BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XC456]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Marine Site Characterization Surveys offshore of North Carolina and South Carolina

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

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible renewal.

SUMMARY: NMFS has received a request from TerraSond Limited (TerraSond) for authorization to take marine mammals incidental to marine site characterization surveys in federal waters offshore of North Carolina and South Carolina in the Bureau of Ocean Energy Management (BOEM) Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (Lease) Areas OCS-A 0545 and OCS-A 0546 (also referred to [by BOEM] as the "Carolina Long Bay Lease Areas." 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 is also requesting comments on a possible one-time, one-year renewal that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than [*insert date 30 days after date of publication in the FEDERAL REGISTER*].

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be submitted via email to *ITP.taylor@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, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act* 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: Jessica Taylor, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical

region if certain findings are made and either regulations are proposed or, if the taking is limited to harassment, a notice of a proposed IHA is provided to the public for review.

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

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 IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs 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 September 19, 2022, NMFS received a request from TerraSond for an IHA to take marine mammals incidental to marine site characterization surveys in federal waters offshore of North Carolina and South Carolina in the Bureau of Ocean Energy Management (BOEM) Lease Areas OCS-A 0545 and 0546. Following NMFS' review of the application, TerraSond submitted revised applications on October 14, 2022 and October 17, 2022. The application was deemed adequate and complete on November 9, 2022. TerraSond's request is for take of small numbers of 18 species of marine mammals by Level B harassment only. Neither TerraSond nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

TerraSond proposes to conduct marine site characterization surveys in the BOEM Lease Areas OCS-A 0545 and 0546 in federal waters offshore of North Carolina and South Carolina to support the development of offshore wind farm technology. TerraSond's proposed site characterization survey activities, specifically high-resolution geophysical (HRG) surveys, have the potential to result in incidental take of marine mammals in the form of Level B behavioral harassment.

Dates and Duration

HRG surveys are planned to commence as early as February 1, 2023 and last for a minimum of 6-8 months (or through January 31, 2024) for a total of approximately 180 active survey days (Table 1) over the course of the 1 year period of effectiveness for the proposed IHA. A "survey day" is defined as a 24-hour (hr) activity period in which active acoustic sound sources are used. This schedule is inclusive of any inclement weather

downtime and crew transfers. Up to 2 HRG survey vessels may be active at one time. The number of anticipated active survey days in a phase (see Table 1) was calculated by dividing the total vessel trackline length by the approximate vessel survey distance per day with active HRG equipment. It is expected that each vessel would cover approximately 100 kilometers (km) per day at a speed of 1.8 meters/second (m/s). The project would consist of three phases, including up to 3 possible tow configurations (Table 1).

Table 1 -- Proposed number of survey days and distances for each phase [1]

Survey Phase	Total Approximate Vessel Trackline (km)	Approximate Vessel Distance per Day (km)	Active Survey Days
Phase 1	4,054	100	41
Phase 2	1,400	100	14
Phase 3	12,488	100	125

[1] Up to two survey vessels may actively survey over a 24- hour period

Specific Geographic Region

TerraSond's survey activities would occur in BOEM Lease Areas OCS-A 0545 and 0546, approximately 34-56 km offshore of Cape Fear, North Carolina (Figure 1). The proposed survey area is offshore of North Carolina and South Carolina in federal waters, and covers an area of approximately 445.4 square kilometers (km^2). Water depths within the proposed survey area range from 20-35 meters (m) (66-115 feet (ft)).

