preserved for subsequent histological analysis.

The hook-and-line sampling would take place for 30 minutes at the same randomly-selected, stratified stations as the bottom longline, while anchored. At each station, hook-and-line gear would be fished using three lines, with each line having two circular hooks baited with squid. For each fishing trip, fishers will randomly space their hooks on the line and will retain all reef fish collected, except for parrotfish and Nassau and goliath groupers, which would be immediately returned to the water. For each hook-and-line set, the following data would be recorded: Date; time of EFP vessel trips (*i.e.,* time of departure and return to dock); station location (latitude and longitude); fishing time to the nearest 10 minutes; weather conditions; depth; total number of hooked fish per vessel; number, weight, length, reproductive condition, and identification of reef fish per hook-and-line; and stratified habitat type or substrate type. Each fish will be identified by hook-and-line position and by fisher. If the habitat or substrate type is unknown, it will be characterized whenever possible using drop cameras.

Also at each station, a camera array would be deployed near the bottom longline for 30 minutes. The use of high-resolution digital video allows for accurate and precise reef fish species identification, counts, and size measurements.

NMFS finds this application warrants further consideration based on a preliminary review. Possible conditions the agency may impose on this permit, if it is indeed granted, include but are not limited to, a prohibition on conducting research within marine protected areas, marine sanctuaries, or special management zones, without additional authorization, and requiring compliance with best practices in the event of interactions with any protected species. NMFS may also require DNER complete and submit periodic catch report forms summarizing the amount of reef fish species harvested during the seasonal closures and within the exempted closed areas, as well as during the period of effectiveness of any issued EFP. Additionally, NMFS would require any sea turtles taken incidentally during the course of fishing or scientific research activities to be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water.

A final decision on issuance of the EFP will depend on NMFS' review of public comments received on the application, consultations with the affected state(s), the Council, and the U.S. Coast Guard, and a determination that it is consistent with all applicable laws.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: June 5, 2018.

Jennifer M. Wallace,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XG108

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Unexploded Ordnance Investigation Survey off the Coast of Virginia

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 Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion) for authorization to take marine mammals incidental to unexploded ordnance (UXO) investigation surveys off the coast of Virginia as part of site characterization surveys in the area of the Research Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS–A 0497) (Lease Area) and coastal waters where a cable route corridor 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 July 11, 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.Youngkin@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.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable* 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: Dale Youngkin, 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.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.* 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.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (incidental harassment authorizations with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216–6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review. 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 March 7, 2018, NMFS received a request from Dominion for an IHA to take marine mammals incidental to high resolution geophysical (HRG) surveys off the coast of Virginia. The purpose of these surveys are to acquire data regarding the potential presence of UXO within the proposed construction and operational footprints of the Coastal Virginia Offshore Wind (CVOW) Project Area in the Lease Area and export cable route construction corridor (Survey Area). A revised application was received on April 26, 2018. NMFS deemed that request to be adequate and complete. Dominion's request is for take of nine marine mammal species by Level B harassment. Neither Dominion nor NMFS expects injury, 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

Dominion proposes to conduct marine site characterization surveys including HRG surveys to search for UXO in the marine environment of the approximately 2,135-acre Lease Area located offshore of Virginia (see Figure 1–1 in the IHA application). Additionally, an export cable route will be established between the Lease Area and Virginia Beach, identified as the Export Cable Route Area (see Figure 1 in the IHA application). See the IHA application for further information. The survey area consists of two 1-kilometer (km) X 1-km turbine position locations, a 2 km by 300 meter (m) Inter-array cable route connecting the two turbine position locations, and a 43-km X 300 m Export Corridor Route. For the purpose of this IHA, the survey area is designated as the Lease Area and cable route corridors. Water depths across the Lease Area are estimated to range from approximately 8 to 40 m (26 to 131 feet (ft)) while the cable route corridors will extend to shallow water areas near landfall locations. Surveys would begin no earlier than August 1, 2018 and are anticipated to last for up to three months.

The purpose of the marine site characterization surveys are to acquire data regarding the potential presence of UXO within the proposed construction and operational footprints of the CVOW Project Area (*i.e.,* export cable construction corridor, inter-array cable area, and wind turbine positions) in accordance with the Bureau of Ocean Energy Management (BOEM) guidelines for archaeology surveys as well as geophysical activities. No removal of ordnance would be conducted as a part of the activities. Underwater sound resulting from Dominion's proposed HRG surveys for UXO have the potential to result in incidental take of marine mammals in the form of harassment.

Dates and Duration

Surveys will last for approximately three months and are anticipated to commence no earlier than August 1, 2018. 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 60 days for the export cable route corridor and approximately 15 days each for the inter-array cable route and wind turbine positions.

