calling the Federal Relay Service at 1–800–877–8339 and providing the operator with the toll-free conference call number: 1–800–310–7032 and conference call ID: 2757439.

Members of the public are invited to submit written comments; the comments must be received in the regional office approximately 30 days after each scheduled meeting. Written comments may be mailed to the Eastern Regional Office, U.S. Commission on Civil Rights, 1331 Pennsylvania Avenue, Suite 1150, Washington, DC 20425, or emailed to Evelyn Bohor at *ero@usccr.gov.* Persons who desire additional information may contact the Eastern Regional Office at (202) 376–7533.

Records and documents discussed during the meeting will be available for public viewing as they become available at *https://www.facadatabase.gov/committee/meetings.aspx?cid=272;* click the ''Meeting Details'' and ''Documents'' links. Records generated from this meeting may also be inspected and reproduced at the Eastern Regional Office, as they become available, both before and after the meetings. Persons interested in the work of this advisory committee are advised to go to the Commission's website, *www.usccr.gov,* or to contact the Eastern Regional Office at the above phone number, email or street address.

Agenda: Tuesday, March 6, 2018 at 11:00 a.m.

I. Welcome and Introductions
 Rollcall
II. Planning Meeting
 Project Topic Planning and Discussions
III. Other Business
IV. Open Comment
V. Adjournment

Dated: February 15, 2018.

David Mussatt,

Supervisory Chief, Regional Programs Unit.

[FR Doc. 2018–03550 Filed 2–21–18; 8:45 am]

BILLING CODE P

DEPARTMENT OF COMMERCE

International Trade Administration

[A–351–852, A–560–832, A–580–896, A–535–905, and A–583–862]

Polyethylene Terephthalate Resin From Brazil, Indonesia, the Republic of Korea, Pakistan, and Taiwan: Postponement of Preliminary Determinations of Antidumping Duty Investigations

AGENCY: Enforcement and Compliance, International Trade Administration, Department of Commerce.

DATES: Applicable February 22, 2018.

FOR FURTHER INFORMATION CONTACT: Kathryn Wallace (Brazil) at (202) 482–6251, Caitlin Monks (Indonesia) at (202) 482–2670, Sean Carey (Republic of Korea) at (202) 482–3964, Lauren Caserta (Pakistan) at (202) 482–4737, Alex Cipolla at (202) 482–4956 (Taiwan), AD/CVD Operations, Enforcement and Compliance, International Trade Administration, U.S. Department of Commerce, 1401 Constitution Avenue NW, Washington, DC 20230.

SUPPLEMENTARY INFORMATION:

Background

On October 23, 2017, the Department of Commerce (Commerce) initiated antidumping duty (AD) investigations on polyethylene terephthalate resin from Brazil, Indonesia, the Republic of Korea, Pakistan, and Taiwan.[1] Commerce exercised its discretion to toll all deadlines affected by the closure of the Federal Government from January 20 through 22, 2018. If the new deadline falls on a non-business day, in accordance with Commerce's practice, the deadline will become the next business day. Accordingly, the current deadline for the preliminary determinations of these investigations is March 8, 2018.

Postponement of Preliminary Determinations

Section 733(b)(1)(A) of the Tariff Act of 1930, as amended (the Act), requires Commerce to issue the preliminary determination in an AD investigation within 140 days after the date on which Commerce initiated the investigation. However, section 733(c)(1)(A) of the Act and 19 CFR 351.205(e) allow Commerce to postpone the preliminary determination at the request of the petitioner.

On January 29, 2018, the petitioners[2] submitted a timely request pursuant to 19 CFR 351.205(e) to postpone the preliminary determinations.[3] They noted that Commerce is still gathering data and questionnaire responses from the foreign producers in these investigations and additional time is necessary for Commerce and interested parties to fully and properly analyze all questionnaire response.[4] For these reasons, and because there are no compelling reasons to deny the request, Commerce, in accordance with section 733(c)(1)(A) of the Act and 19 CFR 351.205(e), is postponing the deadline for the preliminary determinations to no later than 190 days after the day on which the investigations were initiated. Accordingly, Commerce will issue the preliminary determinations no later than April 27, 2018, a date that has been adjusted for the period of the closure of the Federal Government. In accordance with section 735(a)(1) of the Act and 19 CFR 351.210(b)(1), the deadline for the final determinations of these investigations will continue to be 75 days after the date of the preliminary determinations, unless postponed.

This notice is issued and published pursuant to section 733(c)(2) of the Act and 19 CFR 351.205(f)(1).

Dated: February 16, 2018.

Christian Marsh,

Deputy Assistant Secretary for Enforcement and Compliance.

[FR Doc. 2018–03670 Filed 2–21–18; 8:45 am]

BILLING CODE 3510–DS–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XF850

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental To Site Characterization Surveys Off of New York

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

[1] *See Polyethylene Terephthalate Resin from Brazil, Indonesia, the Republic of Korea, Pakistan, and Taiwan: Initiation of Less-Than-Fair-Value Investigations,* 82 FR 48977 (October 23, 2017).

[2] The petitioners for Brazil, Pakistan, Korea, and Taiwan are DAK Americas LLC, Indorama Ventures USA Inc., M&G Polymers USA LLC, and Nan Ya Plastics Corporation America. The petitioners for Indonesia are DAK Americas LLC, M&G Polymers USA LLC, and Nan Ya Plastics Corporation America.

[3] *See* letter from the petitioners, ''Polyethylene Terephthalate Resin from Brazil, Indonesia, the Republic of Korea, Pakistan and Taiwan—Petitioners' Request to Postpone the Preliminary Determinations,'' dated January 29, 2018.

[4] *Id.* At 2.

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received a request from Statoil Wind U.S. LLC (Statoil) for authorization to take marine mammals incidental to marine site characterization surveys off the coast of New York as part of the Empire Wind Project in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS–A 0512) (Lease Area) and coastal waters where one or more cable route corridors will be established. 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.

DATES: Comments and information must be received no later than March 26, 2018.

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.carduner@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/energy_other.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: Jordan Carduner, Office of Protected Resources, NMFS, (301) 427–8401. Electronic copies of the applications and supporting documents, as well as a list of the references cited in this document, may be obtained by visiting the internet at: *www.nmfs.noaa.gov/pr/permits/incidental/energy_other.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, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as: Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

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 potential impacts on the human environment.

Accordingly, NMFS is preparing an Environmental Assessment (EA) to consider the environmental impacts associated with the issuance of the proposed 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 November 9, 2017, NMFS received a request from Statoil for an IHA to take marine mammals incidental to marine site characterization surveys off the coast of New York as part of the Empire Wind Project in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS–A 0512) and coastal waters where one or more cable route corridors will be established. A revised application was received on January 8, 2018. NMFS deemed that request to be adequate and complete. Statoil's request is for take of 11 marine mammal species by Level B harassment. Neither Statoil nor NMFS expects serious injury or mortality to result from this activity and the activity is expected to last no more than one year, therefore, an IHA is appropriate.

Description of the Proposed Activity

Overview

Statoil proposes to conduct marine site characterization surveys including high-resolution geophysical (HRG) and geotechnical surveys in the marine environment of the approximately 79,350-acre Lease Area located approximately 11.5 nautical miles (nm) from Jones Beach, New York (see Figure 1 in the IHA application). Additionally, one or more cable route corridors will be established between the Lease Area and New York, identified as the Cable Route Area (see Figure 1 in the IHA application). See the IHA application for further information. Cable route corridors are anticipated to be 152 meters (m, 500 feet (ft)) wide and may have an overall length of as much as 135 nm. For the purpose of this IHA, the survey area is designated as the Lease Area and cable route corridors that will be established in advance of conducting the HRG survey activity. Water depths across the Lease Area range from approximately 22 to 41 m (72 to 135 ft) while the cable route corridors will extend to shallow water areas near landfall locations. Surveys would occur from approximately March 2018 through July 2018.

The purpose of the marine site characterization surveys are to support the siting, design, and deployment of up to three meteorological data buoy deployment areas and to obtain a baseline assessment of seabed/sub-surface soil conditions in the Lease Area and cable route corridors to support the siting of the proposed wind farm. Underwater sound resulting from Statoil's proposed site characterization surveys have the potential to result in incidental take of marine mammals in the form of behavioral harassment.

Dates and Duration

Surveys will last for approximately 20 weeks and are anticipated to commence upon issuance of the requested IHA, if appropriate. This schedule is based on 24-hour operations and includes potential down time due to inclement weather. Based on 24-hour operations, the estimated duration of the HRG survey activities would be approximately 142 days (including estimated weather down time).

Specific Geographic Region

Statoil's survey activities will occur in the approximately 79,350-acre Lease Area located approximately 11.5 nm from Jones Beach, New York (see Figure 1 in the IHA application). Additionally, one or more cable route corridors would be surveyed between the Lease Area and New York. Cable route corridors are anticipated to be 152 meters (m, 500 ft) wide and may have an overall length of as much as 135 nm.

Detailed Description of the Specified Activities

Statoil's proposed marine site characterization surveys include HRG and geotechnical survey activities. These activities are described below.

HRG Survey Activities

The HRG survey activities proposed by Statoil would include the following:

- Depth sounding (multibeam echosounder) to determine site bathymetry and elevations;
- Magnetic intensity measurements for detecting local variations in regional magnetic field from geological strata and potential ferrous objects on and below the bottom;
- Seafloor imaging (sidescan sonar survey) for seabed sediment classification purposes, to identify natural and man-made acoustic targets resting on the bottom as well as any anomalous features;
- Shallow penetration sub-bottom profiler (pinger/chirp) to map the near surface stratigraphy (top 0 to 5 m (0 to 16 ft) of soils below seabed);
- Medium penetration sub-bottom profiler (sparker) to map deeper subsurface stratigraphy as needed (soils down to 75 to 100 m (246 to 328 ft) below seabed); and
- Ultra short baseline positioning system (USBL) for position referencing for the dynamic positioning (DP) vessel.

Table 1 identifies the representative survey equipment that may be used in support of planned HRG survey activities. The make and model of the listed HRG equipment will vary depending on availability but will be finalized as part of the survey preparations and contract negotiations with the survey contractor. The final selection of the survey equipment will be confirmed prior to the start of the HRG survey program. Any survey equipment selected would have characteristics similar to the systems described below, if different.

HRG system	Representative HRG survey equipment	Operating frequencies	RMS source level [1]	Peak source level [1]	Pulse duration (millisec)
Subsea Positioning/USBL	Sonardyne Ranger 2 USBL[2]	35–50kHz	188 dB_{rms}	200 dB_{Peak}	1.
Sidescan Sonar	Klein 3900 Sidescan Sonar	445/900 kHz	220 dB_{rms}	226 dB_{Peak}	0.0016 to 0.1.
Shallow penetration sub-bottom profiler	EdgeTech 512i	0.4 to 12 kHz	179 dB_{rms}	186 dB_{Peak}	1.8 to 65.8.
Medium penetration sub-bottom profiler	SIG ELC 820 Sparker	0.9 to 1.4 kHz	206 dB_{rms}	215 dB_{Peak}	0.8.
Multibeam Echo Sounder	Reson T20–P	200/300/400 kHz	221 dB_{rms}	227 dB_{Peak}	2 to 6.

[1] All source levels are measured at 1 m and are from Crocker and Fratantonio (2016) except those for the Sonardyne Ranger 2 USBL which are based on manufacturer specifications (as source levels for the Sonardyne Ranger 2 USBL are not listed in Crocker and Fratantonio (2016)).

The HRG survey activities would be supported by a vessel approximately 30 to 55 m (98 to 180 ft) in length and capable of maintaining course and a survey speed of approximately 4 nm per hour (7.4 kilometers per hour (km/hr)) while transiting survey lines. Surveys would be conducted along tracklines spaced 30 m (98 ft) apart, with tie-lines spaced every 500 m (1640 ft). The multichannel array sub-bottom profiler would be operated on 150-m (492-ft) spaced primary lines, while the single channel array sub-bottom profiler would be operated on 30-m (98-ft) line spacing to meet Bureau of Ocean Energy Management (BOEM) requirements as set out in BOEM's *Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to Archeological and Historic Property Information to 30 CFR part 585.*

To minimize cost, the duration of survey activities, and the period of potential impact on marine species while surveying, Statoil has proposed that HRG survey operations would be conducted continuously 24 hours per day. Based on 24-hour operations, the estimated duration of the HRG survey activities would be approximately 142 days (including estimated weather down time) including 123 survey days in the Lease Area and 19 survey days in the cable route corridors.

The deployment of HRG survey equipment, including the equipment planned for use during Statoil's planned activity, produces sound in the marine environment that has the potential to result in harassment of marine mammals. Based on the frequency ranges of the potential equipment planned to be used in support of HRG survey activities (Table 1) the ultra-short baseline (USBL) positioning system and the sub-bottom profilers (shallow and medium penetration) operate within functional marine mammal hearing ranges and have the potential to result in harassment of marine mammals.

Geotechnical Survey Activities

Statoil's proposed geotechnical survey activities would include the following:

- Vibracores would be taken to determine the geological and geotechnical characteristics of the sediments; and
- Cone Penetration Testing (CPT) would be performed to determine stratigraphy and in-situ conditions of the sediments.

Statoil's proposed geotechnical survey activities would begin no earlier than March 2018 and would last up to 30 days. It is anticipated that geotechnical surveys would entail sampling of vibracores and CPT. A sample would be taken approximately every one kilometer (km) along the selected cable route, alternating between CPTs and vibracores, such that intervals for each vibracore and CPT location would be approximately 2 km. Precise cable routes were not known at the time the IHA application was submitted. As many as three cable routes may be identified for geotechnical sampling, with cable routes likely to range in length from 20 km to 65 km. Assuming a maximum, minimum, and median route length for the three potential cable corridors, the total length of survey corridor would be approximately 128 km. Therefore it is anticipated that approximately 128 locations would be sampled (approximately one sample taken per km), located equidistant between the lease area and the New York shoreline (as depicted in Figure 1 of the IHA Application as the Cable Route Area). The duration of each sampling event would take approximately 2–4 hours and geotechnical survey activities would occur 24 hours per day during the survey. Statoil anticipates a production rate of approximately 5 samples per day.