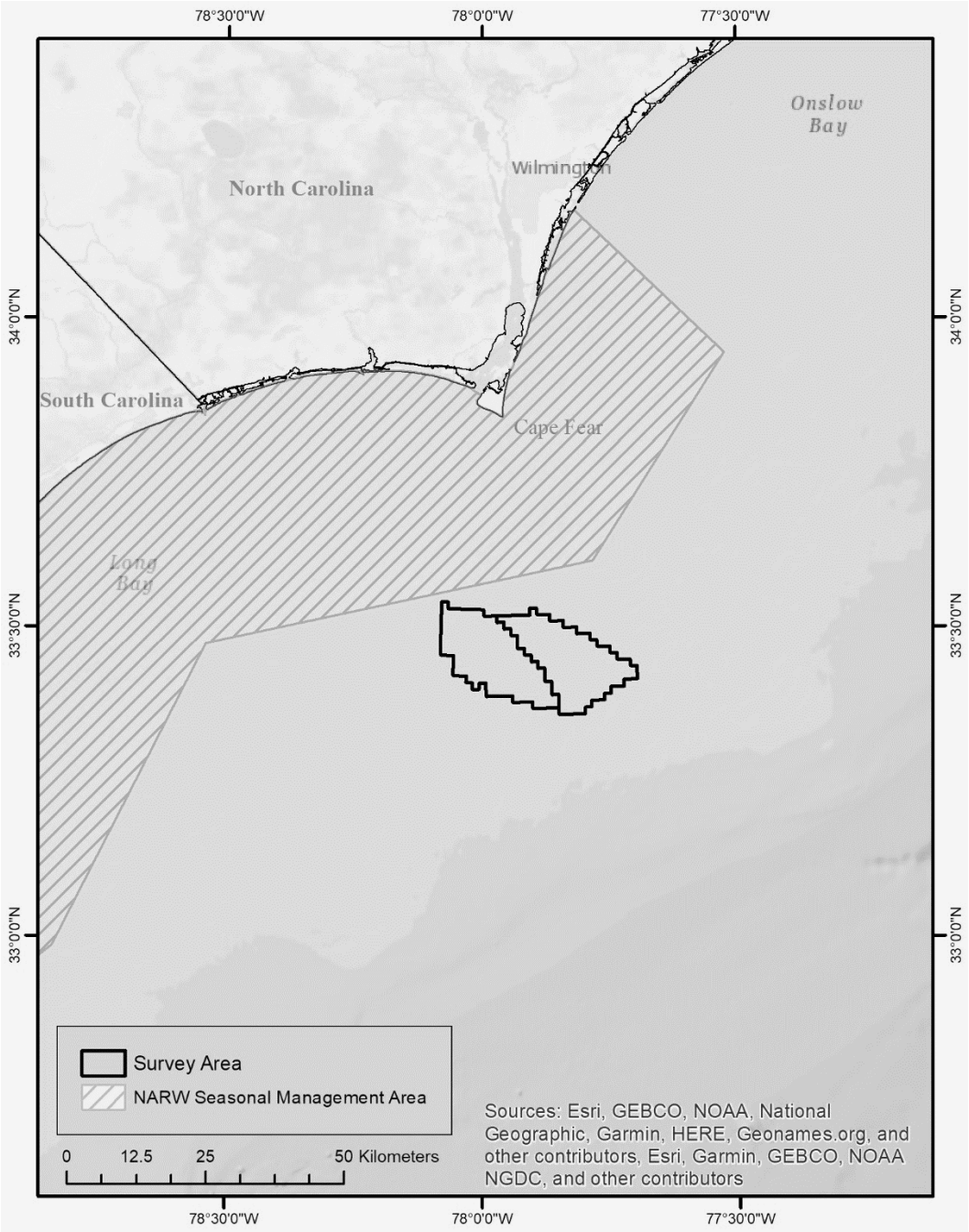

Figure 1. Proposed Survey Area

Detailed Description of Specific Activity

TerraSond proposes to conduct HRG surveys to acquire data on the bathymetry, seafloor morphology, subsurface geology, environmental/biological sites, seafloor obstructions, soil conditions, and locations of any man-made, historical, or archaeological resources in BOEM Lease Areas OCS-A 0545 and 0546 to support offshore wind energy development. HRG surveys will include the use of seafloor mapping equipment with operating frequencies above 180 kilohertz (kHz) (*e.g.,* side-scan sonar (SSS), multibeam echosounders (MBES)); magnetometers and gradiometers that have no acoustic output; and shallow- to medium-penetration sub-bottom profiling (SBP) equipment (*e.g.,* parametric sonars, sparkers) with operating frequencies below 180 kHz. No deep-penetration SBP surveys (*e.g.,* airgun or bubble gun surveys) will be conducted.

TerraSond also proposes to conduct geotechnical surveys, including the use of vibracores and seabed core penetrations tests (CPTs). Vibracoring and CPT may be conducted from the geophysical survey vessel or by an additional geotechnical vessel. NMFS does not expect geotechnical sampling activities to present reasonably anticipated risk of causing incidental take of marine mammals, and these activities are not discussed further in this notice.

As described earlier, TerraSond's proposed HRG surveys will consist of three phases consisting of differing tow configurations of the sparker. Phase 1 may take place concurrently with Phases 2 and 3, and multiple vessels may be used for each stage. Phase 1 would involve the use of a single source vessel towing one sparker source composed of two "decks" of 400 electrode tips each stacked on top of each other. Phase 2 would be a brief period of survey work for Research and Development (R&D) purposes, involving the use of a single source vessel towing three of the same sparker sources with a horizontal separation between the sources of 150 m. The three sources would operate independently while collecting geophysical data along separate lines. Phase 3 would involve a single vessel towing two of the same sparker sources described in Phase 1 with

a horizontal separation between the sources of 30 m. As described in Phase 2, the two sources would operate independently of each other while collecting geophysical data along two separate lines. Phase 3 activities may occur simultaneously with Phase 1 and 2 activities.

TerraSond proposes to use the following acoustic source during HRG survey activities at sounds levels that have the potential to result in Level B harassment of marine mammals:

- Medium penetration SBPs (sparkers) are used to map deep subsurface stratigraphy as needed. Sparkers create acoustic pulses from 50 Hz to 4 kHz omnidirectionally from the source, and are considered to be impulsive sources. Sparkers are typically towed behind the vessel with adjacent hydrophone arrays to receive the return signals.

Operation of the following survey equipment types is not reasonably expected to result in take of marine mammals and will not be discussed further beyond the brief summaries provided below:

- Parametric SBPs are used to provide high data density in sub-bottom profiles that are typically required for cable routes, very shallow water, and archaeological surveys. Parametric SPBs are usually mounted on a pole, either over the side of the vessel or through a moon pool in the bottom of the hull. Crocker and Fratantonio (2016) does not provide relevant measurements or source data for parametric SBPs, however, some source information is provided by the manufacturer. For the proposed project, the SBP used would generate short, very narrow-beam sound pulses at relatively high frequencies (generally around 85 to 115 kHz). The narrow beam width significantly reduces the potential for exposure while the high frequencies of the source are rapidly attenuated in seawater.