Specific Geographic Region

Dominion's survey activities will occur in the approximately 2,135-acre Research Lease Area located off the coast of Virginia (see Figure 1 in the IHA application). Additionally, a cable route corridor would be surveyed between the Lease Area and the coast of Virginia. The cable route corridor to be surveyed is anticipated to be 300 m wide and 43 km long. The wind turbine positions to be surveyed are 2 approximately 1 km X 1 km square areas connected by an inter-array cable route that is 300 m wide and 2 km in length.

Detailed Description of the Specified Activities

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

HRG Survey Activities

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

- Depth sounding (multibeam echosounder) to determine water depths and general bottom topography (currently estimated to range from approximately 8 to 40 m (26 to 131 ft) in depth);
- 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 acoustic targets resting on the bottom or that are partially buried;
- 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); and
- Medium penetration sub-bottom profiler (sparker) to map deeper subsurface stratigraphy as needed (soils down to 20 m (66 ft) below seabed).

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.

TABLE 1—SUMMARY OF HRG SURVEY EQUIPMENT PROPOSED FOR USE BY DOMINION

HRG system	Representative HRG survey equipment	Operating frequencies	RMS source level [1]	Peak source level [1]	Beamwidth (degree)	Pulse duration (millisec)
Subsea Positioning/USBL	Sonardyne Ranger 2 USBL	35–50kHz	188 dB_{rms}	200 dB_{Peak}	180	1.
Sidescan Sonar	Klein 300H Sidescan Sonar	445/900 kHz*	242 dBrms	226 dB_{Peak}	0.2	0.0025 to 0.4.
Pinger/Chirper	GeoPulse Sub-Bottom Profiler	1.5–19 kHz	208 dBrms	223.5 dB_{Peak}	55	0.1 to 1.
Sparker	Geo-Source 600/800	50 Hz–5 kHz	221/217 dB_{rms}	222/223 dB_{Peak}	110	0.8.
Multibeam Sonar	SeaBat 7125	200/400 kHz*	221 dB_{rms}	220 dB_{Peak}	2	2 to 6.
Medium Sub-Bottom Profiler	Innomar 100	85–115 kHz	243 dB_{rms}	250 dB_{Peak}	1	0.07 to 2.

[1] Source levels reported by manufacturer.
*Operating frequencies are above all relevant marine mammal hearing thresholds, so are not assessed in this IHA.

The HRG survey activities would be supported by up to two vessels. Assuming a maximum survey track line to fully cover the survey area, the assigned vessels will be sufficient in size to accomplish the survey goals in specific survey areas and will be capable of maintaining both the required course and survey speed of approximately 4.0 nautical miles per hour (mph) (knot (kn)) while transiting survey lines.

To minimize cost, the duration of survey activities, and the period of potential impact on marine species while surveying, Dominion 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 three months (including estimated weather down time) including 60 survey days in the export cable route and 15 survey days each in the inter-array cable route corridor and wind turbine positions.

The deployment of HRG survey equipment, including the equipment planned for use during Dominion'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 and source levels of the potential equipment planned to be used in support of HRG survey activities (Table 1) the survey activities that have the potential to cause Level B harassment to marine mammals include the noise produced by the 800 kilojoule (kJ) Geo-Source sparker, the GeoPulse sub-bottom profiler (pinger), and the Innomar Medium 100 sub-bottom profiler. We note here that the operating frequencies for all but the Innomar Medium 100 sub-bottom profiler are in the best hearing range for all marine mammal species that may potentially occur in the project area. However, the Innomar Medium 100 sub-bottom profiler operating frequencies are outside of the best hearing range for low-frequency (LF) cetacean species (refer to *Marine Mammal* subsection below for more detail on marine mammal hearing groups). Level A harassment may occur at distances from the Innomar 100 sub-bottom profiler solely for high-frequency (HF) cetaceans (harbor porpoise), though it is very unlikely to occur due to the one degree beam width. For the LF and mid-frequency (MF) cetaceans, Level A harassment could only potentially occur so close to the HRG source such that Level A harassment is not anticipated, especially in consideration of the hearing ranges for LF cetaceans and with implementation of monitoring and mitigation measures (described in more detail in the ''Estimated Take'' and ''Proposed Mitigation'' sections below). 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 Dominion's IHA application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected marine mammal species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SAR; *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS's website (*www.fisheries.noaa.gov/species-directory*).

