Harassment'' section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The ''Negligible Impact Analysis and Determination'' section considers the content of this section, the ''Estimated Take by Incidental Harassment'' section, and the ''Proposed Mitigation'' section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

Description of Sound Sources

Here, we first provide background information on marine mammal hearing before discussing the potential effects of the use of active acoustic sources on marine mammals.

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks of a sound wave; lower frequency sounds have longer wavelengths than higher frequency sounds and attenuate (decrease) more rapidly in shallower water. Amplitude is the height of the sound pressure wave or the 'loudness' of a sound and is typically measured using the decibel (dB) scale. A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific standards). It is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure. When referring to sound pressure levels (SPLs; the sound force per unit area), sound is referenced in the context of underwater sound pressure to 1 microPascal (μPa). One pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. The source level (SL) represents the sound level at a distance of 1 m from the source (referenced to 1 μPa). The received level is the sound level at the listener's position. Note that all underwater sound levels in this document are referenced to a pressure of 1 μPa and all airborne sound levels in this document are referenced to a pressure of 20 μPa.

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. RMS is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick 1983). Rms accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond), except in cases where the source is directional. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound. Ambient sound is defined as environmental background sound levels lacking a single source or point (Richardson *et al.,*1995), and the sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.,* waves, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.,* vessels, dredging, aircraft, construction). A number of sources contribute to ambient sound, including the following (Richardson *et al.,* 1995):

- *Wind and waves:* The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient noise for frequencies between 200 Hz and 50 kHz (Mitson, 1995). Under sea ice, noise generated by ice deformation and ice fracturing may be caused by thermal, wind, drift and current stresses (Roth *et al.,* 2012).
- *Precipitation:* Sound from rain and hail impacting the water surface can become an important component of total noise at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. In the ice-covered study area, precipitation is unlikely to impact ambient sound.
- *Biological:* Marine mammals can contribute significantly to ambient noise levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.
- *Anthropogenic:* Sources of ambient noise related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies. Shipping noise typically dominates the total ambient noise for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly (Richardson *et al.,* 1995). Sound from identifiable anthropogenic sources other than the activity of interest (*e.g.,* a passing vessel) is sometimes termed background sound, as opposed to ambient sound. Anthropogenic sources are unlikely to significantly contribute to ambient underwater noise during the late winter and early spring in the study area as most anthropogenic activities will not be active due to ice cover (*e.g.* seismic surveys, shipping) (Roth *et al.,* 2012).

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise ''ambient'' or ''background'' sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10–20 dB from day to day (Richardson *et al.,* 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

Underwater sounds fall into one of two general sound types: Pulsed and non-pulsed (defined in the following paragraphs). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.,* Ward, 1997 in Southall *et al.,* 2007). Please see Southall *et al.,* (2007) for an in-depth discussion of these concepts.

Pulsed sound sources (*e.g.,* explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI 1986; Harris 1998; NIOSH 1998; ISO 2003; ANSI 2005) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features. There are no pulsed sound sources associated with any planned ICEX18 activities.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or non-continuous (ANSI 1995; NIOSH 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.,* rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems such as those planned for use by the U.S. Navy as part of the proposed action. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Modern sonar technology includes a variety of sonar sensor and processing systems. In concept, the simplest active sonar emits sound waves, or ''pings,'' sent out in multiple directions, and the sound waves then reflect off of the target object in multiple directions. The sonar source calculates the time it takes for the reflected sound waves to return; this calculation determines the distance to the target object. More sophisticated active sonar systems emit a ping and then rapidly scan or listen to the sound waves in a specific area. This provides both distance to the target and directional information. Even more advanced sonar systems use multiple receivers to listen to echoes from several directions simultaneously and provide efficient detection of both direction and distance. In general, when sonar is in use, the sonar 'pings' occur at intervals, referred to as a duty cycle, and the signals themselves are very short in duration. For example, sonar that emits a 1-second ping every 10 seconds has a 10 percent duty cycle. The Navy's most powerful hull-mounted mid-frequency sonar source typically emits a 1-second ping every 50 seconds representing a 2 percent duty cycle. The Navy utilizes sonar systems and other acoustic sensors in support of a variety of mission requirements.