Given the narrow beam width and relatively high frequency. NMFS does not reasonably expect there to be potential for marine mammals to be exposed to the signal;

- Ultra-short baseline (USBL) positioning systems are used to provide high accuracy ranges by measuring the time between the acoustic pulses transmitted by vessel transceiver and a transponder (or beacon) necessary to produce the acoustic profile. USBLs are expected to produce extremely small acoustic propagation distances in their typical operating configuration, and therefore marine mammals are highly unlikely to be exposed;
- Multibeam echosounders (MBES) are used to determine water depths and general bottom topography. MBES sonar systems project sonar pulses in several angled beams from a transducer mounted to a ship's hull. The beams radiate out from the transducer in a fan-shaped pattern orthogonally to the ship's direction. The proposed MBES (Reson T50 Dual Head) has an operating frequency >180 kHz (200-400 kHz) and, therefore, is outside the general hearing range of marine mammals; and
- Side scan sonars (SSS) are used for seabed sediment classification purposes and to identify natural and man-made acoustic targets on the seafloor. The sonar device emits conical or fan-shaped pulses down toward the seafloor in multiple beams at a wide angle, perpendicular to the path of the sensor through the water column. The proposed SSS has an operating frequency >180 kHz (300-600 kHz) and, therefore, is outside the general hearing range of marine mammals.

Table 2 identifies representative survey equipment with the potential to result in exposure and take of marine mammals. TerraSond plans to use the Applied Acoustics

UHRS 400 + 400, which is essentially two of the same Applied Acoustic Dura-Spark sources (Crocker and Fratantonio, 2016) stacked on top of each other creating two "decks" to the sparker. The decks will not be discharged simultaneously. Instead, they will be used in an alternating "flip-flop" pattern. Thus, for all of the described source configurations, the maximum power expected when discharging the sparker source (single deck) will be 800 Joules (J). Crocker and Fratantonio (2016) measured the Applied Acoustics Dura-Spark, but did not provide data for an energy setting near 800 J (for a 400-tip configuration, Crocker and Fratantonio (2016) provide measurements at 500 and 2,000 J). Therefore, TerraSond proposes to use a similar alternative system, which was measured with an input voltage of 750 J, as a surrogate. NMFS concurs with this selection, which is described in Table 2.

Table 2 -- Representative survey equipment expected to result in take of marine mammals

Equipment Type	System	Operating Frequency Range (kHz)	Source Level (dB Pk)	Source Level (dB RMS)	Pulse Duration (ms)	Beamwidth (degrees)	Pulse Repetition Rate (seconds)
Sparker	Applied Acoustics Dura-Spark UHRS 400 + 400, 800 tips total, up to 1,400 J [1]	0.3-1.2	213	203	1.1	180 (Omni)	0.25

kHz= kilohertz; dB = decibel; Pk= peak; RMS= root mean square; J= joule

[1] SIG ELC 820 sparker 750 J used as a proxy (Crocker and Fratantonio, 2016) as the AA Dura-spark was not measured with an energy of 800 J

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

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer

the reader to these descriptions, incorporated here by reference, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *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' website (*https://www.fisheries.noaa.gov/find-species)*.

Table 3 lists all species or stocks for which take is expected and proposed to be authorized for this activity, 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. 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' SARs). While no serious injury or mortality is anticipated or proposed to be authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species or stocks 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' 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 stocks managed under the MMPA in this region are assessed in NMFS' U.S. Atlantic and Gulf of Mexico SARs. All values presented in Table 3 are the most recent available at the time of publication (2021 SARs) and are available online at:

www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments).

Table 3 -- Marine Mammal Species[6] Likely Impacted by the Specified Activities

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, Nmin, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Artiodactyla Cetartiodactyla – Infraorder Cetacea – Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic right whale	*Eubalaena glacialis*	Western Atlantic	E, D, Y	368 (0; 364; 2019) [5]	0.7	7.7
Family Balaenopteridae (rorquals)						
Fin whale	*Balaenoptera physalus*	Western North Atlantic	E, D, Y	6,802 (0.24; 5,573; 2016)	11	1.8
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine	-, -, Y	1,396 (0; 1,380; 2016)	22	12.15
Odontoceti (toothed whales, dolphins, and porpoises)						
Family Physeteridae						
Sperm whale	*Physeter macrocephalus*	North Atlantic	E, D, Y	4,349 (0.28; 3,451; 2016)	3.9	0
Family Ziphiidae (beaked whales)						
Cuvier's beaked whale	*Ziphius cavirostris*	Western North Atlantic	-, -, N	5,744 (0.36, 4,282, 2019)	43	0.2
Mesoplodont whales	*Mesoplodon spp*	Western North Atlantic	-, -, N	3,513 (0.63, UNK, 2004)	UNK	7
Family Delphinidae						
Short-finned pilot whale	*Globicephala macrorhynchus*	Western North Atlantic	-, -, Y	28,924 (0.24; 23,637; 2016)	236	136
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic	-, -, N	39,215 (0.30; 30,627; 2016)	306	29
Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic	-, -, N	39,921 (0.27; 32,032; 2016)	320	0
Bottlenose dolphin	*Tursiops truncatus*	Southern Migratory Coastal	-, -, Y	3,751 (0.6, 2,353, 2016)	23	0-18.3
Bottlenose dolphin	*Tursiops truncatus*	Western North Atlantic Offshore	-, -, N	62,851 (0.23; 51,914; 2016)	519	28
Common dolphin	*Delphinus delphis*	Western North Atlantic	-, -, N	172,974 (0.21; 145,216; 2016)	1,452	390
Rough-toothed dolphin	*Steno bredanensis*	Western North Atlantic	-, -, N	136 (1, 67, 2016)	172	0
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy	-, -, N	95,543 (0.31; 74,034; 2016)	851	164
Order Carnivora – Pinnipedia						

Family Phocidae (earless seals)						
Harbor seal	*Phoca vitulina*	Western North Atlantic	-, -, N	61,336 (0.08; 57,637; 2018)	1,729	339
Gray seal [4]	*Halichoerus grypus*	Western North Atlantic	-, -, N	27,300 (0.22; 22,785; 2016)	1,389	4,453

[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 or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] - NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*. CV is the coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable.