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 Endangered Species Act (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 WITH POTENTIAL OCCURRENCE IN THE SURVEY AREA

Common name	Stock	NMFS MMPA and ESA status; strategic (Y/N) [1]	Stock abundance (CV,N_{min}) [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)	304	rare.
Atlantic spotted dolphin (*Stenella frontalis*)	W North Atlantic	-; N	44,715 (0.43; 31,610)	316	rare.
Bottlenose dolphin (*Tursiops truncatus*)	W North Atlantic, Southern Migratory Coastal.	-; Y	3,751 (0.60; 2,353)	23	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)	17	rare.
Risso's dolphin (*Grampus griseus*)	W North Atlantic	-; N	18,250 (0.46; 12,619)	126	rare.
Common dolphin (*Delphinus delphis*)	W North Atlantic	-; N	70,184 (0.28; 55,690)	557	Common year round.
Striped dolphin (*Stenella coeruleoalba*)	W North Atlantic	-; N	54,807 (0.3; 42,804)	428	rare.
Spinner Dolphin (*Stenella longirostris*)	W North Atlantic	-; N	Unknown (unk; unk; n/a)	Undet	rare.
Harbor porpoise (*Phocoena phocoena*)	Gulf of Maine/Bay of Fundy.	-; N	79,833 (0.32; 61,415)	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)	2.1	rare.
Long-finned pilot whale (*Globicephala melas*).	W North Atlantic	-; Y	5,636 (0.63; 3,464)	35	rare.
Short-finned pilot whale (*Globicephala macrorhynchus*).	W North Atlantic	-; Y	21,515 (0.37; 15,913)	159	rare.
Sperm whale (*Physeter macrocephalus*)	North Atlantic	E; Y	2,288 (0.28; 1,815)	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)	26	rare.
Dwarf sperm whale [4] (*Kogia sima*)	W North Atlantic	-; N	3,785 (0.47; 2,598)	26	rare.
Cuvier's beaked whale (*Ziphius cavirostris*)	W North Atlantic	-; N	6,532 (0.32; 5,021)	50	rare.
Blainville's beaked whale [5] (*Mesoplodon densirostris*).	W North Atlantic	-; N	7,092 (0.54; 4,632)	46	rare.
Gervais' beaked whale [5] (*Mesoplodon europaeus*).	W North Atlantic	-; N	7,092 (0.54; 4,632)	46	rare.
True's beaked whale [5] (*Mesoplodon mirus*)	W North Atlantic	-; N	7,092 (0.54; 4,632)	46	rare.
Sowerby's Beaked Whale [5] (*Mesoplodon bidens*).	W North Atlantic	-; N	7,092 (0.54; 4,632)	46	rare.
Melon-headed whale (*Peponocephala electra*).	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)	14	Year round in continental shelf and slope waters, occur seasonally to forage.
Blue whale (*Balaenoptera musculus*)	W North Atlantic	E; Y	Unknown (unk; 440)	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)	2.5	Year round in continental shelf and slope waters, occur seasonally to forage.
Humpback whale (*Megaptera novaeangliae*)	Gulf of Maine	-; Y	335 (0.42; 239)	3.7	Common year round.
North Atlantic right whale (*Eubalaena glacialis*).	W North Atlantic	E; Y	458 (0; 455)	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)	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)	1,554	Unlikely.
Harbor seal (*Phoca vitulina*)	W North Atlantic	-; N	75,834 (0.15; 66,884)	2,006	Common year round.
Hooded seal (*Cystophora cristata*)	W North Atlantic	-; N	Unknown (unk; unk)	Undet	rare.
Harp seal (*Phoca groenlandica*)	North Atlantic	-; N	Unknown (unk; unk)	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; N_{min} 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 2017 Draft 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, including those occurring in Canada, is estimated at 505,000.

All species that could potentially occur in the proposed survey areas are included in Table 2. However, the temporal and/or spatial occurrence for all but 11 of the 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 or further north 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. The 11 species/stocks evaluated for incidental take include: North Atlantic right whale; humpback whale; fin whale; minke whale; Atlantic white-sided dolphin; common dolphin; bottlenose dolphin; Atlantic spotted dolphin; long-finned pilot whale; short-finned pilot whale; and harbor porpoise.

Five marine mammal species listed in Table 2 are listed under the ESA and are known to be present, at least seasonally, in waters of the mid-Atlantic (sperm whale, north Atlantic right whale, fin whale, blue whale, and sei whale). All of these species are highly migratory and do not spend extended periods of time in the localized survey area. The offshore waters of Virginia (including the survey area) are primarily used as a migration corridor for these species, particularly north Atlantic right whales, during seasonal movements north or south between feeding and breeding grounds (Knowlton *et al.,* 2002; Firestone *et al.,* 2008). While fin and north Atlantic right whales have the potential to occur within the survey area, sperm, blue, and sei whales are more pelagic and/or northern species and their presence within the survey area is unlikely (Waring *et al.,* 2007; 2010; 2012; 2013) and these species are therefore not considered further in this analysis. In addition, while stranding data exists for harbor and gray seals along the mid-Atlantic coast south of New Jersey, their preference for colder, northern waters during the survey period makes their presence in the survey area unlikely. Winter haulout sites for harbor seals have been identified within the Chesapeake Bay region. However, the seals are not present during the summer and fall months when the survey activities are planned (Waring *et al.,* 2016). In addition, coastal Virginia represents the southern extent of the habitat range for gray seals, with few stranding records reported and sightings only occur during winter months as far south as New Jersey (Waring *et al.,* 2016). Therefore pinniped species will not be discussed further in this analysis.