In considering whether marine mammal harassment is an expected outcome of exposure to a particular activity or sound source, NMFS considers both the nature of the exposure itself (*e.g.,* the magnitude, frequency, or duration of exposure) and the conditions specific to the geographic area where the activity is expected to occur (*i.e.,* whether the activity is planned in a foraging area, breeding area, nursery or pupping area, or other biologically important area for the species). We then consider the expected response of the exposed animal and whether the nature and duration or intensity of that response is expected to cause disruption of behavioral patterns (*e.g.,* migration, breathing, nursing, breeding, feeding, or sheltering) or injury.

Geotechnical survey activities would be conducted from a drill ship equipped with DP thrusters. DP thrusters would be used to position the sampling vessel on station and maintain position at each sampling location during the sampling activity. A ship has not yet been assigned to conduct the survey, but Statoil anticipates that survey activities would likely be conducted from a typical offshore sampling vessel, ranging from 250ft to 350ft (76 m to 107 m). Sound produced through use of DP thrusters is similar to that produced by transiting vessels and DP thrusters are typically operated in a similarly predictable manner. NMFS does not believe acoustic impacts from DP thrusters are likely to result in take of marine mammals in the absence of activity- or location-specific circumstances that may otherwise represent specific concerns for marine mammals (*i.e.,* activities proposed in area known to be of particular importance for a particular species), or associated activities that may increase the potential to result in take when in concert with DP thrusters, largely due to the low likelihood of marine mammal behavioral response to DP thrusters that would rise to the level of a take (versus less consequential behavioral reactions). In this case, we are not aware of any such circumstances. Monitoring of past projects that entailed use of DP thrusters has shown a lack of observed marine mammal responses as a result of exposure to sound from DP thrusters. Therefore, NMFS believes the likelihood of DP thrusters used during the proposed geotechnical surveys resulting in harassment of marine mammals to be so low as to be discountable. As DP thrusters are not expected to result in take of marine mammals, these activities are not analyzed further in this document.

Vibracoring entails driving a hydraulic or electric pulsating head through a hollow tube into the seafloor to recover a stratified representation of the sediment. The vibracoring process is short in duration and is performed from a dynamic positioning vessel. The vessel would use DP thrusters to maintain the vessel's position while the vibracore sample is taken, as described above. The vibracoring process would always be performed in concert with DP thrusters, and DP thrusters would begin operating prior to the activation of the vibracore to maintain the vessel's position; thus, we expect that any marine mammals in the project area would detect the presence and noise associated with the vessel and the DP thrusters prior to commencement of vibracoring. Any reaction by marine mammals would be expected to be similar to reactions to the concurrent vessel noise, which are expected to be minor and short term. In this case, vibracoring is not planned in any areas of particular biological significance for any marine mammals. Thus while a marine mammal may perceive noise from vibracoring and may respond briefly, we believe the potential for this response to rise to the level of take to be so low as to be discountable, based on the short duration of the activity and the fact that marine mammals would be expected to react to the vessel and DP thrusters before vibracoring commences, potentially through brief avoidance. In addition, the fact that the geographic area is not biologically important for any marine mammal species means that such reactions are not likely to carry any meaningful significance for the animals.

Field studies conducted off the coast of Virginia to determine the underwater noise produced by CPTs found that these activities did not result in underwater noise levels that exceeded current thresholds for Level B harassment of marine mammals (Kalapinski, 2015). Given the small size and energy footprint of CPTs, NMFS believes the likelihood that noise from these activities would exceed the Level B harassment threshold at any appreciable distance is so low as to be discountable. Therefore, geotechnical survey activities, including CPT and vibracores, are not expected to result in harassment of marine mammals and are not analyzed further in this document.

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 Activity

Sections 3 and 4 of Statoil's IHA application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. 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 these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS's website (*www.nmfs.noaa.gov/pr/species/mammals/*).

Table 2 lists all species with expected potential for occurrence in the survey area and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2017). 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 is included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS'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. All managed stocks in this region are assessed in NMFS's U.S. 2017 draft SARs (*e.g.*, Hayes *et al.*, 2018). All values presented in Table 2 are the most recent available at the time of publication and are available in the 2017 draft SARs (Hayes *et al.*, 2018).

TABLE 2—MARINE MAMMALS KNOWN TO OCCUR IN THE SURVEY AREA

Common name	Stock	NMFS MMPA and ESA status; strategic (Y/N) [1]	Stock Abundance (CV,N_{min}, most recent abundance survey) [2]	PBR [3]	Occurrence and seasonality in the NW Atlantic OCS
Toothed whales (Odontoceti)					
Atlantic white-sided dolphin (*Lagenorhynchus acutus*).	W. North Atlantic	-; N	48,819 (0.61; 30,403; n/a)	304	rare.
Atlantic spotted dolphin (*Stenella frontalis*)	W. North Atlantic	-; N	44,715 (0.43; 31,610; n/a)	316	rare.
Bottlenose dolphin (*Tursiops truncatus*)	W. North Atlantic, Offshore	-; N	77,532 (0.40; 56,053; 2011)	561	Common year round.
Clymene dolphin (*Stenella clymene*)	W. North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.
Pantropical Spotted dolphin (*Stenella attenuata*).	W. North Atlantic	-; N	3,333 (0.91; 1,733; n/a)	17	rare.
Risso's dolphin (*Grampus griseus*)	W. North Atlantic	-; N	18,250 (0.46; 12,619; n/a)	126	rare.
Short-beaked common dolphin (*Delphinus delphis*).	W. North Atlantic	-; N	70,184 (0.28; 55,690; 2011)	557	Common year round.
Striped dolphin (*Stenella coeruleoalba*)	W. North Atlantic	-; N	54,807 (0.3; 42,804; n/a)	428	rare.
Spinner Dolphin (*Stenella longirostris*)	W. North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.
White-beaked dolphin (*Lagenorhynchus albirostris*).	W. North Atlantic	-; N	2,003 (0.94; 1,023; n/a)	10	rare.
Harbor porpoise (*Phocoena phocoena*)	Gulf of Maine/Bay of Fundy	-; N	79,833 (0.32; 61,415; 2011)	706	Common year round.
Killer whale (*Orcinus orca*)	W. North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.
False killer whale (*Pseudorca crassidens*)	W. North Atlantic	-; Y	442 (1.06; 212; n/a)	2.1	rare.
Long-finned pilot whale (*Globicephala melas*)	W. North Atlantic	-; Y	5,636 (0.63; 3,464; n/a)	35	rare.
Short-finned pilot whale (*Globicephala macrorhynchus*).	W. North Atlantic	-; Y	21,515 (0.37; 15,913; n/a)	159	rare.
Sperm whale (*Physeter macrocephalus*)	North Atlantic	E; Y	2,288 (0.28; 1,815; n/a)	3.6	Year round in continental shelf and slope waters, occur seasonally to forage.
Pygmy sperm whale [4] (*Kogia breviceps*)	W. North Atlantic	-; N	3,785 (0.47; 2,598; n/a)	26	rare.
Dwarf sperm whale [4] (*Kogia sima*)	W. North Atlantic	-; N	3,785 (0.47; 2,598; n/a)	26	rare.
Cuvier's beaked whale (*Ziphius cavirostris*)	W. North Atlantic	-; N	6,532 (0.32; 5,021; n/a)	50	rare.
Blainville's beaked whale [5] (*Mesoplodon densirostris*).	W. North Atlantic	-; N	7,092 (0.54; 4,632; n/a)	46	rare.
Gervais' beaked whale [5] (*Mesoplodon europaeus*).	W. North Atlantic	-; N	7,092 (0.54; 4,632; n/a)	46	rare.
True's beaked whale [5] (*Mesoplodon mirus*)	W. North Atlantic	-; N	7,092 (0.54; 4,632; n/a)	46	rare.
Sowerby's Beaked Whale [5] (*Mesoplodon bidens*).	W. North Atlantic	-; N	7,092 (0.54; 4,632; n/a)	46	rare.
Rough-toothed dolphin (*Steno bredanensis*)	W. North Atlantic	-; N	271 (1.0; 134; 2013)	1.3	rare.
Melon-headed whale (*Peponocephala electra*)	W. North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.
Northern bottlenose whale (*Hyperoodon ampullatus*).	W. North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.
Pygmy killer whale (*Feresa attenuata*)	W. North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.
Baleen whales (Mysticeti)					
Minke whale (*Balaenoptera acutorostrata*)	Canadian East Coast	-; N	2,591 (0.81; 1,425; n/a)	162	Year round in continental shelf and slope waters, occur seasonally to forage.
Blue whale (*Balaenoptera musculus*)	W. North Atlantic	E; Y	Unknown (unk; 440; n/a)	0.9	Year round in continental shelf and slope waters, occur seasonally to forage.
Fin whale (*Balaenoptera physalus*)	W. North Atlantic	E; Y	1,618 (0.33; 1,234; n/a)	2.5	Year round in continental shelf and slope waters, occur seasonally to forage.
Humpback whale (*Megaptera novaeangliae*)	Gulf of Maine	-; N	823 (0; 823; n/a)	2.7	Common year round.
North Atlantic right whale (*Eubalaena glacialis*)	W. North Atlantic	E; Y	458 (0; 455; n/a)	1.4	Year round in continental shelf and slope waters, occur seasonally to forage.
Sei whale (*Balaenoptera borealis*)	Nova Scotia	E; Y	357 (0.52; 236; n/a)	0.5	Year round in continental shelf and slope waters, occur seasonally to forage.
Earless seals (Phocidae)					
Gray seal [6] (*Halichoerus grypus*)	W. North Atlantic	-; N	27,131 (0.10; 25,908; n/a)	1,554	Unlikely.
Harbor seal (*Phoca vitulina*)	W. North Atlantic	-; N	75,834 (0.15; 66,884; 2012)	2,006	Common year round.
Hooded seal (*Cystophora cristata*)	W. North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.

TABLE 2—MARINE MAMMALS KNOWN TO OCCUR IN THE SURVEY AREA—Continued

Common name	Stock	NMFS MMPA and ESA status; strategic (Y/N) [1]	Stock Abundance (CV,N_{min}, most recent abundance survey) [2]	PBR [3]	Occurrence and seasonality in the NW Atlantic OCS
Harp seal (*Phoca groenlandica*)	North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.

[1] 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 (see footnote 3) 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] CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable. For certain stocks, abundance estimates are actual counts of animals and there is no associated CV. The most recent abundance survey that is reflected in the abundance estimate is presented; there may be more recent surveys that have not yet been incorporated into the estimate. All values presented here are from the 2016 Atlantic SARs.
[3] Potential biological removal, 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 size (OSP).
[4] Abundance estimate includes both dwarf and pygmy sperm whales.
[5] Abundance estimate includes all species of *Mesoplodon* in the Atlantic.
[6] Abundance estimate applies to U.S. population only, actual abundance is believed to be much larger.

All species that could potentially occur in the proposed survey areas are included in Table 2. However, the temporal and/or spatial occurrence of 26 of the 37 species listed in Table 2 is such that take of these species is not expected to occur, and they are not discussed further beyond the explanation provided here. Take of these species is not anticipated either because they have very low densities in the project area, are known to occur further offshore than the project area, or are considered very unlikely to occur in the project area during the proposed survey due to the species' seasonal occurrence in the area.

Three marine mammal species are listed under the Endangered Species Act (ESA) and are known to be present, at least seasonally, in the survey area and are included in the take request: North Atlantic right whale, fin whale, and sperm whale.

Below is a description of the species that are both common in the survey area southeast of New York and that have the highest likelihood of occurring, at least seasonally, in the survey area and are thus are expected to be potentially be taken by the proposed activities. For the majority of species potentially present in the specific geographic region, NMFS has designated only a single generic stock (*e.g.,* ''western North Atlantic'') for management purposes. This includes the ''Canadian east coast'' stock of minke whales, which includes all minke whales found in U.S. waters. For humpback and sei whales, NMFS defines stocks on the basis of feeding locations, *i.e.,* Gulf of Maine and Nova Scotia, respectively. However, our reference to humpback whales and sei whales in this document refers to any individuals of the species that are found in the specific geographic region.

North Atlantic Right Whale

The North Atlantic right whale ranges from the calving grounds in the southeastern United States to feeding grounds in New England waters and into Canadian waters (Waring *et al.,* 2016). Surveys have demonstrated the existence of seven areas where North Atlantic right whales congregate seasonally, including Georges Bank, Cape Cod, and Massachusetts Bay (Waring *et al.,* 2016). In the late fall months (*e.g.*, October), right whales generally disappear from the feeding grounds in the North Atlantic and move south to their breeding grounds. The proposed survey area is within the North Atlantic right whale migratory corridor. During the proposed survey (*i.e.,* March through August) right whales may be migrating through the proposed survey area and the surrounding waters.

The western North Atlantic population demonstrated overall growth of 2.8 percent per year between 1990 to 2010, despite a decline in 1993 and no growth between 1997 and 2000 (Pace *et al.* 2017). However, since 2010 the population has been in decline, with a 99.99 percent probability of a decline of just under 1 percent per year (Pace *et al.* 2017). Between 1990 and 2015, calving rates varied substantially, with low calving rates coinciding with all three periods of decline or no growth (Pace *et al.* 2017). On average, North Atlantic right whale calving rates are estimated to be roughly half that of southern right whales (*Eubalaena australis*) (Pace *et al.* 2017), which are increasing in abundance (NMFS 2015).