Acoustic Impacts

Please refer to the information given previously regarding sound, characteristics of sound types, and metrics used in this document. Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life, from none or minor to potentially severe responses, depending on received levels, duration of exposure, behavioral context, and various other factors. The potential effects of underwater sound from active acoustic sources can potentially result in one or more of the following: temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2004; Nowacek *et al.,* 2007; Southall *et al.,* 2007; Gotz *et al.,* 2009). The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and duration of the sound exposure. In general, sudden, high level sounds can cause hearing loss, as can longer exposures to lower level sounds. Temporary or permanent loss of hearing will occur almost exclusively for noise within an animal's hearing range. In this section, we first describe specific manifestations of acoustic effects before providing discussion specific to the proposed activities in the next section.

Permanent Threshold Shift—Marine mammals exposed to high-intensity sound, or to lower-intensity sound for prolonged periods, can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Finneran 2015). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not fully recoverable, or (TTS, in which case the animal's hearing threshold would recover over time (Southall *et al.,* 2007). Repeated sound exposure that leads to TTS could cause PTS. In severe cases of PTS, there can be total or partial deafness, while in most cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter 1985).

When PTS occurs, there is physical damage to the sound receptors in the ear (*i.e.,* tissue damage), whereas TTS represents primarily tissue fatigue and is reversible (Southall *et al.,* 2007). In addition, other investigators have suggested that TTS is within the normal bounds of physiological variability and tolerance and does not represent physical injury (*e.g.,* Ward, 1997). Therefore, NMFS does not consider TTS to constitute auditory injury.

Relationships between TTS and PTS thresholds have not been studied in marine mammals—PTS data exists only for a single harbor seal (Kastak *et al.,* 2008)—but are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several decibels above (a 40-dB threshold shift approximates PTS onset; *e.g.,* Kryter *et al.,* 1966; Miller, 1974) that inducing mild TTS (a 6-dB threshold shift approximates TTS onset; *e.g.,* Southall *et al.,* 2007). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulse sounds (such as impact pile driving pulses as received close to the source) are at least six dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.,* 2007).

Temporary threshold shift—TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends.

Marine mammal hearing plays a critical role in communication with conspecifics, and interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (*i.e.,* recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious. For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that occurs during a time where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts.

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin (*Tursiops truncatus),* beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*)) and three species of pinnipeds (northern elephant seal (*Mirounga angustirostris*), harbor seal, and California sea lion (*Zalophus californianus*)) exposed to a limited number of sound sources (*i.e.,* mostly tones and octave-band noise) in laboratory settings (Finneran 2015). In general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species. Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. There are no data available on noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al.* (2007), Finneran and Jenkins (2012), and Finneran *et al.* (2015).

Behavioral effects—Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.,* minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.,* species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.,* Richardson *et al.,* 1995; Wartzok *et al.,* 2003; Southall *et al.,* 2007; Weilgart, 2007; Archer *et al.,* 2010). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.,* 2012), and can vary depending on characteristics associated with the sound source (*e.g.,* whether it is moving or stationary, number of sources, distance from the source). Please see Appendices B–C of Southall *et al.* (2007) for a review of studies involving marine mammal behavioral responses to sound.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.,* 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a ''progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial,'' rather than as, more generally, moderation in response to human disturbance (Bejder *et al.,* 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. As noted, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.* 1995; NRC 2003; Wartzok *et al.* 2003). Controlled experiments with captive marine mammals have showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.* 1997; Finneran *et al.* 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic airguns or acoustic harassment devices) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds 2002; see also Richardson *et al.,* 1995; Nowacek *et al.,* 2007).

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.,* Lusseau and Bejder 2007; Weilgart 2007; NRC 2003). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely, and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.,* Frankel and Clark 2000; Costa *et al.,* 2003; Ng and Leung, 2003; Nowacek *et al.,* 2004; Goldbogen *et al.,* 2013). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g.,* foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

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

Variations in respiration naturally vary with different behaviors and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.,* Kastelein *et al.,* 2001, 2005b, 2006; Gailey *et al.,* 2007).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Miller *et al.,* 2000; Fristrup *et al.,* 2003; Foote *et al.,* 2004), while right whales have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al.,* 2007b). In some cases, animals may cease sound production during production of aversive signals (Bowles *et al.,* 1994).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.,* 1995). For example, gray whales are known to change direction—deflecting from customary migratory paths—in order to avoid noise from seismic surveys (Malme *et al.,* 1984). Avoidance may be short-term, with animals returning to the area once the noise has ceased (*e.g.,* Bowles *et al.,* 1994; Goold, 1996; Morton and Symonds, 2002; Gailey *et al.,* 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.,* Blackwell *et al.,* 2004; Bejder *et al.,* 2006).