Below is a description of the species that are both common in the survey area and that have the highest likelihood of occurring, at least seasonally, in the survey area and are thus have potential to be taken by the proposed activities.

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 18 confirmed dead stranded whales (12 in Canada; 6 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.*

The lease area is part of a biologically 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 United States 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 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.

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. This event has been declared a UME. Partial or full necropsy examinations have been conducted on approximately half of the 68 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).

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).

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.

Common Dolphin

The 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 2000-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

Bottlenose dolphins occur in oceans and peripheral seas at both tropical and temperate latitudes. The population of bottlenose dolphins in the North Atlantic consists of a complex mosaic of stocks (Waring *et al.,* 2016). There are two distinct morphotypes: Migratory coastal and offshore. The migratory coastal morphotype resides in waters typically less than 20 m (65.6 ft) deep, along the inner continental shelf, around islands, and is continuously distributed south of Long Island, NY into the Gulf of Mexico. This migratory coastal population is subdivided into seven stocks based largely upon spatial distribution (Waring *et al.,* 2016). Of these seven coastal stocks, the Western North Atlantic migratory coastal stock is common in the coastal continental shelf water off the North Carolina/Virginia border Waring *et al.,* 2016). There are northern and southern Western North Atlantic migratory coastal stocks, and we would anticipate the southern stock to be present in the survey area. These animals move into or reside in bays, estuaries, lower reaches of rivers, and coastal waters within the approximately 25 m depth isobath north of Cape Hatteras (Reeves *et al.,* 2002; Waring *et al.,* 2016). During winter, bottlenose dolphins are rarely observed north of the North Carolina/Virginia border (Waring *et al.,* 2016).

Generally, the offshore migratory morphotype is found exclusively seaward of 34 km (21 miles) and in waters deeper than 34 m (111.5 ft). The offshore population extends along the entire continental shelf break from Georges Bank to Florida during the spring and summer months, and has been observed in the Gulf of Maine during the late summer and fall. However, the range of the offshore morphotype south of Cape Hatteras has recently been found to overlap with that of the migratory coastal morphotype in water depths of 13 m (42.7 ft) (Waring *et al.,* 2016; Hayes *et al.,* 2017). The main threat to this species is human interaction due to interactions with commercial fisheries (Waring *et al.,* 2016). They have also been adversely affected by pollution, habitat alteration, boat collisions, human disturbance, and are subject to bioaccumulation of toxins.

Atlantic Spotted Dolphin

There are two species of spotted dolphin in the Atlantic Ocean, the Atlantic spotted dolphin, and the pantropical spotted dolphin (Perrin 1987). Where they co-occur, the two species can be difficult to differentiate. In addition, two forms of the Atlantic spotted dolphin exist with one that is large and heavily spotted and the other smaller in size with less spots (Waring *et al.,* 2016). The larger form is associated with continental shelf habitat while the smaller form is more pelagic, preferring offshore waters and waters around oceanic islands (Perrin, 2009; 1994). The Atlantic spotted dolphin prefers tropical to warm temperate waters along the continental shelf 10 to 200 m (33 to 650 ft) deep to slope waters greater than 500 m (1,640 ft).

Risso's Dolphin

Risso's dolphin is typically an offshore dolphin that is uncommon to see inshore (Reeves *et al.,* 2002). Risso's dolphin prefers temperate to tropical waters along the continental shelf edge and can range from Cape Hatteras to Georges Bank from spring through fall, and throughout the mid-Atlantic Bight out to oceanic waters during winter (Payne *et al.,* 1984). Risso's dolphins are usually seen in groups of 12 to 40, but loose aggregations of 100 to 200 or more are seen occasionally (Reeves *et al.,* 2002).

Long-Finned and Short-Finned Pilot Whales

The two species of pilot whales in the western Atlantic are difficult to differentiate. Therefore, both species are presented together, since much of the data is generalized for these species. Both species are generally found along the edge of the continental shelf at depths of 100 to 1,000 m (330 to 3,300 ft) in areas of high reliefs or submerged banks. In the western North Atlantic, long-finned pilot whales are pelagic, occurring in especially high densities in

winter and spring over the continental slope, then moving inshore and onto the shelf in summer and fall following squid and mackerel populations (Reeves *et al.,* 2002). Short-finned pilot whales prefer tropical, subtropical and warm temperate waters (Olsen, 2009). The short-finned pilot whale ranges from New Jersey south through Florida, the northern Gulf of Mexico, and the Caribbean (Warring *et al.,* 2011). Populations for both of these species overlap between North Carolina and New Jersey (Waring *et al.,* 2012; 2011)

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 (>1,800 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).