[3] - These values, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike).

[4] - NMFS' stock abundance estimate (and associated PBR value) applies to the U.S. population only. Total stock abundance (including animals in Canada) is approximately 451,431. The annual M/SI value given is for the total stock.

[5] - The draft 2022 SARs have yet to be released; however, NMFS has updated its species web page to recognize the population estimate for North Atlantic right whales (NARW) is now below 350 animals (*https://www.fisheries.noaa.gov/species/north-atlantic-right-whale*).

[6] - Information on the classification of marine mammal species can be found on the web page for The Society for Marine Mammalogy's Committee on Taxonomy (*https://marinemammalscience.org/science-and-publications/list-marine-mammal-species-subspecies/*; Committee on Taxonomy (2022)).

As indicated above, all 18 species (with 19 managed stocks) in Table 3 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. All species that could potentially occur in the proposed survey area are included in Table 5 of the IHA application. While the blue whale (*Balaenoptera musculus*), minke whale *(Balaenoptera acutorostrata),* sei whale (*Balaenoptera borealis*), Risso's dolphin (*Grampus griseus*), Atlantic white-sided dolphin *(Lagenorhynchus acutus),* Clymene dolphin *(Stenella Clymene*), dwarf sperm whale *(Kogia sima),* pygmy sperm whale *(Kogia breviceps),* false killer whale *(Pseudorca crassidens),* Fraser's dolphin *(Lagenodelphis hosei),* killer whale *(Orcinus orca),* melon-headed whale *(Peponocephala electra),* northern bottlenose whale *(hyperoodon ampullatus),* pantropical spotted dolphin *(Stenella attenuate),* Risso's Dolphin *(Grampus griseus),* pygmy killer whale *(Feresa attenuate),* spinner dolphin *(Stenella longirostris*), striped dolphin *(Stenella coeruleoalba),* white-beaked dolphin *(Lagenorhynchus albirotris),* harp seal *(Pagophilus groenlandicus),* and hooded seal *(Cystophora cristata)* have been reported in the area, the

temporal and/or spatial occurrence of these species is such that take is not expected to occur, and they are not discussed further.

Below is a description of the species that have the highest likelihood of occurring in the project area and are, thus, expected to potentially be taken by the proposed activities as well as further detail informing the baseline for select species (*i.e.,* information regarding current Unusual Mortality Events (UMEs) and important habitat areas).

North Atlantic Right Whale

The North Atlantic right whale (NARW) ranges from calving grounds in the southeastern United States to feeding grounds in New England waters and into Canadian waters (Hayes *et al.,* 2022). Surveys have demonstrated the existence of seven areas where NARWs congregate seasonally: the coastal waters of the southeastern United States, the Great South Channel, Jordan Basin, Georges Basin along the northeastern edge of Georges Bank, Cape Cod and Massachusetts Bays, the Bay of Fundy, and the Roseway Basin on the Scotian Shelf (Hayes *et al.,* 2018). NMFS has designated two critical habitat areas for the NARW under the ESA: The Gulf of Maine/Georges Bank region, and the southeast calving grounds from Cape Fear, North Carolina to Cape Canaveral, Florida (81 FR 4837, January 27, 2016). The southeast calving grounds critical habitat overlaps with the proposed survey area.

New England and Canadian waters are important feeding habitats for NARWs. Since 2010, NARWs have reduced their use of summer feeding habitats in the Great South Channel and Bay of Fundy, while increasing their use of habitat within Cape Cod Bay as well as a region south of Martha's Vineyard and Nantucket Islands (Stone *et al.,* 2017; Mayo *et al.,* 2018; Ganley *et al.,* 2019; Record *et al.,* 2019; Meyer-Gutbrod *et al.,* 2021). This shift is likely due to changes in oceanographic conditions and food supply as dense patches of zooplankton are necessary for efficient foraging (Mayo and Marx, 1990;

Record *et al.,* 2019). NARW use of habitats such as in the Gulf of St. Lawrence, southern New England waters, and the mid-Atlantic waters of the United States have also increased over time (Davis *et al.,* 2017; Davis and Brillant, 2019; Crowe *et al.,* 2021; Quintana-Rizzo *et al.,* 2021).

In the late fall months (*e.g.,* October), NARWs are generally thought to depart from the feeding grounds in the North Atlantic and move south to their calving grounds off Georgia and Florida. However, recent research indicates our understanding of their movement patterns remains incomplete, and not all of the population undergoes a consistent annual migration (Davis *et al.,* 2017). Females may remain in the feeding grounds during the winter in the years preceding and following the birth of a calf to increase their energy stores while juvenile and adult males may move to southern wintering grounds after years of abundant prey in northern feeding areas (Gowan *et al.,* 2019). Passive acoustic studies have demonstrated the year-round presence of NARWs in New Jersey (Whitt *et al.,* 2013) and Virginia (Salisbury *et al.,* 2016), and Hodge *et al*. (2015) made acoustic detections of NARWs off of Georgia and North Carolina in seven months of the year. NARWs are most common in the proposed survey area in the spring (late March) during their northern migration and in the fall (October and November) during their southern migration (NMFS, 2017).