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

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

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

For non-impulsive sounds (*i.e.,* similar to the sources used during the proposed action), data suggest that exposures of pinnipeds to sources between 90 and 140 dB re 1 μPa do not elicit strong behavioral responses; no data were available for exposures at higher received levels for Southall *et al.* (2007) to include in the severity scale analysis. Reactions of harbor seals were the only available data for which the responses could be ranked on the severity scale. For reactions that were recorded, the majority (17 of 18 individuals/groups) were ranked on the severity scale as a 4 (defined as moderate change in movement, brief shift in group distribution, or moderate change in vocal behavior) or lower; the remaining response was ranked as a 6 (defined as minor or moderate avoidance of the sound source). Additional data on hooded seals (*Cystophora cristata*) indicate avoidance responses to signals above 160–170 dB re 1 μPa (Kvadsheim *et al.,* 2010), and data on grey (*Halichoerus grypus*) and harbor seals indicate avoidance response at received levels of 135–144 dB re 1 μPa (Götz *et al.,* 2010). In each instance where food was available, which provided the seals motivation to remain near the source, habituation to the signals occurred rapidly. In the same study, it was noted that habituation was not apparent in wild seals where no food source was available (Götz *et al.* 2010). This implies that the motivation of the animal is necessary to consider in determining the potential for a reaction. In one study aimed to investigate the under-ice movements and sensory cues associated with under-ice navigation of ice seals, acoustic transmitters (60–69 kHz at 159 dB re 1 μPa at 1 m) were attached to ringed seals (Wartzok *et al.,* 1992a; Wartzok *et al.,* 1992b). An acoustic tracking system then was installed in the ice to receive the acoustic signals and provide real-time tracking of ice seal movements. Although the frequencies used in this study are at the upper limit of ringed seal hearing, the ringed seals appeared unaffected by the acoustic transmissions, as they were able to maintain normal behaviors (*e.g.,* finding breathing holes).

Seals exposed to non-impulsive sources with a received sound pressure level within the range of calculated exposures, (142–193 dB re 1 μPa), 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 sources in the Proposed 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) (Kelly *et al.* 1988).

Adult ringed seals spend up to 20 percent of the time in subnivean lairs during the timeframe of the proposed action (Kelly *et al.,* 2010a). Ringed seal pups spend about 50 percent of their time in the lair during the nursing period (Lydersen and Hammill 1993). Ringed seal lairs are typically used by individual seals (haul-out lairs) or by a mother with a pup (birthing lairs); large lairs used by many seals for hauling out are rare (Smith and Stirling 1975). Although the exact amount of transmission loss of sound traveling through ice and snow is unknown, it is clear that sound attenuation would occur due to the environment itself. Due to the significant attenuation of sound through the water (ice)/air interface, any potential sound entering a lair would be below the behavioral threshold and would not result in take. In-air (*i.e.,* in the subnivean lair), the best hearing sensitivity for ringed seals has been documented between 3 and 5 kHz; at higher frequencies, the hearing threshold rapidly increases (Sills *et al.,* 2015).

If the acoustic transmissions are heard and are perceived as a threat, ringed seals within subnivean lairs could react to the sound in a similar fashion to their reaction to other threats, such as polar bears (*Ursus maritimus*) and Arctic foxes (*Vulpes lagopus*), although the type of sound would be novel to them. Responses of ringed seals to a variety of human-induced noises (*e.g.,* helicopter noise, snowmobiles, dogs, people, and seismic activity) have been variable; some seals entered the water and some seals remained in the lair (Kelly *et al.,* 1988). However, in all instances in which observed seals departed lairs in response to noise disturbance, they subsequently reoccupied the lair (Kelly *et al.,* 1988).