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 decibels (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 kHz;

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.,* 2006; Kastelein *et al.,* 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 (all cetacean species) have the reasonable potential to co-occur with the proposed survey activities. Please refer to Table 2. Of the species that may be present, four are classified as low-frequency cetaceans (*i.e.,* all mysticete species), six are classified as mid-frequency cetaceans (*i.e.,* all delphinid species), 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 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 m 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 (HRG) 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).

Threshold Shift

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

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

Relationships between TTS and PTS thresholds have not been studied in marine mammals, and there is no PTS data for cetaceans, but such relationships are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several dB above (a 40-dB threshold shift approximates PTS onset; *e.g.,* Kryter *et al.,* 1966; Miller, 1974) that inducing mild TTS (a 6-dB threshold shift approximates TTS onset; *e.g.,* Southall *et al.,* 2007). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulse sounds (such as impact pile driving pulses as received close to the source) are at least 6 dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.,* 2007). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

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

on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals.

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

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin (Tursiops truncatus), beluga whale (Delphinapterus leucas), harbor porpoise, and Yangtze finless porpoise (Neophocoena asiaeorientalis)) and three species of pinnipeds (northern elephant seal, harbor seal, and California sea lion) exposed to a limited number of sound sources (*i.e.,* mostly tones and octave-band noise) in laboratory settings (Finneran, 2015). TTS was not observed in trained spotted (Phoca largha) and ringed (Pusa hispida) seals exposed to impulsive noise at levels matching previous predictions of TTS onset (Reichmuth *et al.,* 2016). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. There are no data available on noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al.,* (2007), Finneran and Jenkins (2012), Finneran (2015), and NMFS (2016).

Animals in the survey area during the HRG surveys are unlikely to incur TTS hearing impairment due to the characteristics of the sound sources, which include fairly low source levels 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 sound exposure level (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. For similar reasons, and with implementation of mitigation measures, animals in the survey area during the HRG surveys are unlikely to incur PTS hearing impairment; however, a small number of PTS takes are evaluated for authorization as discussed in more detail in the Estimated Take section.

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 proposed HRG equipment 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 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, et al., one 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 some dolphin species 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 Dominion'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).

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 kn). Given the slow vessel speeds and predictable course necessary for data acquisition, ship strike is unlikely to occur during the geophysical surveys. Marine mammals would be able to easily avoid the survey vessel due to the slow vessel speed. Further, Dominion 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. 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 only, 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 as 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. Dominion'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, Dominion'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 (see Table 1). Of the HRG survey equipment planned for use that has the potential to result in harassment of marine mammals, acoustic modeling indicated the Innomar Medium 100 sub-bottom profiler 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 this equipment 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 Innomar Medium 100 sub-bottom profiler (100 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)
Pinger/Chirper	GeoPulse sub-bottom profiler	<5 m
Sparker	Geo-Source 800 sparker	<20 m
Medium penetration sub-bottom profiler	Innomar Medium 100 sub-bottom profiler	*<100 m

* We note here that the Innomar Medium 100 sub-bottom profiler operating frequencies (85–115 kHz) are beyond the best hearing capabilities of LF cetaceans (7–35 kHz), but as this sound source provides the largest Level B isopleth, this information was used to calculate the zone of influence and estimate take for all species.

Predicted distances to Level A harassment isopleths, which vary based on marine mammal functional hearing groups (Table 5), were also calculated by Dominion. 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 (SPL) 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. Dominion used the NMFS optional User Spreadsheet to calculate distances to Level A harassment isopleths (see Appendix A of the IHA application). Modeled distances to isopleths corresponding to Level A harassment thresholds for the proposed HRG equipment and marine mammal hearing groups 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)	PTS onset	Lateral distance (m)
GeoPulse Sub-Bottom Profiler		
Low frequency cetaceans	219 dB_{peak}/	—
	183 dB SEL_{cum}	<1
Mid frequency cetaceans	230 dB_{peak}/	—
	185 dB SEL_{cum}	—
High frequency cetaceans	202 dB_{peak}/	<1
	155 dB SEL_{cum}	16
Phocid Pinnipeds (Underwater)	218 dB_{peak}/	—
	185 dB SEL_{cum}	<1
Geo-Source 800 Sparker		
Low frequency cetaceans	219 dB_{peak}/	—
	183 dB SEL_{cum}	5
Mid frequency cetaceans	230 dB_{peak}/	—
	185 dB SEL_{cum}	<1
High frequency cetaceans	202 dB_{peak}/	<1
	155 dB SEL_{cum}	24
Phocid Pinnipeds (Underwater)	218 dB_{peak}/	—
	185 dB SEL_{cum}	3
Innomar Medium 100 Sub-Bottom Profiler		
Low frequency cetaceans	219 dB_{peak}/	<1
	183 dB SEL_{cum}	N/A
Mid frequency cetaceans	230 dB_{peak}/	<1
	185 dB SEL_{cum}	—
High frequency cetaceans	202 dB_{peak}/	<5
	155 dB SEL_{cum}	<50
Phocid Pinnipeds (Underwater)	218 dB_{peak}/	<1
	185 dB SEL_{cum}	N/A