NARW movements within and between habitats are extensive. A NARW Biologically Important Area (BIA) for migration overlaps the proposed survey area and spans approximately 269,488 km^2 in size from Florida through Massachusetts, encompassing the waters of the continental shelf offshore the east coast of the United States (LaBrecque *et al.,* 2015). NARW movements may include seasonal migrations between northern feeding grounds and southern breeding grounds as well as movements between feeding habitats (Quintana-Rizzo *et al.,* 2021). NARWs generally use the offshore waters of North Carolina and South Carolina during seasonal movements north

and south between their feeding and breeding grounds (Knowlton *et al.,* 2002; Firestone *et al.,* 2008), and have been observed in waters offshore North Carolina from October through December, as well as February and March, a timeframe that aligns with the migratory timeframe for this species (Knowlton *et al.,* 2002). The Right Whale Sightings Advisory System reports shows 12 visual records of NARWs offshore of North Carolina and South Carolina since January 2020 (NMFS, 2022c).

Since 2010, the western NARW population has been in decline (Pace *et al.,* 2017), with a 40 percent decrease in calving rate (Kraus *et al.,* 2016). In 2018, no new NARW calves were documented in their calving grounds; this represented the first time since annual NOAA aerial surveys began in 1989 that no new right whale calves were observed. Eighteen right whale calves were documented in 2021. For the 2022 calving season, 15 NARW calves have been documented. Presently, the best available peer-reviewed population estimate for NARWs is 368 per the 2021 SARs (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*). The draft 2022 SARs have yet to be released; however, NMFS has updated its species web page to recognize the population estimate for NARWs is below 350 animals (*https://www.fisheries.noaa.gov/species/north-atlantic-right-whale*).

NMFS vessel speed regulations for NARWs at 50 CFR 224.105 designated nearshore waters of the Mid-Atlantic Bight as Mid-Atlantic U.S. Seasonal Management Areas (SMA) in 2008. SMAs were developed to reduce the threat of collisions between ships and NARWs around their migratory route, feeding grounds, and calving grounds. In an active SMA, vessels 65 ft or longer must travel at a speed of 10 knots (kn) or less to reduce the threat of vessel collisions unless an exception applies. The North Carolina-Georgia coast SMA, spanning 20 nm from shore from Wilmington, NC to Brunswick, GA, overlaps spatially with the proposed survey area (*https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-*

vessel-strikes-north-atlantic-right-whales#seasonal-management-areas---mid-atlantic). The SMA is active from November 1 through April 30 of each year and may be used by NARWs for migrating or calving. In addition, a NARW reproductive BIA (LaBrecque *et al.,* 2015) overlaps the northwestern corners of both lease areas.

On August 1, 2022, NMFS announced proposed changes to the existing North Atlantic right whale vessel speed regulations to further reduce the likelihood of mortalities and serious injuries to endangered NARW from vessel collisions, which are a leading cause of the species' decline and a primary factor in an ongoing Unusual Mortality Event (87 FR 46921, August 1, 2022). Should a final vessel speed rule be issued and become effective during the effective period of this IHA (or any other MMPA incidental take authorization), the authorization holder would be required to comply with any and all applicable requirements contained within the final rule. Specifically, where measures in any final vessel speed rule are more protective or restrictive than those in this or any other MMPA authorization, authorization holders would be required to comply with the requirements of the rule. Alternatively, where measures in this or any other MMPA authorization are more restrictive or protective than those in any final vessel speed rule, the measures in the MMPA authorization would remain in place. These changes would become effective immediately upon the effective date of any final vessel speed rule and would not require any further action on NMFS's part.

Right Whale Slow Zones are established when NARWs are detected both visually (*i.e.,* Dynamic Management Area) and acoustically (*i.e.,* Acoustic Slow Zone). These are areas where mariners are encouraged to avoid and/or reduce speeds to 10 kn (5.1 m/s) to avoid vessel collisions with NARWs. Slow Zones typically persist for 15 days. More information on these right whale Slow Zones can be found on NMFS' website (*https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-vessel-strikes-north-atlantic-right-whales*).

Elevated NARW mortalities have occurred since June 7, 2017 along the U.S. and Canadian coasts. As of October 2022, a total of 34 confirmed dead stranded whales (21 in Canada; 13 in the United States) have been documented. This event has been declared an Unusual Mortality Event (UME), with human interactions, including entanglement in fixed fishing gear and vessel strikes, implicated in at least 16 of the mortalities thus far. More information is available online at: *www.fisheries.noaa.gov/national/marine-life-distress/2017-2019-north-atlantic-right-whale-unusual-mortality-event.*

Humpback Whale

Humpback whales are found worldwide in all oceans. Humpback whales were listed as endangered under the Endangered Species Conservation Act (ESCA) in June 1970. In 1973, the ESA replaced the ESCA, and humpback whales continued to be listed as endangered. On September 8, 2016, NMFS divided the species into 14 distinct population segments (DPS), removed the current species-level listing, and in its place, listed four DPSs as endangered and one DPS as threatened (81 FR 62259; September 8, 2016). The remaining nine DPSs were not listed. The West Indies DPS, which is not listed under the ESA, is the only DPS of humpback whales that is expected to occur in the proposed survey area. Whales occurring in the proposed survey area are not necessarily from the Gulf of Maine feeding population managed as a stock by NMFS. Bettridge *et al.* (2015) estimated the size of the West Indies DPS population at 12,312 (95 percent CI 8,688-15,954) whales in 2004-05, which is consistent with previous population estimates of approximately 10,000-11,000 whales (Stevick *et al.,* 2003; Smith *et al.,* 1999) and the increasing trend for the West Indies DPS (Bettridge *et al.,* 2015).