Ringed seal mothers have a strong bond with their pups and may physically move their pups from the birth lair to an alternate lair to avoid predation, sometimes risking their lives to defend their pups from potential predators (Smith 1987). Additionally, it is not unusual to find up to three birth lairs within 100 m of each other, probably made by the same female seal, as well as one or more haul-out lairs in the immediate area (Smith *et al.,* 1991). If a ringed seal mother perceives the acoustic transmissions as a threat, the network of multiple birth and haul-out lairs allows the mother and pup to move to a new lair (Smith and Hammill 1981; Smith and Stirling 1975). However, the acoustic transmissions are unlike the low frequency sounds and vibrations felt from approaching predators. Additionally, the acoustic transmissions are not likely to impede a ringed seal from finding a breathing hole or lair, as captive seals have been found to primarily use vision to locate breathing holes and no effect to ringed seal vision would occur from the acoustic transmissions (Elsner *et al.,* 1989; Wartzok *et al.,* 1992a). It is anticipated that a ringed seal would be able to relocate to a different breathing hole relatively easily without impacting their normal behavior patterns.

Stress responses—An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.,* Seyle 1950; Moberg 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

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

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

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.,* Holberton *et al.,* 1996; Hood *et al.,* 1998; Jessop *et al.,* 2003; Krausman *et al.,* 2004; Lankford *et al.,* 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker, 2000; Romano *et al.,* 2002b) and, more rarely, studied in wild populations (*e.g.,* Romano *et al.,* 2002a). These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as ''distress.'' In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2003).

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

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

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.,* Clark *et al.,* 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.,* Miller *et al.,* 2000; Foote *et al.,* 2004; Parks *et al.,* 2007b; Di Iorio and Clark, 2009; Holt *et al.,* 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al.,* 1995), through amplitude modulation of the signal, or through other compensatory behaviors (Houser and Moore, 2014). Masking can be tested directly in captive species (*e.g.,* Erbe, 2008), but in wild populations it must be either modeled or inferred from evidence of masking compensation. There are few studies addressing real-world masking sounds likely to be experienced by marine mammals in the wild (*e.g.,* Branstetter *et al.,* 2013).

Masking affects both senders and receivers of acoustic signals and can potentially have long-term chronic effects on marine mammals at the population level as well as at the individual level. Low-frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, with most of the increase from distant commercial shipping (Hildebrand 2009). All anthropogenic sound sources, but especially chronic and lower-frequency signals (*e.g.,* from vessel traffic), contribute to elevated ambient sound levels, thus intensifying masking.

Potential Effects of Sonar on Prey—Ringed seals feed on marine invertebrates and fish. Marine invertebrates occur in the world's oceans, from warm shallow waters to cold deep waters, and are the dominant animals in all habitats of the study area. Although most species are found within the benthic zone, marine invertebrates can be found in all zones (sympagic (within the sea ice), pelagic (open ocean), or benthic (bottom dwelling)) of the Beaufort Sea (Josefson *et al.,* 2013). The diverse range of species include oysters, crabs, worms, ghost shrimp, snails, sponges, sea fans, isopods, and stony corals (Chess and Hobson 1997; Dugan *et al.,* 2000; Proctor *et al.,* 1980).

Hearing capabilities of invertebrates are largely unknown (Lovell *et al.,* 2005; Popper and Schilt 2008). Outside of studies conducted to test the sensitivity of invertebrates to vibrations, very little is known on the effects of anthropogenic underwater noise on invertebrates (Edmonds *et al.,* 2016). While data are limited, research suggests that some of the major cephalopods and decapods may have limited hearing capabilities (Hanlon 1987; Offutt 1970), and may hear only low-frequency (less than 1 kHz) sources (Offutt 1970), which is most likely within the frequency band of biological signals (Hill 2009). In a review of crustacean sensitivity of high amplitude underwater noise by Edmonds *et al.* (2016), crustaceans may be able to hear the frequencies at which they produce sound, but it remains unclear which noises are incidentally produced and if there are any negative effects from masking them. Acoustic signals produced by crustaceans range from low frequency rumbles (20–60 Hz) to high frequency signals (20–55 kHz) (Henninger and Watson 2005; Patek and Caldwell 2006; Staaterman *et al.,* 2016). Aquatic invertebrates that can sense local water movements with ciliated cells include cnidarians, flatworms, segmented worms, urochordates (tunicates), mollusks, and arthropods (Budelmann 1992a, 1992b; Popper *et al.,* 2001). Some aquatic invertebrates have specialized organs called statocysts for determination of equilibrium and, in some cases, linear or angular acceleration. Statocysts allow an animal to sense movement and may enable some species, such as cephalopods and crustaceans, to be sensitive to water particle movements associated with sound (Goodall *et al.,* 1990; Hu *et al.,* 2009; Kaifu *et al.,* 2008; Montgomery *et al.,* 2006; Popper *et al.,* 2001; Roberts and Breithaupt 2016; Salmon 1971). Because any acoustic sensory capabilities, if present at all, are limited to detecting water motion, and water particle motion near a sound source falls off rapidly with distance, aquatic invertebrates are probably limited to detecting nearby sound sources rather than sound caused by pressure waves from distant sources.