Note: Peak SPL is unweighted (flat weighted), whereas the cumulative SEL criterion is M-weighted for the given marine mammal hearing group.
— indicates not expected to be measureable to regulatory threshold at any appreciable distance.
N/A indicates not applicable as the HRG sound source is outside the effective marine mammal hearing range.

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 to avoid Level A harassment (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. However, to be conservative, Dominion has requested small amounts of Level A incidental take for bottlenose, common, and Atlantic white-sided dophins to specifically allow survey activities to continue, understanding the proclivity of these species to approach vessels to bow and/or wake ride and closely investigate active survey gear. Calculated distances presented in Table 5 indicates Level A PTS onset occurring at distances less than one m of the sound source (if at all) for mid-frequency cetaceans such as delphinids, and the applicant has calculated take based on a 5 m zone as an even more conservative measure for Level A take. However, due to the small Level A isopleth and the fact that animals are not likely to remain within this small zone for long enough to incur PTS, NMFS is not proposing to authorize Level A take for these species/stocks.

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 Dominion'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. For example, in the case of the Innomar Medium 100 sub-bottom profiler, the beamwidth is only one degree. 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. In addition to the conservative estimation of calculated distances to isopleths associated with the Innomar Medium 100 sub-bottom profiler, calculated takes may be conservative due to the fact that this sound source operates at frequencies beyond the best hearing capabilities of

LF cetaceans, but calculated takes for all species were based on the isopleths associated with this sound source. As discussed above, the Innomar Medium 100 sub-bottom profiler operates at frequencies between 85 and 115 kHz and the best hearing range of LF cetaceans is between 7 and 35 kHz. Therefore, we would not expect that take of LF cetaceans would likely occur due to the use of this equipment because it operates beyond their hearing capabilities, but takes were estimated based on these isopleths due to the fact that the largest distances were associated with this equipment.

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.,* Summer (June, July, August), and Fall (September, October, November)) to provide seasonal density estimates. The highest average seasonal density as reported by Roberts *et al.* (2016), for each species, was used based on the planned survey dates of August through October.

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 regulatory threshold criteria (Tables 4 and 5) and estimated daily track line distance of approximately 177.8 km (110.5 mi), it was estimated that an area of 35.59 km^2 (13.74 mi^2) per day would be ensonified to the largest Level B harassment threshold, and 1.78 km^2 (0.69 mi^2) per day would be ensonifed to the Level A harassment threshold (largest threshold of 155 dB SEL_{cum} for HF cetaceans was used) (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 A harassment threshold per day (km^2)	Estimated area ensonified to Level B harassment threshold per day (km^2)
177.8	1.78	35.59

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 turbine positions, inter-array cable route corridor survey areas, and export cable route corridors; therefore, the estimated number of each species taken per survey day was calculated separately for the these survey areas. 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 (turbine positions, inter-array cable route, and export 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.,* 15 survey days each in the turbine position location and inter-array cable route, and 60 survey days in the export cable route corridor portion of the survey) to get a total number of takes per species in each respective survey area.

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 unlikely as to be discountable. Proposed take numbers are shown in Table 7. As described above, the zone of influence (ZOI) were calculated based on the sound source with the largest isopleths to the regulatory thresholds (the Innomar

Medium 100 sub-bottom profiler) without consideration of the fact that this equipment operates beyond the best hearing capability of LF cetaceans, so calculated takes of these species are likely to be overestimates due to the fact that we would not necessarily expect LF cetaceans to be harassed by sound produced by this equipment.