Humpback whales are highly migratory, traveling between mid to high latitude waters to feed from spring through fall and lower latitude wintering grounds to calve and breed. Humpback whales may traverse deep, pelagic areas while migrating (Baker *et al.,* 1998; Calambokidis *et al.,* 2001; Garrigue *et al.,* 2002). Not all humpback whales from

the Gulf of Maine stock migrate to breeding areas during the winter as Swingle *et al*. (1993) noted significant numbers of humpback whales in mid and high latitude regions during this time.

The proposed survey areas offshore North Carolina and South Carolina are part of a humpback whale migration pathway between the calving/breeding grounds in the south and the feeding grounds in the north (Hayes *et al.,* 2020). Since 1989, juvenile humpback whales have been sighted in the mid-Atlantic coast and offshore North Carolina and South Carolina more frequently during the winter months, with sightings peaking between January and March (Swingle *et al.,* 1993). The mid-Atlantic region likely represents a supplemental winter feeding ground for non-reproductive animals that are not participating in reproductive behavior at the breeding grounds (Barco *et al.,* 2002; Swingle *et al.,* 1993).

The most significant anthropogenic causes of mortality of humpback whales include incidental fishery entanglements, responsible for roughly eight whale mortalities, and vessel collisions, responsible for four mortalities both on average annually from 2013 to 2017 (Hayes *et al.,* 2020). Since January 2016, elevated humpback whale mortalities have occurred along the Atlantic coast from Maine to Florida. This event has been declared a UME. Partial or full necropsy examinations have been conducted on approximately half of the 161 known cases (as of October 7, 2022). Of the whales examined, approximately 50 percent had evidence of human interaction, either ship strike or entanglement. While a portion of the whales have shown evidence of pre-mortem vessel strike, this finding is not consistent across all whales examined and more research is needed. A total of 22 strandings have occurred in North Carolina since 2016. Three previous UMEs involving humpback whales have occurred since 2000, in 2003, 2005, and 2006. More information is available at: *www.fisheries.noaa.gov/national/marine-life-distress/2016-2021-humpback-whale-unusual-mortality-event-along-atlantic-coast.*

Fin Whale

Fin whales have a common occurrence in waters of the U.S. Atlantic Exclusive Economic Zone (EEZ), principally from Cape Hatteras northward with a distribution in both continental shelf and deep water habitats (Hayes *et al.,* 2022). 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 although densities vary seasonally (Edwards *et al.,* 2015; Hayes *et al.,* 2022).

Western North Atlantic fin whales typically feed in the Gulf of Maine and the waters surrounding New England, but mating and calving (and general wintering) areas are largely unknown (Hain *et al.,* 1992; Hayes *et al.,* 2022). Calving likely takes place from October through January in the mid-Atlantic region (Hain *et al.,* 1992). New England and Gulf of St. Lawrence waters represent major feeding grounds for fin whales (Hayes *et al.,* 2022). Fin whales can be found offshore of North Carolina and South Carolina year-round, although sighting data indicate that they are most abundant during spring, winter, and summer (Hayes *et al.,* 2022).

The fin whale is federally listed under the ESA as an endangered species and is designated as a strategic stock under the MMPA due to its endangered status under the ESA, uncertain human-caused mortality, and incomplete survey coverage of the stock's defined range. The main threats to fin whales are fishery interactions and vessel collisions (Hayes *et al.,* 2022).

Sperm Whale

The distribution of the sperm whale in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Hayes *et al.,* 2020). The offshore distribution is likely associated with Gulf Stream features (Waring *et al.,* 1993). During the winter, sperm whales are concentrated to the east and northeast of Cape Hatteras (Hayes *et al.,* 2020). In the spring, the distribution shifts northward to east

of Delaware and Virginia as well as throughout the central region of the mid-Atlantic Bight and the southern region of George's Bank (Hayes *et al.,* 2020). In summer, the distribution continues to shift northward to the area east and north of George's Bank and the continental shelf south of New England. Sperm whales are most abundant along the continental shelf of the mid-Atlantic during fall (Hayes *et al.,* 2020).

Geographic distribution of sperm whales is likely linked to their social structure and low reproductive rate. The basic social unit of the sperm whale appears to be the mixed school of adult females plus their calves and some juveniles of both sexes, and social bonds may persist for many years (Christal *et al.,* 1998). Other social groupings include nursery, juvenile, bachelor, and bull schools as well as solitary bulls (Best, 1979; Whitehead *et al.,* 1991; Christal *et al.,* 1998). Groupings have distinct geographical ranges with females and juveniles occurring in tropical and sub-tropical waters, and males being more wide-ranging and occurring in northern latitudes (Hayes *et al.,* 2020). The peak breeding season in the northern hemisphere for sperm whales occurs between April and June (Best *et al.,* 1984), and calving grounds likely exist around Cape Hatteras, North Carolina (Costidis *et al.,* 2017). Sperm whale distribution can also vary in response to prey availability, such as squid (Jacquet and Gendron, 2002).