Studies of sound energy effects on invertebrates are few, and identify only behavioral responses. Non-auditory injury, permanent threshold shift, temporary threshold shift, and masking studies have not been conducted for invertebrates. Both behavioral and auditory brainstem response studies suggest that crustaceans may sense frequencies up to 3 kHz, but best sensitivity is likely below 200 Hz (Goodall *et al.,* 1990; Lovell *et al.,* 2005; Lovell *et al.,* 2006). Most cephalopods likely sense low-frequency sound below 1 kHz, with best sensitivities at lower frequencies (Budelmann 2010; Mooney *et al.,* 2010; Offutt 1970). A few cephalopods may sense higher frequencies up to 1,500 Hz (Hu *et al.,* 2009).

It is expected that most marine invertebrates would not sense the frequencies of the sonar associated with the proposed action. Most marine invertebrates would not be close enough to active sonar systems to potentially experience impacts to sensory structures. Any marine invertebrate capable of sensing sound may alter its behavior if exposed to sonar. Although acoustic transmissions produced during the proposed action may briefly impact individuals, intermittent exposures to sonar are not expected to impact survival, growth, recruitment, or reproduction of widespread marine invertebrate populations.

The fish species located in the study area include those that are closely associated with the deep ocean habitat of the Beaufort Sea. Nearly 250 marine fish species have been described in the Arctic, excluding the larger parts of the sub-Arctic Bering, Barents, and Norwegian Seas (Mecklenburg *et al.,* 2011). However, only about 30 are known to occur in the Arctic waters of the Beaufort Sea (Christiansen and Reist 2013). Largely because of the difficulty of sampling in remote, ice-covered seas, many high-Arctic fish species are known only from rare or geographically patchy records (Mecklenburg *et al.,* 2011). Aquatic systems of the Arctic undergo extended seasonal periods of ice cover and other harsh environmental conditions. Fish inhabiting such systems must be biologically and ecologically adapted to surviving such conditions. Important environmental factors that Arctic fish must contend with include reduced light, seasonal darkness, ice cover, low biodiversity, and low seasonal productivity.

All fish have two sensory systems to detect sound in the water: The inner ear, which functions very much like the inner ear in other vertebrates, and the lateral line, which consists of a series of receptors along the fish's body (Popper and Fay 2010; Popper *et al.,* 2014). The inner ear generally detects relatively higher-frequency sounds, while the lateral line detects water motion at low frequencies (below a few hundred Hz) (Hastings and Popper 2005). Lateral line receptors respond to the relative motion between the body surface and surrounding water; this relative motion, however, only takes place very close to sound sources and most fish are unable to detect this motion at more than one to two body lengths distance away (Popper *et al.,* 2014). Although hearing capability data only exist for fewer than 100 of the 32,000 fish species, current data suggest that most species of fish detect sounds from 50 to 1,000 Hz, with few fish hearing sounds above 4 kHz (Popper 2008). It is believed that most fish have their best hearing sensitivity from 100 to 400 Hz (Popper 2003). Permanent hearing loss has not been documented in fish. A study by Halvorsen *et al.* (2012) found that for temporary hearing loss or similar negative impacts to occur, the noise needed to be within the fish's individual hearing frequency range; external factors, such as developmental history of the fish or environmental factors, may result in differing impacts to sound exposure in fish of the same species. The sensory hair cells of the inner ear in fish can regenerate after they are damaged, unlike in mammals where sensory hair cells loss is permanent (Lombarte *et al.,* 1993; Smith *et al.,* 2006). As a consequence, any hearing loss in fish may be as temporary as the timeframe required to repair or replace the sensory cells that were damaged or destroyed (Smith *et al.,* 2006), and no permanent loss of hearing in fish would result from exposure to sound.