The current abundance estimate for this stock is 458 individuals (Hayes *et al.,* 2018). Data indicates that the number of adult females fell from 200 in 2010 to 186 in 2015 while males fell from 283 to 272 in the same timeframe (Pace *et al.,* 2017). In addition, elevated North Atlantic right whale mortalities have occurred since June 7, 2017. A total of 17 confirmed dead stranded whales (12 in Canada; 5 in the United States), with an additional 5 live whale entanglements in Canada, have been documented to date. This event has been declared an Unusual Mortality Event (UME). More information is available online at: *http://www.nmfs.noaa.gov/pr/health/mmume/2017northatlanticrightwhaleume.html.*

Humpback Whale

Humpback whales are found worldwide in all oceans. The humpback whale population within the North Atlantic has been estimated to include approximately 11,570 individuals (Waring *et al.,* 2016). Humpbacks occur off southern New England in all four seasons, with peak abundance in spring and summer. In winter, humpback whales from waters off New England, Canada, Greenland, Iceland, and Norway migrate to mate and calve primarily in the West Indies (including the Antilles, the Dominican Republic, the Virgin Islands and Puerto Rico), where spatial and genetic mixing among these groups occurs (Waring *et al.,* 2015). While migrating, humpback whales utilize the mid-Atlantic as a migration pathway between calving/mating grounds to the south and feeding grounds in the north (Waring *et al.* 2007).

Since January 2016, elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through North Carolina. Partial or full necropsy examinations have been conducted on approximately half of the 62 known cases. A portion of the whales have shown evidence of pre-mortem vessel strike; however, this finding is not consistent across all of the whales examined so more research is needed. NOAA is consulting with researchers that are conducting studies on the humpback whale populations, and these efforts may provide information on changes in whale distribution and habitat use that could provide additional insight into how these vessel interactions occurred. Three previous UMEs involving humpback whales have occurred since 2000, in 2003, 2005, and 2006. More information is available at *www.nmfs.noaa.gov/pr/health/mmume/2017humpbackatlanticume.html.*

Fin Whale

Fin whales are common in waters of the U.S. Atlantic Exclusive Economic Zone (EEZ), principally from Cape Hatteras northward (Waring *et al.,* 2016). Fin whales are present north of 35-degree latitude in every season and are broadly distributed throughout the western North Atlantic for most of the year (Waring *et al.,* 2016). Fin whales are found in small groups of up to 5 individuals (Brueggeman *et al.,* 1987). The current abundance estimate for the western North Atlantic stock of fin whales is 1,618 individuals (Hayes *et al.,* 2017). The main threats to fin whales are fishery interactions and vessel collisions (Waring *et al.,* 2016).

Minke Whale

Minke whales can be found in temperate, tropical, and high-latitude waters. The Canadian East Coast stock can be found in the area from the western half of the Davis Strait (45° W) to the Gulf of Mexico (Waring *et al.,* 2016). This species generally occupies waters less than 100 m deep on the continental shelf. There appears to be a strong seasonal component to minke whale distribution in which spring to fall are times of relatively widespread and common occurrence, and when the whales are most abundant in New England waters, while during winter the species appears to be largely absent (Waring *et al.,* 2016). The main threats to this stock are interactions with fisheries, strandings, and vessel collisions.

Sperm Whale

The distribution of the sperm whale in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring *et al.,* 2014). The basic social unit of the sperm whale appears to be the mixed school of adult females plus their calves and some juveniles of both sexes, normally numbering 20–40 animals in all. There is evidence that some social bonds persist for many years (Christal *et al.,* 1998). This species forms stable social groups, site fidelity, and latitudinal range limitations in groups of females and juveniles (Whitehead, 2002). In summer, the distribution of sperm whales includes the area east and north of Georges Bank and into the Northeast Channel region, as well as the continental shelf (inshore of the 100-m isobath) south of New England. In the fall, sperm whale occurrence south of New England on the continental shelf is at its highest level, and there remains a continental shelf edge occurrence in the mid-Atlantic bight. In winter, sperm whales are concentrated east and northeast of Cape Hatteras. The current abundance estimate for this stock is 2,288 (Hayes *et al.,* 2017).

Atlantic White-Sided Dolphin

White-sided dolphins are found in temperate and sub-polar waters of the North Atlantic, primarily in continental shelf waters to the 100-m depth contour from central West Greenland to North Carolina (Waring *et al.,* 2016). There are three stock units: Gulf of Maine, Gulf of St. Lawrence, and Labrador Sea stocks (Palka *et al.,* 1997). The Gulf of Maine population of white-sided dolphins is most common in continental shelf waters from Hudson Canyon (approximately 39° N) to Georges Bank, and in the Gulf of Maine and lower Bay of Fundy. Sighting data indicate seasonal shifts in distribution (Northridge *et al.,* 1997). During January to May, low numbers of white-sided dolphins are found from Georges Bank to Jeffreys Ledge (off New Hampshire), with even lower numbers south of Georges Bank, as documented by a few strandings collected on beaches of Virginia to South Carolina. From June through September, large numbers of white-sided dolphins are found from Georges Bank to the lower Bay of Fundy. From October to December, white-sided dolphins occur at intermediate densities from southern Georges Bank to southern Gulf of Maine (Payne and Heinemann 1990). Sightings south of Georges Bank, particularly around Hudson Canyon, occur year round but at low densities. The current abundance estimate for this stock is 48,819 (Hayes *et al.,* 2017). The main threat to this species is interactions with fisheries.

Short-Beaked Common Dolphin

The short-beaked common dolphin is found worldwide in temperate to subtropical seas. In the North Atlantic, short-beaked common dolphins are commonly found over the continental shelf between the 100-m and 2,000-m isobaths and over prominent underwater topography and east to the mid-Atlantic Ridge (Waring *et al.,* 2016). Only the western North Atlantic stock may be present in the Lease Area. The current abundance estimate for this stock is 70,184 animals (Hayes *et al.,* 2017). The main threat to this species is interactions with fisheries.

Bottlenose Dolphin

There are two distinct bottlenose dolphin morphotypes: The coastal and offshore forms in the western North Atlantic (Waring *et al.,* 2016). The offshore form is distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic Ocean from Georges Bank to the Florida Keys and is the only type that may be present in the survey area as the survey area is north of the northern extent of the range of the Western North Atlantic Northern Migratory Coastal Stock. The current abundance estimate for the western north Atlantic stock is 77,532 (Hayes *et al.,* 2017). The main threat to this species is interactions with fisheries.

Harbor Porpoise

In the Lease Area, only the Gulf of Maine/Bay of Fundy stock may be present. This stock is found in U.S. and Canadian Atlantic waters and is concentrated in the northern Gulf of Maine and southern Bay of Fundy region, generally in waters less than 150 m deep (Waring *et al.,* 2016). They are seen from the coastline to deep waters (>1800 m; Westgate *et al.* 1998), although the majority of the population is found over the continental shelf (Waring *et al.,* 2016). Average group size for this stock in the Bay of Fundy is approximately four individuals (Palka 2007). The current abundance estimate for this stock is 79,883 (Hayes *et al.,* 2017). The main threat to this species is interactions with fisheries, with documented take in the U.S. northeast sink gillnet, mid-Atlantic gillnet, and northeast bottom trawl fisheries and in the Canadian herring weir fisheries (Waring *et al.,* 2016).

Harbor Seal

The harbor seal is found in all nearshore waters of the North Atlantic and North Pacific Oceans and adjoining seas above about 30° N (Burns, 2009). In the western North Atlantic, they are distributed from the eastern Canadian Arctic and Greenland south to southern New England and New York, and occasionally to the Carolinas (Waring *et al.,* 2016). Haulout and pupping sites are located off Manomet, MA and the Isles of Shoals, ME, but generally do not occur in areas in southern New England (Waring *et al.,* 2016). The current abundance estimate for this stock is 75,834 (Hayes *et al.,* 2017). The main threat to this species is interactions with fisheries.

Gray Seal

There are three major populations of gray seals found in the world; eastern Canada (western North Atlantic stock), northwestern Europe and the Baltic Sea. The gray seals that occur in the Project Area belong to the western North Atlantic stock, which ranges from New Jersey to Labrador. Current population trends show that gray seal abundance is likely increasing in the U.S. Atlantic EEZ (Waring *et al.,* 2016). Although the rate of increase is unknown, surveys conducted since their arrival in the 1980s indicate a steady increase in abundance in both Maine and Massachusetts (Waring *et al.,* 2016). It is believed that recolonization by Canadian gray seals is the source of the U.S. population (Waring *et al.,* 2016).

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 Hertz (Hz) and 35 kilohertz (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;
- 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 kH;

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.,* 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2016) for a review of available information. Eleven marine mammal species (nine cetacean and two pinniped (both phocid) species) have the reasonable potential to co-occur with the proposed survey activities. Please refer to Table 2. Of the cetacean species that may be present, five are classified as low-frequency cetaceans (*i.e.,* all mysticete species), three are classified as mid-frequency cetaceans (*i.e.,* all delphinid species and the sperm whale), and one is classified as a high-frequency cetacean (*i.e.,* harbor porpoise).

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'' section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The ''Negligible Impact Analysis and Determination'' section considers the content of this section, the ''Estimated Take'' 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.

Background on Sound

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and is generally characterized by several variables. Frequency describes the sound's pitch and is measured in Hz or kHz, while sound level describes the sound's intensity and is measured in decibels (dB). Sound level increases or decreases exponentially with each dB of change. The logarithmic nature of the scale means that each 10-dB increase is a 10-fold increase in acoustic power (and a 20-dB increase is then a 100-fold increase in power). A 10-fold increase in acoustic power does not mean that the sound is perceived as being 10 times louder, however. Sound levels are compared to a reference sound pressure (micro-Pascal) to identify the medium. For air and water, these reference pressures are ''re: 20 micro Pascals (µPa)'' and ''re: 1 µPa,'' respectively. 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 1975). 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. 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 rather than by peak pressures.

When sound travels (propagates) from its source, its loudness decreases as the distance traveled by the sound increases. Thus, the loudness of a sound at its source is higher than the loudness of that same sound one km away. Acousticians often refer to the loudness of a sound at its source (typically referenced to one meter from the source) as the source level and the loudness of sound elsewhere as the received level (*i.e.,* typically the receiver). For example, a humpback whale 3 km from a device that has a source level of 230 dB may only be exposed to sound that is 160 dB loud, depending on how the sound travels through water (*e.g.,* spherical spreading (6 dB reduction with doubling of distance) was used in this example). As a result, it is important to understand the difference between source levels and received levels when discussing the loudness of sound in the ocean or its impacts on the marine environment.

As sound travels from a source, its propagation in water is influenced by various physical characteristics, including water temperature, depth, salinity, and surface and bottom properties that cause refraction, reflection, absorption, and scattering of sound waves. Oceans are not homogeneous and the contribution of each of these individual factors is extremely complex and interrelated. The physical characteristics that determine the sound's speed through the water will change with depth, season, geographic location, and with time of day (as a result, in actual active sonar operations, crews will measure oceanic conditions, such as sea water temperature and depth, to calibrate models that determine the path the sonar signal will take as it travels through the ocean and how strong the sound signal will be at a given range along a particular transmission path). As sound travels through the ocean, the intensity associated with the wavefront diminishes, or attenuates. This decrease in intensity is referred to as propagation loss, also commonly called transmission loss.

Acoustic Impacts

Geophysical surveys may temporarily impact marine mammals in the area due to elevated in-water sound levels. Marine mammals are continually exposed to many sources of sound. Naturally occurring sounds such as lightning, rain, sub-sea earthquakes, and biological sounds (*e.g.,* snapping shrimp, whale songs) are widespread throughout the world's oceans. Marine mammals produce sounds in various contexts and use sound for various biological functions including, but not limited to: (1) Social interactions; (2) foraging; (3) orientation; and (4) predator detection. Interference with producing or receiving these sounds may result in adverse impacts. Audible distance, or received levels of sound depend on the nature of the sound source, ambient noise conditions, and the sensitivity of the receptor to the sound (Richardson *et al.,* 1995). Type and significance of marine mammal reactions to sound are likely dependent on a variety of factors including, but not limited to, (1) the behavioral state of the animal (*e.g.,* feeding, traveling, etc.); (2) frequency of the sound; (3) distance between the animal and the source; and (4) the level of the sound relative to ambient conditions (Southall *et al.,* 2007).

When considering the influence of various kinds of sound on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Current data indicate that not all marine mammal species have equal hearing capabilities (Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008).

Animals are less sensitive to sounds at the outer edges of their functional hearing range and are more sensitive to a range of frequencies within the middle of their functional hearing range. For mid-frequency cetaceans, functional hearing estimates occur between approximately 150 Hz and 160 kHz with best hearing estimated to occur between approximately 10 to less than 100 kHz (Finneran *et al.,* 2005 and 2009, Natchtigall *et al.,* 2005 and 2008; Yuen *et al.,* 2005; Popov *et al.,* 2011; and Schlundt *et al.,* 2011).

Hearing Impairment

Marine mammals may experience temporary or permanent hearing impairment when exposed to loud sounds. Hearing impairment is classified by temporary threshold shift (TTS) and permanent threshold shift (PTS). PTS is considered auditory injury (Southall *et al.,* 2007) and occurs in a specific frequency range and amount. Irreparable damage to the inner or outer cochlear hair cells may cause PTS; however, other mechanisms are also involved, such as exceeding the elastic limits of certain tissues and membranes in the middle and inner ears and resultant changes in the chemical composition of the inner ear fluids (Southall *et al.,* 2007). There are no empirical data for onset of PTS in any marine mammal; therefore, PTS-onset must be estimated from TTS-onset measurements and from the rate of TTS growth with increasing exposure levels above the level eliciting TTS-onset. PTS is presumed to be likely if the hearing threshold is reduced by ≥40 dB (that is, 40 dB of TTS).

Temporary Threshold Shift (TTS)

TTS is the mildest form of hearing impairment that can occur during exposure to a loud sound (Kryter 1985). While experiencing TTS, the hearing threshold rises and a sound must be stronger in order to be heard. At least in terrestrial mammals, TTS can last from minutes or hours to (in cases of strong TTS) days, can be limited to a particular frequency range, and can occur to varying degrees (*i.e.,* a loss of a certain number of dBs of sensitivity). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the noise ends.