TABLE 7—NUMBERS OF POTENTIAL INCIDENTAL TAKE OF MARINE MAMMALS CALCULATED AND PROPOSED FOR LEVEL B HARASSMENT AUTHORIZATION

Species	Turbine positions		Export cable route		Inter-array cable route		Totals	
	Max. seasonal density [a] (#/1,000 km^2)	Calculated takes	Max. seasonal density [a] (#/1,000 km^2)	Calculated takes	Max. seasonal density [a] (#/1,000 km^2)	Calculated takes	Adjusted take	% of population
North Atlantic right whale	0.00	0	0.00	0.00	0.00	0.00	[b] 0	0.00
Humpback whale	0.02	0.10	0.02	0.39	0.02	0.10	1	0.30
Fin whale	0.11	0.57	0.11	2.28	0.11	0.57	[b] 0	0.00
Minke whale	0.03	0.14	0.03	0.58	0.03	0.14	[c] 10	0.39
Bottlenose dolphin—N Coastal Migratory	13.99	74.69	13.99	298.77	13.99	74.69	[d e] 350	9.33
Bottlenose dolphin—Offshore	13.99	74.69	13.99	298.77	13.99	74.69	[d e] 350	9.33
Atlantic spotted dolphin	0.90	4.80	1.23	26.29	0.90	4.80	[c] 300	0.67
Common dolphin	2.50	13.35	2.50	53.40	2.50	13.35	[d] 400	0.57
Atlantic white-sided dolphin	0.39	2.08	0.39	8.30	0.39	2.08	[c] 200	0.41
Risso's dolphin	0.01	0.03	0.00	0.02	0.01	0.03	0	0.00
Short-finned/long-finned pilot whale	0.06	0.31	0.02	0.53	0.06	0.31	[e] 15	0.27
Harbor porpoise	0.27	1.45	0.23	4.91	0.27	1.45	8	0.01

[a] Density values from Duke University (Roberts *et al.,* 2016).
[b] Proposed mitigation (exclusion zone) will prevent take.
[c] Value increased to reflect typical group size.
[d] Calculated take has been modified to account for increases in actual sighting data to date (Ocean Wind LLC, 2017) based on similar project activities.
[e] Take adjusted to account for possible overlap of the Western North Atlantic southern migratory coastal and offshore stocks (assume a 50 percent of each stock).

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, Dominion is proposing the following mitigation measures during the proposed marine site characterization surveys.

Marine Mammal Exclusion and Watch Zones

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 (164.0 ft) EZ for harbor porpoises, which is the extent of the largest calculated distance to the potential for onset of PTS (Level A harassment);
- 100 m (328.1 ft) EZ for ESA-listed large whales (*i.e.,* fin whales), which is the largest calculated distance to the potential for behavioral harassment (Level B behavioral harassment); and
- 500 m (1,640.4 ft) EZ for North Atlantic right whales.

In addition, PSOs will visually monitor to the extent of the Level B zone (100 m (328.1 ft)) for all other marine mammal species not listed above.

Visual Monitoring

Visual 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.

Pre-Clearance of the Exclusion Zone

For all HRG survey activities, Dominion would implement a 30-minute pre-clearance period of the relevant EZs prior to the initiation of HRG survey equipment. 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.

Ramp-Up of Survey Equipment

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

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.

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

Dominion 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 kn (18.5 km/hr) or less speed restrictions in any DMA. This applies to all vessels operating at any time of year. In addition (if applicable, as surveys are not anticipated to occur during this time of year), vessels over 19.8 m (65 ft) operating from November 1 through April 30 will operate at speeds of 10 kn or less;
- All vessel operators will reduce vessel speed to 10 kn (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 kn (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 500 m (1640 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 500 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 100 m 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 the engines until the non-delphinoid cetacean has moved out of the vessel's path and beyond 100 m.
- 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 kn (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.

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. The proposed survey

activities will occur in the vicinity of the Right Whale Mid-Atlantic SMA located at the mouth of the Chesapeake Bay. However, the proposed survey start date in August, 2018 is outside of the seasonal mandatory speed restriction period for this SMA (November 1 through April 30). 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 Dominion will work with NMFS to shut down and/or alter the survey activities as needed to avoid right whales to the extent possible.

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 additional 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 training program, as appropriate. As proposed by the applicant and required by BOEM, an observer team comprising a minimum of four NMFS-approved PSOs operating in shifts, will be employed by Dominion during the proposed surveys. PSOs 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. During ramp-up procedures, two PSOs will be required. Each PSO will monitor 360 degrees of the field of vision.

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, 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 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 Dominion. 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.

Proposed Reporting Measures

Dominion 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 activities lead to an injury of a marine mammal (Level A harassment) or mortality (*e.g.,* ship-strike, gear interaction, and/or entanglement), Dominion 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 Dominion to minimize reoccurrence of such an event in the future. Dominion would not resume activities until notified by NMFS.

In the event that Dominion 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), Dominion 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 Dominion to determine if modifications in the activities are appropriate.

In the event that Dominion 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), Dominion 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. Dominion would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS. Dominion 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 Tables 8 and 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 Dominion'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 most 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 Virginia, this biologically important migratory area extends from the coast to the just beyond 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, North Atlantic 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 Dominion'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 or serious injury is anticipated or authorized;
- The anticipated impacts of the proposed activity on marine mammals would limited to 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 10 percent of bottlenose dolphin stocks, and less than 1 percent of each of the other species and stocks). See Tables 7 and 8. 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.