Sperm whales are listed as an endangered species under the ESA, and the North Atlantic stock is considered strategic under the MMPA. The greatest threats to sperm whales include ship strikes (McGillivary *et al.,* 2009; Carrillo and Ritter, 2010), anthropogenic sound (Nowacek *et al.,* 2015), and the potential for climate change to influence variations in spatial distribution and abundance of prey (Hayes *et al.,* 2020).

Cuvier's Beaked Whale

Cuvier's beaked whales occur mainly along the continental shelf edge of the Mid-Atlantic region of the U.S east coast (CETAP, 1982; Waring *et al.,* 1992; Waring *et al.,* 2001; Hamazaki, 2002; Palka, 2006). They are known to prefer deep, pelagic waters

along the continental slope edge, and favor steep underwater geological features such as banks, seamounts, and submarine canyons (NOAA Fisheries, 2022a). Offshore of Cape Hatteras, North Carolina, satellite-tagged beaked whales have demonstrated restricted movement patterns suggesting a resident population (Foley, 2018). Cuvier's beaked whales can be found year-round offshore of North Carolina (Hayes *et al.,* 2020; McLellan *et al.,* 2018; Stainstreet *et al.,* 2017) with a potential to offshore of North Carolina and South Carolina (Roberts *et al.,* 2016). Mass strandings of beaked whales globally have been associated with naval activities (Cox *et al.,* 2006; D'Amico *et al.,* 2009; Fernandez *et al.,* 2005; Filadelfo *et al.,* 2009).

Mesoplodont Whales

The genus, *Mesoplodon*, includes four species of beaked whales: True's beaked whale (*Mesoplodon mirus*), Gervais' beaked whale (*M. europaeus*), Blainville's beaked whale (*M. densirostris*) and Sowerby's beaked whale (*M. bidens*) (Mead, 1989). As these species are difficult to distinguish at sea, much of the available information on the distribution of beaked whales is specific to the genus level (Waring *et al.,* 2008b). Along the U.S. Atlantic coast, *Mesoplodon* beaked whale sightings occur primarily along the continental shelf edge and deeper oceanic waters (CETAP, 1982; Waring *et al.,* 1992; Tove, 1995; Waring *et al.,* 2001; Hamazaki, 2002; Palka, 2006). As with Cuvier's beaked whales, *Mesoplon* beaked whale distributions have been linked to physical features such as continental slope, canyons, escarpments, and oceanic islands (DoN, 2008; Pitman, 2018). Key areas for *Mesoplodon* whales have been identified along the continental edge of the western North Atlantic with depths down to 5,000 m from Cape Hatteras north to southern Nova Scotia (DoN, 2008). Distribution of individual *Mesoplodon* beaked whale species may vary by water temperature with Blainville's and Gervais' beaked whales occurring in warmer southern waters and Sowerby's and True's beaked whales occurring in cooler northern waters (DoN, 2008). Blainville's, Gervais', and True's beaked whales

are expected to occur within the proposed survey area, based upon previous sighting and stranding records (Hayes *et al.,* 2008; Hayes *et al.,* 2010).

Pilot Whale

Two species of pilot whales, long-finned and short-finned, occur in the Western North Atlantic and may be sighted within the proposed study area. These species are difficult to differentiate at sea, and cannot be reliably distinguished during most surveys (Rone and Pace, 2012; Hayes *et al.,* 2021). Pilot whales tend to occur in areas of high relief or submerged banks, and may be associated with the Gulf Stream wall and thermal fronts along the continental shelf edge (Waring *et al.,* 1992). Both species of pilot whale are more generally found along the edge of the continental shelf at depths of 100 to 1,000 m (330 to 3,300 ft) in winter and early spring (CETAP, 1982; Payne and Heinemann, 1993; Abend and Smith 1999; Hamazaki, 2002). During late spring through late fall, they frequently travel into the central and northern Georges Bank, Great South Channel, and northward into the Gulf of Maine (CETAP, 1982; Payne and Heinemann, 1993; Hayes *et al.* 2021). Spatial distributions of long-finned and short-finned pilot whales overlap along the central Atlantic shelf break between New Jersey and southern Georges Bank (Payne and Heinemann, 1993; Hayes *et al.,* 2021). Long-finned pilot whales are more pelagic, and have occasionally stranded as far south as Florida (Hayes *et al.,* 2021).

Short-finned pilot whales prefer tropical, subtropical, and warm temperate waters (Jefferson *et al.* 2015). South of Cape Hatteras, NC, most pilot whale sightings are expected to be short-finned pilot whales (Hayes *et al.,* 2021). The continental shelf break is an important foraging habitat for short-finned pilot whales in the Western North Atlantic. A satellite tagging study of short-finned pilot whales showed whales to concentrate along the shelf break from Cape Hatteras, NC north to Hudson Canyon as well as in shelf break waters south of Cape Lookout, NC (Thorne *et al.,* 2017).

Atlantic Spotted Dolphin

Atlantic spotted dolphins are found in tropical and warm temperate waters along the continental shelf from 10 to 200 m (33 to 650 ft) deep to slope waters greater than 500 m (1,640 ft) (Leatherwood *et al.,* 1976; Hayes *et al.,* 2020). Their range extends from southern New England, south to Gulf of Mexico and the Caribbean to Venezuela (Leatherwood *et al.,* 1976; Perrin *et al.,* 1994; Hayes *et al.,* 2020). This stock regularly occurs in continental shelf waters south of Cape Hatteras and in continental shelf edge and continental slope waters north of this region (Hayes *et al.* 2020).