Marine mammal hearing plays a critical role in communication with conspecifics and in 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 takes place during a time when the animals is traveling through the open ocean, where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during a time when communication is critical for successful mother/calf interactions could have more serious impacts if it were in the same frequency band as the necessary vocalizations and of a severity that it impeded communication. The fact that animals exposed to levels and durations of sound that would be expected to result in this physiological response would also be expected to have behavioral responses of a comparatively more severe or sustained nature is also notable and potentially of more importance than the simple existence of a TTS.

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin, beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocaena phocaenoides*)) 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 (*e.g.,* Finneran *et al.,* 2002 and 2010; Nachtigall *et al.,* 2004; Kastak *et al.,* 2005; Lucke *et al.,* 2009; Mooney *et al.,* 2009; Popov *et al.,* 2011; Finneran and Schlundt, 2010). In general, harbor seals (Kastak *et al.,* 2005; Kastelein *et al.,* 2012a) and harbor porpoises (Lucke *et al.,* 2009; Kastelein *et al.,* 2012b) have a lower TTS onset than other measured pinniped or cetacean species. However, even for these animals, which are better able to hear higher frequencies and may be more sensitive to higher frequencies, exposures on the order of approximately 170 dB rms or higher for brief transient signals are likely required for even temporary (recoverable) changes in hearing sensitivity that would likely not be categorized as physiologically damaging (Lucke *et al.,* 2009). 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 Finneran (2016).

Scientific literature highlights the inherent complexity of predicting TTS onset in marine mammals, as well as the importance of considering exposure duration when assessing potential impacts (Mooney *et al.,* 2009a, 2009b; Kastak *et al.,* 2007). Generally, with sound exposures of equal energy, quieter sounds (lower sound pressure levels (SPL)) of longer duration were found to induce TTS onset more than louder sounds (higher SPL) of shorter duration (more similar to sub-bottom profilers). For intermittent sounds, less threshold shift will occur than from a continuous exposure with the same energy (some recovery will occur between intermittent exposures) (Kryter *et al.,* 1966; Ward 1997). For sound exposures at or somewhat above the TTS-onset threshold, hearing sensitivity recovers rapidly after exposure to the sound ends; intermittent exposures recover faster in comparison with continuous exposures of the same duration (Finneran *et al.,* 2010). NMFS considers TTS as Level B harassment that is mediated by physiological effects on the auditory system.

Animals in the Lease Area during the HRG survey are unlikely to incur TTS hearing impairment due to the characteristics of the sound sources, which include low source levels (208 to 221 dB re 1 μPa-m) and generally very short pulses and duration of the sound. Even for high-frequency cetacean species (*e.g.,* harbor porpoises), which may have increased sensitivity to TTS (Lucke *et al.,* 2009; Kastelein *et al.,* 2012b), individuals would have to make a very close approach and also remain very close to vessels operating these sources in order to receive multiple exposures at relatively high levels, as would be necessary to cause TTS. Intermittent exposures—as would occur due to the brief, transient signals produced by these sources—require a higher cumulative SEL to induce TTS than would continuous exposures of the same duration (*i.e.,* intermittent exposure results in lower levels of TTS) (Mooney *et al.,* 2009a; Finneran *et al.,* 2010). Moreover, most marine mammals would more likely avoid a loud sound source rather than swim in such close proximity as to result in TTS. Kremser *et al.* (2005) noted that the probability of a cetacean swimming through the area of exposure when a sub-bottom profiler emits a pulse is small—because if the animal was in the area, it would have to pass the transducer at close range in order to be subjected to sound levels that could cause TTS and would likely exhibit avoidance behavior to the area near the transducer rather than swim through at such a close range. Further, the restricted beam shape of the sub-bottom profiler and other HRG survey equipment makes it unlikely that an animal would be exposed more than briefly during the passage of the vessel. Boebel *et al.* (2005) concluded similarly for single and multibeam echosounders and, more recently, Lurton (2016) conducted a modeling exercise and concluded similarly that likely potential for acoustic injury from these types of systems is negligible but that behavioral response cannot be ruled out. Animals may avoid the area around the survey vessels, thereby reducing exposure. Any disturbance to marine mammals is likely to be in the form of temporary avoidance or alteration of opportunistic foraging behavior near the survey location.

Masking

Masking is the obscuring of sounds of interest to an animal by other sounds, typically at similar frequencies. Marine mammals are highly dependent on sound, and their ability to recognize sound signals amid other sound is important in communication and detection of both predators and prey (Tyack 2000). Background ambient sound may interfere with or mask the ability of an animal to detect a sound signal even when that signal is above its absolute hearing threshold. Even in the absence of anthropogenic sound, the marine environment is often loud. Natural ambient sound includes contributions from wind, waves, precipitation, other animals, and (at frequencies above 30 kHz) thermal sound resulting from molecular agitation (Richardson *et al.,* 1995).

Background sound may also include anthropogenic sound, and masking of natural sounds can result when human activities produce high levels of background sound. Conversely, if the background level of underwater sound is high (*e.g.,* on a day with strong wind and high waves), an anthropogenic sound source would not be detectable as far away as would be possible under quieter conditions and would itself be masked. Ambient sound is highly variable on continental shelves (Myrberg 1978; Desharnais *et al.,* 1999). This results in a high degree of variability in the range at which marine mammals can detect anthropogenic sounds.

Although masking is a phenomenon which may occur naturally, the introduction of loud anthropogenic sounds into the marine environment at frequencies important to marine mammals increases the severity and frequency of occurrence of masking. For example, if a baleen whale is exposed to continuous low-frequency sound from an industrial source, this would reduce the size of the area around that whale within which it can hear the calls of another whale. The components of background noise that are similar in frequency to the signal in question primarily determine the degree of masking of that signal. In general, little is known about the degree to which marine mammals rely upon detection of sounds from conspecifics, predators, prey, or other natural sources. In the absence of specific information about the importance of detecting these natural sounds, it is not possible to predict the impact of masking on marine mammals (Richardson *et al.,* 1995). In general, masking effects are expected to be less severe when sounds are transient than when they are continuous. Masking is typically of greater concern for those marine mammals that utilize low-frequency communications, such as baleen whales, because of how far low-frequency sounds propagate.

Marine mammal communications would not likely be masked appreciably by the sub-bottom profiler signals given the directionality of the signal and the brief period when an individual mammal is likely to be within its beam.

Non-Auditory Physical Effects (Stress)

Classic stress responses begin when an animal's central nervous system perceives a potential threat to its homeostasis. That perception triggers stress responses regardless of whether a stimulus actually threatens the animal; the mere perception of a threat is sufficient to trigger a stress response (Moberg 2000; Seyle 1950). Once an animal's central nervous system perceives a threat, it mounts a biological response or defense that consists of a combination of the four general biological defense responses: behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses.

In the case of many stressors, an animal's first and sometimes most economical (in terms of biotic costs) response is behavioral avoidance of the potential stressor or avoidance of continued exposure to a stressor. An animal's second line of defense to stressors involves the sympathetic part of the autonomic nervous system and the classical ''fight or flight'' response which includes the cardiovascular system, the gastrointestinal system, the exocrine glands, and the adrenal medulla to produce changes in heart rate, blood pressure, and gastrointestinal activity that humans commonly associate with ''stress.'' These responses have a relatively short duration and may or may not have significant long-term effect on an animal's welfare.

An animal's third line of defense to stressors involves its neuroendocrine systems; the system that has received the most study has been the hypothalamus-pituitary-adrenal system (also known as the HPA axis in mammals). Unlike stress responses associated with the autonomic nervous system, virtually all neuro-endocrine 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 (Moberg 1987; Rivier 1995), altered metabolism (Elasser *et al.,* 2000), reduced immune competence (Blecha 2000), and behavioral disturbance. Increases in the circulation of glucocorticosteroids (cortisol, corticosterone, and aldosterone in marine mammals; see Romano *et al.,* 2004) have been equated with stress for many years.

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and distress is the biotic 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 a risk to the animal's welfare. 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 biotic function, which impairs those functions that experience the diversion. For example, when mounting a stress response diverts energy away from growth in young animals, those animals may experience stunted growth. When mounting a stress response diverts energy from a fetus, an animal's reproductive success and its fitness will suffer. In these cases, the animals will have entered a pre-pathological or pathological state which is called ''distress'' (Seyle 1950) or ''allostatic loading'' (McEwen and Wingfield 2003). This pathological state will last until the animal replenishes its biotic reserves sufficient to restore normal function. Note that these examples involved a long-term (days or weeks) stress response exposure to stimuli.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses have also been documented fairly well through controlled experiments; because this physiology exists in every vertebrate that has been studied, it is not surprising that stress responses and their costs have been documented in both laboratory and free-living animals (for examples see, Holberton *et al.,* 1996; Hood *et al.,* 1998; Jessop *et al.,* 2003; Krausman *et al.,* 2004; Lankford *et al.,* 2005; Reneerkens *et al.,* 2002; Thompson and Hamer, 2000). Information has also been collected on the physiological responses of marine mammals to exposure to anthropogenic sounds (Fair and Becker 2000; Romano *et al.,* 2002). For example, Rolland *et al.* (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales.

Studies of other marine animals and terrestrial animals would also lead us to expect some marine mammals to experience physiological stress responses and, perhaps, physiological responses that would be classified as ''distress'' upon exposure to high frequency, mid-frequency and low-frequency sounds. For example, Jansen (1998) reported on the relationship between acoustic exposures and physiological responses that are indicative of stress responses in humans (for example, elevated respiration and increased heart rates). Jones (1998) reported on reductions in human performance when faced with acute, repetitive exposures to acoustic disturbance. Trimper *et al.* (1998) reported on the physiological stress responses of osprey to low-level aircraft noise while Krausman *et al.* (2004) reported on the auditory and physiology stress responses of endangered Sonoran pronghorn to military overflights. Smith *et al.* (2004a, 2004b), for example, identified noise-induced physiological transient stress responses in hearing-specialist fish (*i.e.,* goldfish) that accompanied short- and long-term hearing losses. Welch and Welch (1970) reported physiological and behavioral stress responses that accompanied damage to the inner ears of fish and several mammals.

Hearing is one of the primary senses marine mammals use to gather information about their environment and to communicate with conspecifics. Although empirical information on the relationship between sensory impairment (TTS, PTS, and acoustic masking) on marine mammals remains limited, it seems reasonable to assume that reducing an animal's ability to gather information about its environment and to communicate with other members of its species would be stressful for animals that use hearing as their primary sensory mechanism. Therefore, we assume that acoustic exposures sufficient to trigger onset PTS or TTS would be accompanied by physiological stress responses because terrestrial animals exhibit those responses under similar conditions (NRC 2003). More importantly, marine mammals might experience stress responses at received levels lower than those necessary to trigger onset TTS. Based on empirical studies of the time required to recover from stress responses (Moberg 2000), we also assume that stress responses are likely to persist beyond the time interval required for animals to recover from TTS and might result in pathological and pre-pathological states that would be as significant as behavioral responses to TTS.

In general, there are few data on the potential for strong, anthropogenic underwater sounds to cause non-auditory physical effects in marine mammals. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall *et al.,* 2007). There is no definitive evidence that any of these effects occur even for marine mammals in close proximity to an anthropogenic sound source. In addition, marine mammals that show behavioral avoidance of survey vessels and related sound sources are unlikely to incur non-auditory impairment or other physical effects. NMFS does not expect that the generally short-term, intermittent, and transitory HRG and geotechnical activities would create conditions of long-term, continuous noise and chronic acoustic exposure leading to long-term physiological stress responses in marine mammals.

Behavioral Disturbance

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 shown pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997; Finneran *et al.,* 2003). Observed responses of wild marine mammals to loud, pulsed sound sources (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 2005). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.,* Frankel and Clark 2000; Costa *et al.,* 2003; Ng and Leung 2003; Nowacek *et al.,* 2004; Goldbogen *et al.,* 2013a,b). 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; Stone *et al.,* 2000; Morton and Symonds, 2002; Gailey *et al.,* 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.,* Blackwell *et al.,* 2004; Bejder *et al.,* 2006; Teilmann *et al.,* 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.,* directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus, 1996). 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.

Marine mammals are likely to avoid the HRG survey activity, especially the naturally shy harbor porpoise, while the harbor seals might be attracted to them out of curiosity. However, because the sub-bottom profilers and other HRG survey equipment operate from a moving vessel, and the maximum radius to the Level B harassment threshold is relatively small, the area and time that this equipment would be affecting a given location is very small. Further, once an area has been surveyed, it is not likely that it will be surveyed again, thereby reducing the likelihood of repeated HRG-related impacts within the survey area.

We have also considered the potential for severe behavioral responses such as stranding and associated indirect injury or mortality from Statoil's use of HRG survey equipment, on the basis of a 2008 mass stranding of approximately 100 melon-headed whales in a Madagascar lagoon system. An investigation of the event indicated that use of a high-frequency mapping system (12-kHz multibeam echosounder) was the most plausible and likely initial behavioral trigger of the event, while providing the caveat that there is no unequivocal and easily identifiable single cause (Southall *et al.,* 2013). The investigatory panel's conclusion was based on (1) very close temporal and spatial association and directed movement of the survey with the stranding event; (2) the unusual nature of such an event coupled with previously documented apparent behavioral sensitivity of the species to other sound types (Southall *et al.,* 2006; Brownell *et al.,* 2009); and (3) the fact that all other possible factors considered were determined to be unlikely causes. Specifically, regarding survey patterns prior to the event and in relation to bathymetry, the vessel transited in a north-south direction on the shelf break parallel to the shore, ensonifying large areas of deep-water habitat prior to operating intermittently in a concentrated area offshore from the stranding site; this may have trapped the animals between the sound source and the shore, thus driving them towards the lagoon system. The investigatory panel systematically excluded or deemed highly unlikely nearly all potential reasons for these animals leaving their typical pelagic habitat for an area extremely atypical for the species (*i.e.,* a shallow lagoon system). Notably, this was the first time that such a system has been associated with a stranding event. The panel also noted several site- and situation-specific secondary factors that may have contributed to the avoidance responses that led to the eventual entrapment and mortality of the whales. Specifically, shoreward-directed surface currents and elevated chlorophyll levels in the area preceding the event may have played a role (Southall *et al.,* 2013). The report also notes that prior use of a similar system in the general area may have sensitized the animals and also concluded that, for odontocete cetaceans that hear well in higher frequency ranges where ambient noise is typically quite low, high-power active sonars operating in this range may be more easily audible and have potential effects over larger areas than low frequency systems that have more typically been considered in terms of anthropogenic noise impacts. It is, however, important to note that the relatively lower output frequency, higher output power, and complex nature of the system implicated in this event, in context of the other factors noted here, likely produced a fairly unusual set of circumstances that indicate that such events would likely remain rare and are not necessarily relevant to use of lower-power, higher-frequency systems more commonly used for HRG survey applications. The risk of similar events recurring may be very low, given the extensive use of active acoustic systems used for scientific and navigational purposes worldwide on a daily basis and the lack of direct evidence of such responses previously reported.