Fish species in the study area are expected to hear the low-frequency sources associated with the proposed action, but most are not expected to detect sounds above this threshold. Only a few fish species are able to detect mid-frequency sonar above 1 kHz and could have behavioral reactions or experience auditory masking during these activities. These effects are expected to be transient and long-term consequences for the population are not expected. Fish with hearing specializations capable of detecting high-frequency sounds are not expected to be within the study area. If hearing specialists were present, they would have to be in close vicinity to the source to experience effects from the acoustic transmission. Human-generated sound could alter the behavior of a fish in a manner that would affect its way of living, such as where it tries to locate food or how well it can locate a potential mate; behavioral responses to loud noise could include a startle response, such as the fish swimming away from the source, the fish ''freezing'' and staying in place, or scattering (Popper 2003). Auditory masking could also interfere with a fish's ability to hear biologically relevant sounds, inhibiting the ability to detect both predators and prey, and impacting schooling, mating, and navigating (Popper 2003). If an individual fish comes into contact with low-frequency acoustic transmissions and is able to perceive the transmissions, they are expected to exhibit short-term behavioral reactions, when initially exposed to acoustic transmissions, which would not significantly alter breeding, foraging, or populations. Overall effects to fish from active sonar sources would be localized, temporary, and infrequent.

Effects to Physical and Foraging Habitat—Unless the sound source is stationary and/or continuous over a long duration in one area, neither of which applies to ICEX18 activities, the effects of the introduction of sound into the environment are generally considered to have a less severe impact on marine mammal habitat compared to any physical alteration of the habitat. Acoustic exposures are not expected to result in long-term physical alteration of the water column or bottom topography as the occurrences are of limited duration and would occur intermittently. Acoustic transmissions also would have no structural impact to subnivean lairs in the ice. Furthermore, since ice dampens acoustic transmissions (Richardson *et al.,* 1995) the level of sound energy that reaches the interior of a subnivean lair will be less than that ensonifying water under surrounding ice.

Non-acoustic Impacts—Deployment of the ice camp could potentially affect ringed seal habitat by physically damaging or crushing subnivean lairs. These non-acoustic impacts could result in ringed 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.

ICEX18 personnel will be actively conducting testing and training operations on the sea ice and will travel around the camp area, including the runway, on snowmobiles. Although the Navy does not anticipate observing any seals on the ice, it is possible that the presence of active humans could behaviorally disturb ringed seals that are in lairs or on the ice. As discussed above, the camp will not be deployed in areas with pressure ridges and seals will have opportunity to move away from disturbances associated with human activity. Furthermore, camp personnel will maintain a 100-meter avoidance distance for all marine mammals on the ice. Based on this information, we do not believe the presence of humans on ice will result in take.

Our preliminary determination of effects to the physical environment includes minimal possible impacts to ringed seals and ringed seal habitat from camp operation or deployment activities. In summary, given the relatively short duration of submarine testing and training activities, relatively small area that would be affected, and lack of physical impacts to habitat, the proposed actions are not likely to have a permanent, adverse effect on populations of prey species or marine mammal habitat. Therefore, any impacts to marine mammal habitat are not expected to cause significant or long-term consequences for individual ringed seals or their populations.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization 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 proposed to be authorized. However, as described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated.

Described in the most basic way, we estimate take by considering: (1) Acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of 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 and MMPA Letter of Authorization renewals for the Navy's testing and training military readiness activities; these behavioral harassment thresholds are being proposed for use here to evaluate the potential effects of this 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 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 μPa @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 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 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% probability of response at 166 dB re 1 μPa. 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://aftteis.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.aftteis.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 proposed 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 proposed 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 proposed 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 km^2 in the cold season (defined as December through May). The density numbers are assumed static throughout the ice camp proposed action area for this species. The density data generated for this species was based on environmental variables known to exist within the proposed 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 proposed 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 km^2). Lower densities were seen in waters greater than 35 m in depth (0–0.77 seals per km^2).The proposed 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 proposed 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 proposed 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 are integral components of NAEMO. In NAEMO, animats are distributed nonuniformly 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 animat within the energy footprint of the event and calculates the number of animats having received levels of energy exposures that fall within defined impact thresholds. Predicted effects on the animats 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 animat 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 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 μPa 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). 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 μPa @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 μPa SPL isopleth; 1.5 km from the source to the 130 dB re 1 μPa SPL isopleth; and 400 m from the source to the 140 dB dB re 1 μPa 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 proposed 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 proposed 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.