The NMFS Office of Protected Resources is proposing mitigation to avoid the incidental take of the species of marine mammals which are likely to be present and are listed under the ESA: The North Atlantic right and fin whales. Therefore, consultation under section 7 of the ESA is not required.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to Dominion for conducting UXO surveys offshore Virginia and along the export 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 UXO survey activities utilizing HRG survey equipment, 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 Dominion Energy Virginia (Dominion), the vessel operator and other relevant personnel, the lead PSO, and any other relevant designees of Dominion operating under the authority of this IHA.

(b) The species authorized for taking are listed in Table 8. The taking is limited to the species and numbers listed in Tables 8 and 9. Any taking of species not listed in Tables 8 and 9, or exceeding the authorized amounts listed, 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) Dominion 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) Dominion 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. PSOs shall monitor a marine mammal Watch Zone that shall encompass an area 500 m from the survey equipment to encompass the exclusion zone for North Atlantic right whales. PSOs shall document and record the behavior of all marine mammals observed within the Watch Zone. The Exclusion Zones are as follows:

(i) A 50 m Exclusion Zone for harbor porpoises;

(ii) a 100 m Exclusion Zone for large ESA-listed whales, except North Atlantic right whales (*i.e.,* fin whales); and

(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) If a species for which authorization has not been granted, or, a species for which authorization has been granted but the authorized number of takes have been met, approaches or is observed within 100 m of the survey equipment, shutdown must occur.

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

(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 kn (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 kn (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 kn (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 kn (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, DWW shall contact the NMFS Office of Protected Resources to determine whether survey location and/or activities should be altered to avoid North Atlantic right whales.

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

(a) A minimum of four NMFS-approved PSOs, operating in shifts, shall be employed by Dominion 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) During night surveys, night-vision equipment and infrared technology shall be used. Specifications for night-vision and infrared equipment shall be provided to NMFS for review and acceptance prior to start of surveys.

(e) PSOs 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. During ramp-up procedures and nighttime operations PSOs shall work in pairs.

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

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

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

(i) Data on all 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 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, Dominion 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 Dominion to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Dominion may not resume their activities until notified by NMFS.

(ii) In the event that Dominion 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), Dominion 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 Dominion to determine whether additional mitigation measures or modifications to the activities are appropriate.

(iii) In the event that Dominion 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), Dominion shall report the incident to NMFS within 24 hours of the discovery. Dominion 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; and

(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: June 6, 2018.

Donna S. Wieting,

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

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DEPARTMENT OF DEFENSE

Department of the Army

Board of Visitors, United States Military Academy (USMA)

AGENCY: Department of the Army, DoD.

ACTION: Notice of committee meeting.

SUMMARY: Under the provisions of the Federal Advisory Committee Act of 1972, the Government in the Sunshine Act of 1976, the Department of Defense announces that the following Federal advisory committee meeting will take place.

DATES: The meeting will be held on Monday, July 9, 2018, Time 8:00 a.m.–11:00 a.m. Members of the public wishing to attend the meeting will be required to show a government photo ID upon entering West Point in order to gain access to the meeting location. All members of the public are subject to security screening.

ADDRESSES: The meeting will be held in the Haig Room, Jefferson Hall, West Point, New York 10996.

FOR FURTHER INFORMATION CONTACT: Mrs. Deadra K. Ghostlaw, the Designated Federal Officer for the committee, in writing at: Secretary of the General Staff, ATTN: Deadra K. Ghostlaw, 646 Swift Road, West Point, NY 10996; by email at: *deadra.ghostlaw@usma.edu* or *BoV@usma.edu;* or by telephone at (845) 938–4200.

SUPPLEMENTARY INFORMATION: The committee meeting is being held under the provisions of the Federal Advisory Committee Act of 1972 (5 U.S.C., Appendix, as amended), the Government in the Sunshine Act of 1976 (5 U.S.C. 552b, as amended), and 41 CFR 102–3.150. The USMA BoV provides independent advice and recommendations to the President of the United States on matters related to morale, discipline, curriculum, instruction, physical equipment, fiscal affairs, academic methods, and any other matters relating to the Academy that the Board decides to consider.

Purpose of the Meeting: This is the 2018 Summer Meeting of the USMA BoV. Members of the Board will be provided updates on Academy issues. Agenda: Introduction; Board Business; Superintendent Introduction: Mission, Vision, and Priorities; Strategic Imperative 1—Develop Leaders of Character: Developing Leaders of Character, Update on changes to CCDP (Cadet Character Development Plan), Annual Assessment; Strategic Imperative 2—Foster Relevance and Preeminence: Build Diverse and