Tolerance

Numerous studies have shown that underwater sounds from industrial activities are often readily detectable by marine mammals in the water at distances of many km. However, other studies have shown that marine mammals at distances more than a few km away often show no apparent response to industrial activities of various types (Miller *et al.,* 2005). This is often true even in cases when the sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of that mammal group. Although various baleen whales, toothed whales, and (less frequently) pinnipeds have been shown to react behaviorally to underwater sound from sources such as airgun pulses or vessels under some conditions, at other times, mammals of all three types have shown no overt reactions (*e.g.,* Malme *et al.,* 1986; Richardson *et al.,* 1995; Madsen and Mohl 2000; Croll *et al.,* 2001; Jacobs and Terhune 2002; Madsen *et al.,* 2002;

Miller *et al.,* 2005). In general, pinnipeds seem to be more tolerant of exposure to some types of underwater sound than are baleen whales. Richardson *et al.* (1995) found that vessel sound does not seem to affect pinnipeds that are already in the water. Richardson *et al.* (1995) went on to explain that seals on haul-outs sometimes respond strongly to the presence of vessels and at other times appear to show considerable tolerance of vessels, and Brueggeman *et al.* (1992) observed ringed seals (*Pusa hispida*) hauled out on ice pans displaying short-term escape reactions when a ship approached within 0.16–0.31 miles (0.25–0.5 km). Due to the relatively high vessel traffic in the Lease Area it is possible that marine mammals are habituated to noise (*e.g.,* DP thrusters) from project vessels in the area.

Vessel Strike

Ship strikes of marine mammals can cause major wounds, which may lead to the death of the animal. An animal at the surface could be struck directly by a vessel, a surfacing animal could hit the bottom of a vessel, or a vessel's propeller could injure an animal just below the surface. The severity of injuries typically depends on the size and speed of the vessel (Knowlton and Kraus 2001; Laist *et al.,* 2001; Vanderlaan and Taggart 2007).

The most vulnerable marine mammals are those that spend extended periods of time at the surface in order to restore oxygen levels within their tissues after deep dives (*e.g.,* the sperm whale). In addition, some baleen whales, such as the North Atlantic right whale, seem generally unresponsive to vessel sound, making them more susceptible to vessel collisions (Nowacek *et al.,* 2004). These species are primarily large, slow moving whales. Smaller marine mammals (*e.g.,* bottlenose dolphin) move quickly through the water column and are often seen riding the bow wave of large ships. Marine mammal responses to vessels may include avoidance and changes in dive pattern (NRC 2003).

An examination of all known ship strikes from all shipping sources (civilian and military) indicates vessel speed is a principal factor in whether a vessel strike results in death (Knowlton and Kraus 2001; Laist *et al.,* 2001; Jensen and Silber 2003; Vanderlaan and Taggart 2007). In assessing records with known vessel speeds, Laist *et al.* (2001) found a direct relationship between the occurrence of a whale strike and the speed of the vessel involved in the collision. The authors concluded that most deaths occurred when a vessel was traveling in excess of 24.1 km/h (14.9 mph; 13 knots (kn)). Given the slow vessel speeds and predictable course necessary for data acquisition, ship strike is unlikely to occur during the geophysical and geotechnical surveys. Marine mammals would be able to easily avoid the survey vessel due to the slow vessel speed. Further, Statoil would implement measures (*e.g.,* protected species monitoring, vessel speed restrictions and separation distances; see *Proposed Mitigation Measures*) set forth in the BOEM lease to reduce the risk of a vessel strike to marine mammal species in the survey area.

Marine Mammal Habitat

There are no feeding areas, rookeries or mating grounds known to be biologically important to marine mammals within the proposed project area. The area is part of an important migratory area for North Atlantic right whales; this important migratory area is comprised of the waters of the continental shelf offshore the East Coast of the U.S. and extends from Florida through Massachusetts. Given the limited spatial extent of the proposed survey and the large spatial extent of the migratory area, we do not expect North Atlantic right whale migration to be negatively impacted by the proposed survey. There is no designated critical habitat for any ESA-listed marine mammals in the proposed survey area. NMFS' regulations at 50 CFR part 224.105 designated the nearshore waters of the Mid-Atlantic Bight as the Mid-Atlantic U.S. Seasonal Management Area (SMA) for right whales in 2008. Mandatory vessel speed restrictions (less than 10 kn) are in place in that SMA from November 1 through April 30 to reduce the threat of collisions between ships and right whales around their migratory route and calving grounds.

Bottom disturbance associated with the HRG survey activities may include grab sampling to validate the seabed classification obtained from the multibeam echosounder/sidescan sonar data. This will typically be accomplished using a Mini-Harmon Grab with 0.1 m^2 sample area or the slightly larger Harmon Grab with a 0.2 m^2 sample area. The HRG survey equipment will not contact the seafloor and does not represent a source of pollution. We are not aware of any available literature on impacts to marine mammal prey from HRG survey equipment. However, as the HRG survey equipment introduces noise to the marine environment, there is the potential for it to result in avoidance of the area around the HRG survey activities on the part of marine mammal prey. Any avoidance of the area on the part of marine mammal prey would be expected to be short term and temporary.

Because of the temporary nature of the disturbance, the availability of similar habitat and resources (*e.g.,* prey species) in the surrounding area, and the lack of important or unique marine mammal habitat, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations. Impacts on marine mammal habitat from the proposed activities will be temporary, insignificant, and discountable.

Estimated Take

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

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level B harassment, as use of the HRG equipment has the potential to result in disruption of behavioral patterns for individual marine mammals. NMFS has determined take by Level A harassment is not an expected outcome of the proposed activity and thus we do not propose to authorize the take of any marine mammals by Level A harassment. This is discussed in greater detail below. As described previously, no mortality or serious injury is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated for this project.

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. Below, we describe these components in more detail and present the proposed take estimate.

Acoustic Thresholds

NMFS uses acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B harassment—Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the sound source (*e.g.,* frequency, predictability, duty cycle); the environment (*e.g.,* bathymetry); and the receiving animals (hearing, motivation, experience, demography, behavioral context); therefore can be difficult to predict (Southall *et al.,* 2007, Ellison *et al.,* 2011). NMFS uses a generalized acoustic threshold based on received level to estimate the onset of Level B (behavioral) harassment. NMFS predicts that marine mammals may be behaviorally harassed when exposed to underwater anthropogenic noise above received levels 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.,* seismic HRG equipment) or intermittent (*e.g.,* scientific sonar) sources. Statoil's proposed activity includes the use of impulsive sources. Therefore, the 160 dB re 1 μPa (rms) criteria is applicable for analysis of Level B harassment.

Level A harassment—NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 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). The Technical Guidance identifies the received levels, or thresholds, above which individual marine mammals are predicted to experience changes in their hearing sensitivity for all underwater anthropogenic sound sources, reflects the best available science, and better predicts the potential for auditory injury than does NMFS' historical criteria.

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, and are provided in Table 3 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: *www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.* As described above, Statoil's proposed activity includes the use of intermittent and impulsive sources

TABLE 3—THRESHOLDS IDENTIFYING THE ONSET OF PERMANENT THRESHOLD SHIFT IN MARINE MAMMALS

Hearing group	PTS onset thresholds	
	Impulsive*	Non-impulsive
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB; $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$: 230 dB; $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	$L_{pk,flat}$: 202 dB; $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB; $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB; $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB

Note: * Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (Lpk) has a reference value of 1 μPa, and cumulative sound exposure level (LE) has a reference value of 1μPa2s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.,* varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

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

The proposed survey would entail the use of HRG survey equipment. The distance to the isopleth corresponding to the threshold for Level B harassment was calculated for all HRG survey equipment with the potential to result in harassment of marine mammals (*i.e.,* the USBL and the sub-bottom profilers; Table 1) based on source characteristics as described in Crocker and Fratantonio (2016) using the practical transmission loss (TL) equation: TL = $15\log_{10}r$. Of the HRG survey equipment planned for use that has the potential to result in harassment of marine mammals, acoustic modeling indicated the Sig ELC 820 Sparker would be expected to produce sound that would propagate the furthest in the water (Table 4); therefore, for the purposes of the take calculation, it was assumed the Sig ELC 820 Sparker would be active during the entirety of the survey. Thus the distance to the isopleth corresponding to the threshold for Level B harassment for the Sig ELC 820 Sparker (1,166 m; Table 4) was used as the basis of the Level B take calculation for all marine mammals.

TABLE 4—PREDICTED RADIAL DISTANCES (m) FROM HRG SOURCES TO ISOPLETHS CORRESPONDING TO LEVEL B HARASSMENT THRESHOLD

HRG system	HRG survey equipment	Modeled distance to threshold (160 dB re 1 μPa)
Subsea Positioning/USBL	Sonardyne Ranger 2 USBL	74
Shallow penetration sub-bottom profiler	EdgeTech 512i	18
Medium penetration sub-bottom profiler	SIG ELC 820 Sparker	1,166

Predicted distances to Level A harassment isopleths, which vary based on marine mammal functional hearing groups (Table 5), were also calculated by Statoil. The updated acoustic thresholds for impulsive sounds (such as HRG survey equipment) contained in the Technical Guidance (NMFS, 2016) were presented as dual metric acoustic thresholds using both SEL_{cum} and peak sound pressure level metrics. As dual metrics, NMFS considers onset of PTS (Level A harassment) to have occurred when either one of the two metrics is exceeded (*i.e.,* metric resulting in the largest isopleth). The SEL_{cum} metric considers both level and duration of exposure, as well as auditory weighting functions by marine mammal hearing group. In recognition of the fact that calculating Level A harassment ensonified areas could be more technically challenging to predict due to the duration component and the use of weighting functions in the new SEL_{cum} thresholds, NMFS developed an optional User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to facilitate the estimation of take numbers. Statoil used the NMFS optional User Spreadsheet to calculate distances to Level A harassment isopleths based on SEL_{cum} (shown in Appendix A of the IHA application) and used the practical spreading loss model (similar to the method used to calculate Level B isopleths as described above) to calculate distances to Level A harassment isopleths based on peak pressure. Modeled distances to isopleths corresponding to Level A harassment thresholds for the Sig ELC 820 Sparker are shown in Table 5.

TABLE 5—MODELED RADIAL DISTANCES (m) TO ISOPLETHS CORRESPONDING TO LEVEL A HARASSMENT THRESHOLDS

Functional hearing group (Level A harassment thresholds)	SEL_{cum} [1]	Peak SPL_{flat}
Low frequency cetaceans ($L_{pk,flat}$: 219 dB; $L_{E,LF,24h}$: 183 dB)	9.8	n/a
Mid frequency cetaceans ($L_{pk,flat}$: 230 dB; $L_{E,MF,24h}$: 185 dB)	0	n/a
High frequency cetaceans ($L_{pk,flat}$: 202 dB; $L_{E,HF,24h}$: 155 dB)	3.6	7.3
Phocid Pinnipeds (Underwater)($L_{pk,flat}$: 218 dB; $L_{E,HF,24h}$: 185 dB)	2.6	n/a

[1] Distances to isopleths based on SEL_{cum} were calculated in the NMFS optional User Spreadsheet based on the following inputs: Source level of 206 dB rms, source velocity of 2.06 meters per second, pulse duration of 0.008 seconds, repetition rate of 0.25 seconds, and weighting factor adjustment of 1.4 kHz. Isopleths shown for SEL_{cum} are different than those shown in the IHA application as one of the inputs used by the applicant was incorrect which resulted in outputs that were not accurate: The applicant entered an incorrect repetition rate of 4 seconds rather than the correct repetition rate of 0.25 seconds. NMFS therefore used the NMFS optional User Spreadsheet to calculate isopleths for SEL_{cum} for the Sig ELC 820 Sparker using the correct repetition rate.

In this case, due to the very small estimated distances to Level A harassment thresholds for all marine mammal functional hearing groups, based on both SEL_{cum} and peak SPL (Table 5), and in consideration of the proposed mitigation measures, including marine mammal exclusion zones that greatly exceed the largest modeled isopleths to Level A harassment thresholds (see the Proposed Mitigation section for more detail) NMFS has determined that the likelihood of Level A take of marine mammals occurring as a result of the proposed survey is so low as to be discountable.

We note that because of some of the assumptions included in the methods used, isopleths produced may be overestimates to some degree. The acoustic sources proposed for use in Statoil's survey do not radiate sound equally in all directions but were designed instead to focus acoustic energy directly toward the sea floor. Therefore, the acoustic energy produced by these sources is not received equally in all directions around the source but is instead concentrated along some narrower plane depending on the beamwidth of the source. However, the calculated distances to isopleths do not account for this directionality of the sound source and are therefore conservative. For mobile sources, such as the proposed survey, the User Spreadsheet predicts the closest distance at which a stationary animal would not incur PTS if the sound source traveled by the animal in a straight line at a constant speed.