Proposed Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to 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 proposed 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, which is well before ringed seal pupping season begins. Pups are weaned and then mating occurs in April and May. 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.
- 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 proposed 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 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 proposed measures, NMFS has preliminarily determined that the proposed mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth, ''requirements pertaining to the monitoring and reporting of such taking.'' The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed 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 proposed 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 behavioral Level B 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, 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 μPa), 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 proposed 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 proposed 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 the area of disturbance, temporarily impacting marine mammals' foraging opportunities, this would encompass a relatively small area of habitat leaving large areas of existing fish and marine mammal foraging habitat unaffected. As such, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

For on-ice activity, neither take nor mortality of seals are expected due to 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.

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 preliminary determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized;
- 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 prey or habitat;
- Physical impacts to ringed seal subnivean lairs will be avoided; and
- Ice camp activities would not affect 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 preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Unmitigable Adverse Impact Analysis and Determination

Impacts to subsistence uses of marine mammals resulting from the proposed action are not anticipated. The proposed 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 preliminarily determined that there will not be an unmitigable adverse impact on subsistence uses from the Navy's proposed 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 proposed for authorization or expected to result from this activity. Therefore, NMFS has determined that formal consultation under section 7 of the ESA is not required for this action.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to the Navy for conducting submarine training and testing provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

1. This Authorization is valid from February 1, 2018 through May 1, 2018.

2. This Authorization is valid only for activities associated with submarine training and testing in the Beaufort Sea and Arctic Ocean.

3. General Conditions.

(a) A copy of this IHA must be in the possession of the Navy, its designees, and work crew personnel operating under the authority of this IHA.

(b) The number of animals and species authorized for taking by Level B harassment is 1,676 ringed seals.

4. Prohibitions.

(a) The taking, by incidental harassment only, is limited to the species and number listed under condition 3(b). The taking by death of these species or the taking by harassment, injury or death of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this Authorization.

5. Mitigation Measures.

The holder of this Authorization is required to implement the following mitigation measures.

(a) Shutdown Measures.

(i) The Navy shall implement shutdown measures if a marine mammal is detected by submarines via passive acoustics during use of active sonar transmissions from submarines and torpedoes.

(ii) The Navy shall not restart acoustic transmissions until after 15 minutes have passed with no marine mammal detections.

(b) The Navy shall avoid on-ice take by implementing the following:

(i) Foot and snowmobile movement shall avoid pressure ridges;

(ii) The ice camp, including runway, shall be built on multi-year ice without pressure ridges;

(iii) Snowmobiles shall follow established routes;

(iv) Camp deployment shall be gradual with activity increasing over the first five days and shall be completed by March 15, 2018.

(vi) Implementation of 100-meter avoidance distance of all marine mammals.

6. Reporting.

The holder of this Authorization is required to:

(a) Submit a draft exercise monitoring report within 90 days of the completion of proposed training and testing activities.

(b) The draft exercise monitoring report will include data regarding sonar use and any marine mammal sightings or detection. It will also include information on the number of sonar-related shutdowns recorded.

(c) 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.

(d) Reporting injured or dead marine mammals:

(i) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury (Level A harassment), serious injury, or mortality, the Navy shall immediately cease the specified activities and report the incident to the Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinator, NMFS. The Navy shall adhere to protocols outlined in the Stranding Response Plan for Atlantic Fleet Training and Testing (AFTT) Study Area (November 2013).

7. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein, or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

Request for Public Comments

We request comment on our analyses, the draft authorization, and any other aspect of this Notice of Proposed IHA for the Navy's proposed ICEX18 training and testing activities. Please include with your comments any supporting data or literature citations to help inform our final decision on the request for MMPA authorization.

Dated: October 13, 2017.

Catherine Marzin,

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

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XF745

Pacific Fishery Management Council; Public Meeting

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

ACTION: Notice of public meeting (webinar).

SUMMARY: The Pacific Fishery Management Council's (Pacific Council) Coastal Pelagic Species Management Team (CPSMT) and Coastal Pelagic Species Advisory Subpanel (CPSAS) will hold a webinar meeting that is open to the public.

DATES: The webinar will be held Tuesday, November 7, 2017, from 1 p.m. to 4 p.m., or until business has been completed.

ADDRESSES: The meeting will be held via webinar. A public listening station is available at the Pacific Council office (address below). To attend the webinar,