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

The best available scientific information was considered in conducting marine mammal exposure estimates (the basis for estimating take). For cetacean species, densities calculated by Roberts *et al.* (2016) were used. The density data presented by Roberts *et al.* (2016) incorporates aerial and shipboard line-transect survey data from NMFS and from other organizations collected over the period 1992–2014. Roberts *et al.* (2016) modeled density from 8 physiographic and 16 dynamic oceanographic and biological covariates, and controlled for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting. In general, NMFS considers the models produced by Roberts *et al.* (2016) to be the best available source of data regarding cetacean density in the Atlantic Ocean. More information, including the model results and supplementary information for each model, is available online at: *seamap.env.duke.edu/models/Duke-EC-GOM-2015/.*

For the purposes of the take calculations, density data from Roberts *et al.* (2016) were mapped within the boundary of the survey area for each survey segment (*i.e.,* the Lease Area survey segment and the cable route area survey segment; See Figure 1 in the IHA application) using a geographic information system. Monthly density data for all cetacean species potentially taken by the proposed survey was available via Roberts *et al.* (2016). Monthly mean density within the survey area, as provided in Roberts *et al.* (2016), were averaged by season (*i.e.,* Winter (December, January, February), Spring (March, April, May), Summer (June, July, August), Fall (September, October, November)) to provide seasonal density estimates. For the Lease Area survey segment, the highest average seasonal density as reported by Roberts *et al.* (2016) was used based on the planned survey dates of March through July. For the cable route area survey segment, the average spring seasonal densities within the maximum survey area were used, given the planned start date and duration of the survey within the cable route area.

Systematic, offshore, at-sea survey data for pinnipeds are more limited than those for cetaceans. The best available information concerning pinniped densities in the proposed survey area is the U.S. Navy's Navy Operating Area (OPAREA) Density Estimates (NODEs) (DoN, 2007). These density models utilized vessel-based and aerial survey data collected by NMFS from 1998–2005 during broad-scale abundance studies. Modeling methodology is detailed in DoN (2007). The NODEs density estimates do not include density data for gray seals. For the purposes of this IHA, gray seal density in the project area was assumed to be the same as harbor seal density. Mid-Atlantic OPAREA Density Estimates (DoN, 2007) as reported for the spring and summer season were used to estimate pinniped densities for the purposes of the take calculations.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate.

In order to estimate the number of marine mammals predicted to be exposed to sound levels that would result in harassment, radial distances to predicted isopleths corresponding to harassment thresholds are calculated, as described above. Those distances are then used to calculate the area(s) around the HRG survey equipment predicted to be ensonified to sound levels that exceed harassment thresholds. The area estimated to be ensonified to relevant thresholds in a single day of the survey is then calculated, based on areas predicted to be ensonified around the HRG survey equipment and estimated trackline distance traveled per day by the survey vessel. The estimated daily vessel track line distance was determined using the estimated average speed of the vessel (4 kn) multiplied by 24 (to account for the 24 hour operational period of the survey). Using the maximum distance to the Level B harassment threshold of 1,166 m (Table 4) and estimated daily track line distance of approximately 177.8 km (110.5 mi), it was estimated that an area of 418.9 km^2 (161.7 mi^2) per day would be ensonified to the Level B harassment threshold (Table 6).

TABLE 6—ESTIMATED TRACK LINE DISTANCE PER DAY (KM) AND AREA (KM^2) ESTIMATED TO BE ENSONIFIED TO LEVEL B HARASSMENT THRESHOLD PER DAY

Estimated track line distance per day (km)	Estimated area ensonified to Level B harassment threshold per day (km^2)
177.8	418.9

The number of marine mammals expected to be incidentally taken per day is then calculated by estimating the number of each species predicted to occur within the daily ensonified area, using estimated marine mammal densities as described above. In this case, estimated marine mammal density values varied between the Lease Area and cable route corridor survey areas, therefore the estimated number of each species taken per survey day was calculated separately for the Lease Area survey area and cable route corridor survey area. Estimated numbers of each species taken per day are then multiplied by the number of survey days to generate an estimate of the total number of each species expected to be taken over the duration of the survey. In this case, as the estimated number of each species taken per day varied depending on survey area (Lease Area and cable route corridor), the number of each species taken per day in each respective survey area was multiplied by the number of survey days anticipated in each survey area (*i.e.,* 123 survey days in the Lease Area portion of the survey and 19 survey days in the cable route corridor portion of the survey) to get a total number of takes per species in each respective survey area. Total take numbers for each respective survey area (Lease Area and cable route corridor) were then rounded. These numbers were then summed to get a total number of each species expected to be taken over the duration of all surveys (Table 9).

As described above, due to the very small estimated distances to Level A harassment thresholds (based on both SEL_{cum} and peak SPL; Table 5), and in consideration of the proposed mitigation measures, the likelihood of the proposed survey resulting in take in the form of Level A harassment is considered so low as to be discountable, therefore we do not propose to authorize take of any marine mammals by Level A harassment. Proposed take numbers are shown in Tables 7, 8 and 9. Take numbers proposed for authorization (Tables 7, 8 and 9) are slightly different than those requested in the IHA application (Table 7 in the IHA application) due to slight differences in take calculation methods.

TABLE 7—NUMBERS OF POTENTIAL INCIDENTAL TAKE OF MARINE MAMMALS PROPOSED FOR AUTHORIZATION IN CABLE ROUTE CORRIDOR PORTION OF SURVEY

Species	Density (#/1,000 km^2)	Proposed Level A takes	Proposed Level B takes	Total proposed takes
North Atlantic right whale	0.04	0	3	3
Humpback whale	0.02	0	2	2
Fin whale	0.1	0	8	8
Sperm whale	0.01	0	1	1
Minke whale	0.03	0	2	2
Bottlenose dolphin	9.65	0	768	768

TABLE 7—NUMBERS OF POTENTIAL INCIDENTAL TAKE OF MARINE MAMMALS PROPOSED FOR AUTHORIZATION IN CABLE ROUTE CORRIDOR PORTION OF SURVEY—Continued

Species	Density (#/1,000 km²)	Proposed Level A takes	Proposed Level B takes	Total proposed takes
Short-beaked common dolphin	1.42	0	113	113
Atlantic white-sided dolphin	0.32	0	25	25
Harbor porpoise	1.91	0	152	152
Harbor seal	4.87	0	388	388
Gray seal	4.87	0	388	388

TABLE 8—NUMBERS OF POTENTIAL INCIDENTAL TAKE OF MARINE MAMMALS PROPOSED FOR AUTHORIZATION IN LEASE AREA PORTION OF SURVEY

Species	Density (#/1,000 km²)	Proposed Level A takes	Proposed Level B takes	Total proposed takes
North Atlantic right whale	0.03	0	15	15
Humpback whale	0.04	0	21	21
Fin whale	0.17	0	88	88
Sperm whale	0.01	0	5	5
Minke whale	0.07	0	36	36
Bottlenose dolphin	1.53	0	788	788
Short-beaked common dolphin	3.06	0	1,577	1,577
Atlantic white-sided dolphin	0.78	0	402	402
Harbor porpoise	4.09	0	2,107	2,107
Harbor seal	4.87	0	2,509	2,509
Gray seal	4.87	0	2,509	2,509

TABLE 9—TOTAL NUMBERS OF POTENTIAL INCIDENTAL TAKE OF MARINE MAMMALS PROPOSED FOR AUTHORIZATION AND PROPOSED TAKES AS A PERCENTAGE OF POPULATION

Species	Proposed Level A takes	Proposed Level B takes	Total proposed takes	Total proposed takes as a percentage of population
North Atlantic right whale	0	18	18	4.1
Humpback whale	0	23	23	2.8
Fin whale	0	96	96	5.9
Sperm whale	0	6	6	0.3
Minke whale	0	38	38	1.5
Bottlenose dolphin	0	1,556	1,556	2.0
Short-beaked common dolphin	0	1,690	1,690	2.4
Atlantic white-sided dolphin	0	427	427	0.9
Harbor porpoise	0	2,259	2,259	2.8
Harbor seal	0	2,897	2,897	3.8
Gray seal	0	2,897	2,897	0.6

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 (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) the likelihood of effective implementation (probability implemented as planned), and;

(2) The practicability of the measures for applicant implementation, which may consider such things as relative cost and impact on operations.

Proposed Mitigation Measures

With NMFS' input during the application process, and as per the BOEM Lease, Statoil is proposing the following mitigation measures during the proposed marine site characterization surveys.

Marine Mammal Exclusion and Watch Zones

As required in the BOEM lease, marine mammal exclusion zones (EZ) will be established around the HRG survey equipment and monitored by protected species observers (PSO) during HRG surveys as follows:

- 50 m EZ for pinnipeds and delphinids (except harbor porpoises);
- 100 m EZ for large whales including sperm whales and mysticetes (except North Atlantic right whales) and harbor porpoises;
- 500 m EZ for North Atlantic right whales.

In addition, PSOs will visually monitor to the extent of the Level B zone (1,166 m), or as far as possible if the extent of the Level B zone is not fully visible.

Statoil intends to submit a sound source verification report showing sound levels associated with HRG survey equipment. If results of the sound source verification report indicate that actual distances to isopleths corresponding to harassment thresholds are larger than the EZs and/or Level B monitoring zones, NMFS may modify the zone(s) accordingly. If results of source verification indicate that actual distances to isopleths corresponding to harassment thresholds are less than the EZs and/or Level B monitoring zones, Statoil has indicated an intention to request modification of the zone(s), as appropriate. NMFS would review any such request and may modify the zone(s) depending on review of the report on source verification. Any such modification may be superseded by EZs required by BOEM.

Visual Monitoring

As per the BOEM lease, visual and acoustic monitoring of the established exclusion and monitoring zones will be performed by qualified and NMFS-approved PSOs. It will be the responsibility of the Lead PSO on duty to communicate the presence of marine mammals as well as to communicate and enforce the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate. PSOs will be equipped with binoculars and have the ability to estimate distances to marine mammals located in proximity to the vessel and/or exclusion zone using range finders. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the siting and monitoring of marine species. Digital single-lens reflex camera equipment will be used to record sightings and verify species identification. During surveys conducted at night, night-vision equipment and infrared technology will be available for PSO use, and passive acoustic monitoring (PAM; described below) will be used.

Pre-Clearance of the Exclusion Zone

For all HRG survey activities, Statoil would implement a 30-minute pre-clearance period of the relevant EZs prior to the initiation of HRG survey equipment (as required by BOEM). During this period the EZs would be monitored by PSOs, using the appropriate visual technology for a 30-minute period. HRG survey equipment would not be initiated if marine mammals are observed within or approaching the relevant EZs during this pre-clearance period. If a marine mammal were observed within or approaching the relevant EZ during the pre-clearance period, ramp-up would not begin until the animal(s) has been observed exiting the EZ or until an additional time period has elapsed with no further sighting of the animal (15 minutes for small delphinoid cetaceans and pinnipeds and 30 minutes for all other species). This pre-clearance requirement would include small delphinoids that approach the vessel (*e.g.,* bow ride). PSOs would also continue to monitor the zone for 30 minutes after survey equipment is shut down or survey activity has concluded.

Passive Acoustic Monitoring

As required in the BOEM lease, PAM would be required during HRG surveys conducted at night. In addition, PAM systems would be employed during daylight hours as needed to support system calibration and PSO and PAM team coordination, as well as in support of efforts to evaluate the effectiveness of the various mitigation techniques (*i.e.,* visual observations during day and night, compared to the PAM detections/operations). PAM operators will also be on call as necessary during daytime operations should visual observations become impaired. BOEM's lease stipulations require the use of PAM during nighttime operations. However, these requirements do not require that any mitigation action be taken upon acoustic detection of marine mammals. Given the range of species that could occur in the survey area, the PAM system will consist of an array of hydrophones with both broadband (sampling mid-range frequencies of 2 kHz to 200 kHz) and at least one low-frequency hydrophone (sampling range frequencies of 75 Hz to 30 kHz). The PAM operator would monitor the hydrophone signals in real time both aurally (using headphones) and visually (via the monitor screen displays). PAM operator would communicate detections to the Lead PSO on duty who will ensure the implementation of the appropriate mitigation procedures. A mitigation and monitoring communications flow diagram has been included as Appendix C of the IHA application.

Ramp-Up of Survey Equipment

As required in the BOEM lease, where technically feasible, a ramp-up procedure would be used for HRG survey equipment capable of adjusting energy levels at the start or re-start of HRG survey activities. The ramp-up procedure would be used at the beginning of HRG survey activities in order to provide additional protection to marine mammals near the survey area by allowing them to vacate the area prior to the commencement of survey equipment use at full energy. A ramp-up would begin with the power of the smallest acoustic equipment at its lowest practical power output appropriate for the survey. When technically feasible the power would then be gradually turned up and other acoustic sources added in way such that the source level would increase gradually.

Shutdown Procedures

As required in the BOEM lease, if a marine mammal is observed within or approaching the relevant EZ (as described above) an immediate shutdown of the survey equipment is required. Subsequent restart of the survey equipment may only occur after the animal(s) has either been observed exiting the relevant EZ or until an additional time period has elapsed with no further sighting of the animal (15 minutes for delphinoid cetaceans and pinnipeds and 30 minutes for all other species). HRG survey equipment may be allowed to continue operating if small delphinids voluntarily approach the vessel (*e.g.,* to bow ride) when HRG survey equipment is operating.

As required in the BOEM lease, if the HRG equipment shuts down for reasons other than mitigation (*i.e.,* mechanical or electronic failure) resulting in the cessation of the survey equipment for a period greater than 20 minutes, a 30 minute pre-clearance period (as described above) would precede the restart of the HRG survey equipment. If the pause is less than less than 20 minutes, the equipment may be restarted as soon as practicable at its full operational level only if visual surveys were continued diligently throughout the silent period and the EZs remained clear of marine mammals during that entire period. If visual surveys were not continued diligently during the pause of 20 minutes or less, a 30-minute pre-clearance period (as described above) would precede the re-start of the HRG survey equipment. Following a shutdown, HRG survey equipment may be restarted following pre-clearance of the zones as described above.

Vessel Strike Avoidance

Statoil will ensure that vessel operators and crew maintain a vigilant watch for cetaceans and pinnipeds by slowing down or stopping the vessel to avoid striking marine mammals. Survey vessel crew members responsible for navigation duties will receive site-specific training on marine mammal sighting/reporting and vessel strike avoidance measures. Vessel strike avoidance measures will include, but are not limited to, the following, as required in the BOEM lease, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk:

- All vessel operators and crew will maintain vigilant watch for cetaceans and pinnipeds, and slow down or stop their vessel to avoid striking these protected species;
- All vessel operators will comply with 10 knot (18.5 km/hr) or less speed restrictions in any SMA per NOAA guidance. This applies to all vessels operating at any time of year;
- All vessel operators will reduce vessel speed to 10 knots (18.5 km/hr) or less when any large whale, any mother/calf pairs, pods, or large assemblages of non-delphinoid cetaceans are observed near (within 100 m [330 ft]) an underway vessel;
- All survey vessels will maintain a separation distance of 500 m (1640 ft) or greater from any sighted North Atlantic right whale;
- If underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots (18.5 km/hr) or less until the 500 m (1640 ft) minimum separation distance has been established. If a North Atlantic right whale is sighted in a vessel's path, or within 100 m (330 ft) to an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. Engines will not be engaged until the North Atlantic right whale has moved outside of the vessel's path and beyond 100 m. If stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 100 m;
- All vessels will maintain a separation distance of 100 m (330 ft) or greater from any sighted non-delphinoid cetacean. If sighted, the vessel underway must reduce speed and shift the engine to neutral, and must not engage the engines until the non-delphinoid cetacean has moved outside of the vessel's path and beyond 100 m. If a survey vessel is stationary, the vessel will not engage engines until the non-delphinoid cetacean has moved out of the vessel's path and beyond 100 m;
- All vessels will maintain a separation distance of 50 m (164 ft) or greater from any sighted delphinoid cetacean. Any vessel underway remain parallel to a sighted delphinoid cetacean's course whenever possible, and avoid excessive speed or abrupt changes in direction. Any vessel underway reduces vessel speed to 10 knots (18.5 km/hr) or less when pods (including mother/calf pairs) or large assemblages of delphinoid cetaceans are observed. Vessels may not adjust course and speed until the delphinoid cetaceans have moved beyond 50 m and/or the abeam of the underway vessel;
- All vessels underway will not divert or alter course in order to approach any whale, delphinoid cetacean, or pinniped. Any vessel underway will avoid excessive speed or abrupt changes in direction to avoid injury to the sighted cetacean or pinniped; and
- All vessels will maintain a separation distance of 50 m (164 ft) or greater from any sighted pinniped.

The training program would be provided to NMFS for review and approval prior to the start of surveys. Confirmation of the training and understanding of the requirements will be documented on a training course log sheet. Signing the log sheet will certify that the crew members understand and will comply with the necessary requirements throughout the survey event.

Seasonal Operating Requirements

Between watch shifts, members of the monitoring team will consult NMFS' North Atlantic right whale reporting systems for the presence of North Atlantic right whales throughout survey operations. However, the proposed survey activities will occur outside of the SMA located off the coasts of New Jersey and New York. Members of the monitoring team will monitor the NMFS North Atlantic right whale reporting systems for the establishment of a Dynamic Management Area (DMA). If NMFS should establish a DMA in the survey area, within 24 hours of the establishment of the DMA Statoil will work with NMFS to shut down and/or alter the survey activities to avoid the DMA.

The proposed mitigation measures are designed to avoid the already low potential for injury in addition to some Level B harassment, and to minimize the potential for vessel strikes. There are no known marine mammal feeding areas, rookeries, or mating grounds in the survey area that would otherwise potentially warrant increased mitigation measures for marine mammals or their habitat (or both). The proposed survey would occur in an area that has been identified as a biologically important area for migration for North Atlantic right whales. However, given the small spatial extent of the survey area relative to the substantially larger spatial extent of the right whale migratory area, the survey is not expected to appreciably reduce migratory habitat nor to negatively impact the migration of North Atlantic right whales, thus mitigation to address the proposed survey's occurrence in North Atlantic right whale migratory habitat is not warranted. Further, we believe the proposed mitigation measures are practicable for the applicant to implement.

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

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth, requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

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

• Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.,* presence, abundance, distribution, density);

• Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) Action or environment (*e.g.,* source characterization, propagation, ambient noise); (2) affected species (*e.g.,* life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.,* age, calving or feeding areas);

• Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;

• How anticipated responses to stressors impact either: (1) Long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;

• Effects on marine mammal habitat (*e.g.,* marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and

• Mitigation and monitoring effectiveness.

Proposed Monitoring Measures

As described above, visual monitoring of the EZs and monitoring zone will be performed by qualified and NMFS-approved PSOs. Observer qualifications will include direct field experience on a marine mammal observation vessel and/or aerial surveys and completion of a PSO and/or PAM training program, as appropriate. As proposed by the applicant and required by BOEM, an observer team comprising a minimum of four NMFS-approved PSOs and a minimum of two certified PAM operator(s), operating in shifts, will be employed by Statoil during the proposed surveys. PSOs and PAM operators will work in shifts such that no one monitor will work more than 4 consecutive hours without a 2 hour break or longer than 12 hours during any 24-hour period. During daylight hours the PSOs will rotate in shifts of one on and three off, while during nighttime operations PSOs will work in pairs (per BOEM's requirements?). The PAM operators will also be on call as necessary during daytime operations should visual observations become impaired. Each PSO will monitor 360 degrees of the field of vision. Statoil will provide resumes of all proposed PSOs and PAM operators (including alternates) to NMFS for review and approval at least 45 days prior to the start of survey operations.

Also as described above, PSOs will be equipped with binoculars and have the ability to estimate distances to marine mammals located in proximity to the vessel and/or exclusion zone using range finders. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the siting and monitoring of marine species. Digital single-lens reflex camera equipment will be used to record sightings and verify species identification. During night operations, PAM, night-vision equipment, and infrared technology will be used to increase the ability to detect marine mammals. Position data will be recorded using hand-held or vessel global positioning system (GPS) units for each sighting. Observations will take place from the highest available vantage point on the survey vessel. General 360-degree scanning will occur during the monitoring periods, and target scanning by the PSO will occur when alerted of a marine mammal presence.

Data on all PAM/PSO observations will be recorded based on standard PSO collection requirements. This will include dates and locations of survey operations; time of observation, location and weather; details of the sightings (*e.g.,* species, age classification [if known], numbers, behavior); and details of any observed ''taking'' (behavioral disturbances). The data sheet will be provided to NMFS for review and approval prior to the start of survey activities. In addition, prior to initiation of survey work, all crew members will undergo environmental training, a component of which will focus on the procedures for sighting and protection of marine mammals. A briefing will also be conducted between the survey supervisors and crews, the PSOs, and Statoil. The purpose of the briefing will be to establish responsibilities of each party, define the chains of command, discuss communication procedures, provide an overview of monitoring purposes, and review operational procedures.

Acoustic Field Verification—As described above, field verification of sound levels associated with survey equipment will be conducted. Results of the field verification may be used to request modification of the EZs and monitoring zones. The details of the applicant's plan for field verification of sound levels are provided as Appendix B to the IHA application.

Proposed Reporting Measures

Statoil will provide the following reports as necessary during survey activities:

• The Applicant will contact NMFS within 24 hours of the commencement of survey activities and again within 24 hours of the completion of the activity.

• *Notification of Injured or Dead Marine Mammals*—In the unanticipated event that the specified HRG and geotechnical activities lead to an injury of a marine mammal (Level A harassment) or mortality (*e.g.,* ship-strike, gear interaction, and/or entanglement), Statoil would immediately cease the specified activities and report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources and the NMFS Greater Atlantic Stranding Coordinator. The report would include the following information:

• Time, date, and location (latitude/longitude) of the incident;

• Name and type of vessel involved;

• Vessel's speed during and leading up to the incident;

• Description of the incident;

• Status of all sound source use in the 24 hours preceding the incident;

• Water depth;

• Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, and visibility);

• Description of all marine mammal observations in the 24 hours preceding the incident;

• Species identification or description of the animal(s) involved;

• Fate of the animal(s); and

• Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the event. NMFS would work with Statoil to minimize reoccurrence of such an event in the future. Statoil would not resume activities until notified by NMFS.

In the event that Statoil discovers an injured or dead marine mammal and determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.,* in less than a moderate state of decomposition), Statoil would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources and the NMFS Greater Atlantic Stranding Coordinator. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with Statoil to determine if modifications in the activities are appropriate.

In the event that Statoil discovers an injured or dead marine mammal and determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Statoil would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, and the NMFS Greater Atlantic Regional Stranding Coordinator, within 24 hours of the discovery. Statoil would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS. Statoil may continue its operations under such a case.

• Within 90 days after completion of survey activities, a final technical report will be provided to NMFS that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, estimates the number of marine mammals estimated to have been taken during survey activities, and provides an interpretation of the results and effectiveness of all mitigation and monitoring. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS.

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. 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).

To avoid repetition, our analysis applies to all the species listed in Table 9, given that NMFS expects the anticipated effects of the proposed survey to be similar in nature.

NMFS does not anticipate that serious injury or mortality would occur as a result of Statoil's proposed survey, even in the absence of proposed mitigation. Thus the proposed authorization does not authorize any serious injury or mortality. As discussed in the *Potential Effects* section, non-auditory physical effects and vessel strike are not expected to occur.

We expect that all potential takes would be in the form of short-term Level B behavioral harassment in the form of temporary avoidance of the area or decreased foraging (if such activity were occurring), reactions that are considered to be of low severity and with no lasting biological consequences (*e.g.,* Southall *et al.,* 2007).

Potential impacts to marine mammal habitat were discussed previously in this document (see *Potential Effects of the Specified Activity on Marine Mammals and their Habitat*). Marine mammal habitat may be impacted by elevated sound levels, but these impacts would be temporary. In addition to being temporary and short in overall duration, the acoustic footprint of the proposed survey is small relative to the overall distribution of the animals in the area and their use of the area. Feeding behavior is not likely to be significantly impacted, as no areas of biological significance for marine mammal feeding are known to exist in the survey area. Prey species are mobile and are broadly distributed throughout the project area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance, the availability of similar habitat and resources in the surrounding area, and the lack of important or unique marine mammal feeding habitat, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations. In addition, there are no rookeries or mating or calving areas known to be biologically important to marine mammals within the proposed project area. The proposed survey area is within a biologically important migratory area for North Atlantic right whales (effective March-April and November-December) that extends from Massachusetts to Florida (LaBrecque, *et al.,* 2015). Off the coast of New York, this biologically important migratory area extends from the coast to the shelf break. Due to the fact that that the proposed survey is temporary and short in overall duration, and the fact that the spatial acoustic footprint of the proposed survey is very small relative to the spatial extent of the available migratory habitat in the area, right whale migration is not expected to be impacted by the proposed survey.

The proposed mitigation measures are expected to reduce the number and/or severity of takes by (1) giving animals the opportunity to move away from the sound source before HRG survey equipment reaches full energy; (2) preventing animals from being exposed to sound levels that may otherwise result in injury. Additional vessel strike avoidance requirements will further mitigate potential impacts to marine mammals during vessel transit to and within the survey area.

NMFS concludes that exposures to marine mammal species and stocks due to Statoil's proposed survey would result in only short-term (temporary and short in duration) effects to individuals exposed. Marine mammals may temporarily avoid the immediate area, but are not expected to permanently abandon the area. Major shifts in habitat use, distribution, or foraging success are not expected. NMFS does not anticipate the proposed take estimates to impact annual rates of recruitment or survival.

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 mortality, serious injury, or Level A harassment is anticipated or authorized;

• The anticipated impacts of the proposed activity on marine mammals would be temporary behavioral changes due to avoidance of the area around the survey vessel;

• The availability of alternate areas of similar habitat value for marine mammals to temporarily vacate the survey area during the proposed survey to avoid exposure to sounds from the activity;

• The proposed project area does not contain areas of significance for feeding, mating or calving;

• Effects on species that serve as prey species for marine mammals from the proposed survey are not expected;

• The proposed mitigation measures, including visual and acoustic monitoring and shutdowns, are expected to minimize potential impacts to marine mammals.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The numbers of marine mammals that we propose for authorization to be taken, for all species and stocks, would be considered small relative to the relevant stocks or populations (less than 6 percent of each species and stock). See Table 9. Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

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

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act 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, in this case with the NMFS Greater Atlantic Regional Fisheries Office (GARFO), whenever we propose to authorize take for endangered or threatened species.

The NMFS Office of Protected Resources is proposing to authorize the incidental take of three species of marine mammals which are listed under the ESA: The North Atlantic right, fin, and sperm whale. BOEM consulted with NMFS GARFO under section 7 of the ESA on commercial wind lease issuance and site assessment activities on the Atlantic Outer Continental Shelf in Massachusetts, Rhode Island, New York and New Jersey Wind Energy Areas. NMFS GARFO issued a Biological Opinion concluding that these activities may adversely affect but are not likely to jeopardize the continued existence of the North Atlantic right, fin, and sperm whale. The Biological Opinion can be found online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.* NMFS will conclude the ESA section 7 consultation prior to reaching a determination regarding the proposed issuance of the authorization. If the IHA is issued, the Biological Opinion may be amended to include an incidental take statement for these marine mammal species, as appropriate.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to Statoil for conducting marine site assessment surveys offshore New York and along potential submarine cable routes from the date of issuance for a period of one year, 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 IHA is valid for a period of one year from the date of issuance.

2. This IHA is valid only for marine site characterization survey activity, as specified in the IHA application, in the Atlantic Ocean.

3. General Conditions.

(a) A copy of this IHA must be in the possession of Statoil Wind U.S. LLC (Statoil), the vessel operator and other relevant personnel, the lead PSO, and any other relevant designees of Statoil operating under the authority of this IHA.

(b) The species authorized for taking are listed in Table 9. The taking, by Level B harassment only, is limited to the species and numbers listed in Table 9. Any taking of species not listed in Table 9, or exceeding the authorized amounts listed in Table 9, is prohibited and may result in the modification, suspension, or revocation of this IHA.

(c) The taking by injury, serious injury or death of any species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA.

(d) Statoil shall ensure that the vessel operator and other relevant vessel personnel are briefed on all responsibilities, communication procedures, marine mammal monitoring protocols, operational procedures, and IHA requirements prior to the start of survey activity, and when relevant new personnel join the survey operations.

4. Mitigation Requirements—the holder of this Authorization is required to implement the following mitigation measures:

(a) Statoil shall use at least four (4) NMFS-approved protected species observers (PSOs) during HRG surveys. The PSOs must have no tasks other than to conduct observational effort, record observational data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammals and mitigation requirements. PSO resumes shall be provided to NMFS for approval prior to commencement of the survey.

(b) Visual monitoring must begin no less than 30 minutes prior to initiation of survey equipment and must continue until 30 minutes after use of survey equipment ceases.

(c) Exclusion Zones and Watch Zone—PSOs shall establish and monitor marine mammal Exclusion Zones and Watch Zones. The Watch Zone shall represent the extent of the Level B harassment zone (1,166 m) or, as far as possible if the extent of the Level B zone is not fully visible. The Exclusion Zones are as follows:

(i) a 50 m Exclusion Zone for pinnipeds and delphinids (except harbor porpoises);

(ii) a 100 m Exclusion Zone for large whales including sperm whales and mysticetes (except North Atlantic right whales) and harbor porpoises;

(iii) a 500 m Exclusion Zone for North Atlantic right whales.

(d) Shutdown requirements—If a marine mammal is observed within, entering, or approaching the relevant Exclusion Zones as described under 4(c) while geophysical survey equipment is operational, the geophysical survey equipment must be immediately shut down.

(i) Any PSO on duty has the authority to call for shutdown of survey equipment. When there is certainty regarding the need for mitigation action on the basis of visual detection, the relevant PSO(s) must call for such action immediately.

(ii) When a shutdown is called for by a PSO, the shutdown must occur and any dispute resolved only following shutdown.

(iii) The shutdown requirement is waived for small delphinoids that approach the vessel (*e.g.,* bow ride).

(iv) Upon implementation of a shutdown, survey equipment may be reactivated when all marine mammals have been confirmed by visual observation to have exited the relevant Exclusion Zone or an additional time period has elapsed with no further sighting of the animal that triggered the shutdown (15 minutes for small delphinoid cetaceans and pinnipeds and 30 minutes for all other species).

(v) If geophysical equipment shuts down for reasons other than mitigation (*i.e.,* mechanical or electronic failure) resulting in the cessation of the survey equipment for a period of less than 20 minutes, the equipment may be restarted as soon as practicable if visual surveys were continued diligently throughout the silent period and the relevant Exclusion Zones are confirmed by PSOs to have remained clear of marine mammals during the entire 20 minute period. If visual surveys were not continued diligently during the pause of 20 minutes or less, a 30 minute pre-clearance period shall precede the restart of the geophysical survey equipment as described in 4(e). If the period of shutdown for reasons other than mitigation is greater than 20 minutes, a pre-clearance period shall precede the restart of the geophysical survey equipment as described in 4(e).

(e) Pre-clearance observation—30 minutes of pre-clearance observation shall be conducted prior to initiation of geophysical survey equipment. geophysical survey equipment shall not be initiated if marine mammals are observed within or approaching the relevant Exclusion Zones as described under 4(d) during the pre-clearance period. If a marine mammal is observed within or approaching the relevant Exclusion Zone during the pre-clearance period, geophysical survey equipment shall not be initiated until the animal(s) is confirmed by visual observation to have exited the relevant Exclusion Zone or until an additional time period has elapsed with no further sighting of the animal (15 minutes for small delphinoid cetaceans and pinnipeds and 30 minutes for all other species).

(f) Ramp-up—when technically feasible, survey equipment shall be ramped up at the start or re-start of survey activities. Ramp-up will begin with the power of the smallest acoustic equipment at its lowest practical power output appropriate for the survey. When technically feasible the power will then be gradually turned up and other acoustic sources added in way such that the source level would increase gradually.

(g) Vessel Strike Avoidance—Vessel operator and crew must maintain a vigilant watch for all marine mammals and slow down or stop the vessel or alter course, as appropriate, to avoid striking any marine mammal, unless such action represents a human safety concern. Survey vessel crew members responsible for navigation duties shall receive site-specific training on marine mammal sighting/reporting and vessel strike avoidance measures. Vessel strike avoidance measures shall include the following, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk:

(i) The vessel operator and crew shall maintain vigilant watch for cetaceans and pinnipeds, and slow down or stop the vessel to avoid striking marine mammals;

(ii) The vessel operator will reduce vessel speed to 10 knots (18.5 km/hr) or less when any large whale, any mother/calf pairs, whale or dolphin pods, or larger assemblages of non-delphinoid cetaceans are observed near (within 100 m (330 ft)) an underway vessel;

(iii) The survey vessel will maintain a separation distance of 500 m (1640 ft) or greater from any sighted North Atlantic right whale;

(iv) If underway, the vessel must steer a course away from any sighted North Atlantic right whale at 10 knots (18.5 km/hr) or less until the 500 m (1640 ft) minimum separation distance has been established. If a North Atlantic right whale is sighted in a vessel's path, or within 100 m (330 ft) to an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. Engines will not be engaged until the North Atlantic right whale has moved outside of the vessel's path and beyond 100 m. If stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 100 m;

(v) The vessel will maintain a separation distance of 100 m (330 ft) or greater from any sighted non-delphinoid cetacean. If sighted, the vessel underway must reduce speed and shift the engine to neutral, and must not engage the engines until the non-delphinoid cetacean has moved outside of the vessel's path and beyond 100 m. If a survey vessel is stationary, the vessel will not engage engines until the non-delphinoid cetacean has moved out of the vessel's path and beyond 100 m;

(vi) The vessel will maintain a separation distance of 50 m (164 ft) or greater from any sighted delphinoid cetacean. Any vessel underway remain parallel to a sighted delphinoid cetacean's course whenever possible, and avoid excessive speed or abrupt changes in direction. Any vessel underway reduces vessel speed to 10 knots (18.5 km/hr) or less when pods (including mother/calf pairs) or large assemblages of delphinoid cetaceans are observed. Vessels may not adjust course and speed until the delphinoid cetaceans have moved beyond 50 m and/or the abeam of the underway vessel;

(vii) All vessels underway will not divert or alter course in order to approach any whale, delphinoid cetacean, or pinniped. Any vessel underway will avoid excessive speed or abrupt changes in direction to avoid injury to the sighted cetacean or pinniped; and

(viii) All vessels will maintain a separation distance of 50 m (164 ft) or greater from any sighted pinniped.

(ix) The vessel operator will comply with 10 knot (18.5 km/hr) or less speed restrictions in any Seasonal Management Area per NMFS guidance.

(x) If NMFS should establish a Dynamic Management Area (DMA) in the area of the survey, within 24 hours of the establishment of the DMA Statoil shall work with NMFS to shut down and/or alter survey activities to avoid the DMA as appropriate.

5. Monitoring Requirements—The Holder of this Authorization is required to conduct marine mammal visual monitoring and passive acoustic monitoring (PAM) during geophysical survey activity. Monitoring shall be conducted in accordance with the following requirements:

(a) A minimum of four NMFS-approved PSOs and a minimum of two certified (PAM) operator(s), operating in shifts, shall be employed by Statoil during geophysical surveys.

(b) Observations shall take place from the highest available vantage point on the survey vessel. General 360-degree scanning shall occur during the monitoring periods, and target scanning by PSOs will occur when alerted of a marine mammal presence.

(c) PSOs shall be equipped with binoculars and have the ability to estimate distances to marine mammals located in proximity to the vessel and/or Exclusion Zones using range finders. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine species. Digital single-lens reflex camera equipment will be used to record sightings and verify species identification.

(d) PAM shall be used during nighttime geophysical survey operations. The PAM system shall consist of an array of hydrophones with both broadband (sampling mid-range frequencies of 2 kHz to 200 kHz) and at least one low-frequency hydrophone (sampling range frequencies of 75 Hz to 30 kHz). PAM operators shall communicate detections or vocalizations to the Lead PSO on duty who shall ensure the implementation of the appropriate mitigation measure.

(e) During night surveys, night-vision equipment and infrared technology shall be used in addition to PAM. Specifications for night-vision and infrared equipment shall be provided to NMFS for review and acceptance prior to start of surveys.

(f) PSOs and PAM operators shall work in shifts such that no one monitor will work more than 4 consecutive hours without a 2 hour break or longer than 12 hours during any 24-hour period. During daylight hours the PSOs shall rotate in shifts of 1 on and 3 off, and while during nighttime operations PSOs shall work in pairs.

(g) PAM operators shall also be on call as necessary during daytime operations should visual observations become impaired.

(h) Position data shall be recorded using hand-held or vessel global positioning system (GPS) units for each sighting.

(i) A briefing shall be conducted between survey supervisors and crews, PSOs, and Statoil to establish responsibilities of each party, define chains of command, discuss communication procedures, provide an overview of monitoring purposes, and review operational procedures.

(j) Statoil shall provide resumes of all proposed PSOs and PAM operators (including alternates) to NMFS for review and approval at least 45 days prior to the start of survey operations.

(k) PSO Qualifications shall include direct field experience on a marine mammal observation vessel and/or aerial surveys.

(a) Data on all PAM/PSO observations shall be recorded based on standard PSO collection requirements. PSOs must use standardized data forms, whether hard copy or electronic. The following information shall be reported:

(i) PSO names and affiliations.

(ii) Dates of departures and returns to port with port name.

(iii) Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort.

(iv) Vessel location (latitude/longitude) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts.

(v) Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change.

(vi) Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including wind speed and direction, Beaufort sea state, Beaufort wind force, swell height, weather conditions, cloud cover, sun glare, and overall visibility to the horizon.

(vii) Factors that may be contributing to impaired observations during each PSO shift change or as needed as environmental conditions change (*e.g.,* vessel traffic, equipment malfunctions).

(viii) Survey activity information, such as acoustic source power output while in operation, number and volume of airguns operating in the array, tow depth of the array, and any other notes of significance (*i.e.,* pre-ramp-up survey, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.).

(ix) If a marine mammal is sighted, the following information should be recorded:

(A) Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);

(B) PSO who sighted the animal;

(C) Time of sighting;

(D) Vessel location at time of sighting;

(E) Water depth;

(F) Direction of vessel's travel (compass direction);

(G) Direction of animal's travel relative to the vessel;

(H) Pace of the animal;

(I) Estimated distance to the animal and its heading relative to vessel at initial sighting;

(J) Identification of the animal (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified); also note the composition of the group if there is a mix of species;

(K) Estimated number of animals (high/low/best);

(L) Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);

(M) Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);

(N) Detailed behavior observations (*e.g.,* number of blows, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior);

(O) Animal's closest point of approach and/or closest distance from the center point of the acoustic source;

(P) Platform activity at time of sighting (*e.g.,* deploying, recovering, testing, data acquisition, other); and

(Q) Description of any actions implemented in response to the sighting (*e.g.,* delays, shutdown, ramp-up, speed or course alteration, etc.) and time and location of the action.

6. Reporting—a technical report shall be provided to NMFS within 90 days after completion of survey activities that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, estimates the number of marine mammals that may have been taken during survey activities, describes the effectiveness of the various mitigation techniques (*i.e.* visual observations during day and night compared to PAM detections/operations) and provides an interpretation of the results and effectiveness of all monitoring tasks. Any recommendations made by NMFS shall be addressed in the final report prior to acceptance by NMFS.

(a) Reporting injured or dead marine mammals:

(i) In the event that the specified activity clearly causes the take of a marine mammal in a manner not prohibited by this IHA (if issued), such as serious injury or mortality, Statoil shall immediately cease the specified activities and immediately report the incident to NMFS. The report must include the following information:

(A) Time, date, and location (latitude/longitude) of the incident;

(B) Vessel's speed during and leading up to the incident;

(C) Description of the incident;

(D) Status of all sound source use in the 24 hours preceding the incident;

(E) Water depth;

(F) Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, and visibility);

(G) Description of all marine mammal observations in the 24 hours preceding the incident;

(H) Species identification or description of the animal(s) involved;

(I) Fate of the animal(s); and

(J) Photographs or video footage of the animal(s).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Statoil to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Statoil may not resume their activities until notified by NMFS.

(ii) In the event that Statoil discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition), Statoil shall immediately report the incident to NMFS. The report must include the same information identified in condition 6(b)(i) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with Statoil to determine whether additional mitigation measures or modifications to the activities are appropriate.

(iii) In the event that Statoil discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the specified activities (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Statoil shall report the incident to NMFS within 24 hours of the discovery. Statoil shall provide photographs or video footage or other documentation of the sighting to NMFS.

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 proposed marine site characterization surveys. Please include with your comments any supporting data or literature citations to help inform our final decision on the request for MMPA authorization.

On a case-by-case basis, NMFS may issue a one-year renewal IHA without additional notice when (1) another year of identical or nearly identical activities as described in the Specified Activities section is planned, or (2) the activities would not be completed by the time the IHA expires and renewal would allow completion of the activities beyond that described in the Dates and Duration section, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to expiration of the current IHA.
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted beyond the initial dates either are identical to the previously analyzed activities or include changes so minor (*e.g.,* reduction in pile size) that the changes do not affect the previous analyses, take estimates, or mitigation and monitoring requirements.

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

- Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures remain the same and appropriate, and the original findings remain valid.

Dated: February 16, 2018.

Donna S. Wieting,

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

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XF882

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Astoria Waterfront Bridge Replacement Project

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

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received a request from the City of Astoria for authorization to take marine mammals incidental to pile driving and construction work during the Waterfront Bridge Replacement Project in Astoria, Oregon. 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.

DATES: Comments and information must be received no later than March 26, 2018.

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

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by