Two forms, or ecotypes, occur in the Western North Atlantic. A large and heavily spotted ecotype inhabits the continental shelf, usually found inside or near the 200 m isobaths in continental shelf waters south of Cape Hatteras. A smaller, less spotted and offshore ecotype occurs in the continental slope waters of the Western North Atlantic, typically north of Cape Hatteras, North Carolina (Mullin and Fulling, 2003; Hayes *et al.,* 2020). The offshore ecotype and the pantropical spotted dolphin (*Stenella attenuata*) are difficult to differentiate at sea (Hayes *et al.,* 2020). Atlantic spotted dolphins have been observed during 2021 HRG surveys offshore northern North Carolina during the months of September – December (Marine-Ventures, 2022). Spotted dolphins were also observed during all seasons except winter during 2019 digital aerial baseline surveys in a nearby survey area (Normandeau-APEM, 2020).

Bottlenose Dolphin

The bottlenose dolphin populations in the U.S. North Atlantic consist of a complex mosaic of dolphin stocks (Hayes *et al.,* 2021). Two morphologically and genetically distinct bottlenose dolphin ecotypes, coastal and offshore, exist along the North Atlantic coast. The coastal ecotype typically resides in waters less than 20 m (65.6 ft) deep, along the inner continental shelf (within 7.5 km (4.6 miles) of shore) and is further subdivided into seven stocks based largely upon spatial distribution (Hayes *et al.* 2021). North of Cape Hatteras, the offshore and coastal ecotypes are separated by

bathymetric contours during the summer. Torres *et al.,* (2003) found dolphins corresponding to the offshore ecotype to typically be found in waters greater than 34 m in depth and greater than 34 km from shore.

Two stocks of bottlenose dolphins may be found in the vicinity of the proposed survey area—the western North Atlantic Offshore Stock (WNAOS), which is comprised of the offshore ecotype, and the Southern Coastal Migratory Stock (SCMS). The SCMS is one of two stocks thought to make broad-scale seasonal migrations in the coastal waters of the Western North Atlantic and occurs from Assateague, Virginia, south to northern Florida (Hayes *et al.,* 2021). Seasonally, SCMS movements indicate they are mostly found in southern North Carolina (Cape Lookout) from October to December; they continue to move farther south from January to March to as far south as northern Florida and move back north to coastal North Carolina from April to June. SCMS bottlenose dolphins occupy waters north of Cape Lookout, North Carolina, to as far north as Chesapeake Bay from July to August. An observed shift in spatial distribution during a summer 2004 survey indicated that the northern boundary for the SCMS may vary from year to year (Hayes *et al.* 2021).

The offshore population consists of one stock (WNAOS) in the western North Atlantic Ocean, is distributed primarily along the outer continental shelf and continental slope, and occurs widely during the spring and summer from Georges Bank to the Florida Keys with late summer and fall incursions as far north the Gulf of Maine depending on water temperatures (Kenney, 1990; Hayes *et al.,* 2020). Although WNAOS dolphins are typically found beyond 34 km from shore, sightings may occur at close at 7.3 km from shore in depths as shallow as 13 m (Garrison *et al.,* 2003; Hayes *et al.,* 2020).

Both the SCMS and WNAOS may occur year-round within the proposed survey area. Bottlenose dolphins were observed during the months of July–November during 2019 HRG surveys offshore of Kitty Hawk, North Carolina, north of the proposed survey

area (Tetra-Tech, 2022). Additional digital aerial baseline surveys offshore of Kitty Hawk, North Carolina observed bottlenose dolphins in the months of January and March (Normandeau-APEM, 2020).

Common Dolphin

The common dolphin is found world-wide in temperate to subtropical seas. In the Western North Atlantic, common dolphins are commonly found over the continental shelf between the 200 m and 2,000 m isobaths and over prominent underwater topography and east to the mid-Atlantic Ridge (Doksaeter *et al.,* 2008; Waring *et al.,* 2008a). Common dolphins have been noted to be associated with Gulf Stream features (CETAP, 1982; Selzer and Payne, 1988; Waring *et al.* 1992). The species exhibits seasonal movements, occurring between Cape Hatteras and Georges Bank from mid-January to May, then migrating onto Georges Bank and the Scotian Shelf between mid-summer and fall. During fall, large aggregations occur on Georges Bank (Hain *et al.,* 1981; CETAP, 1982; Payne *et al.,* 1984; Selzer and Payne, 1988; Hayes *et al.* 2020). The species is less common south of Cape Hatteras, although sightings have been reported as far south as the Georgia/South Carolina border (Jefferson *et al.,* 2009; Hayes *et al.* 2020). Common dolphins were also observed off the northern coast of North Carolina during HRG surveys during the months of March and January 2019 (Normandeau-APEM, 2020).

Rough-toothed Dolphin

Rough-toothed dolphins occur worldwide in warm temperate, subtropical, or tropical waters in a wide range of water depths (West *et al.,* 2011; Hayes *et al.,* 2019). Along the Western Atlantic coast, rough toothed dolphins have been observed from Virginia through Florida with occasional sightings on the continental shelf off North Carolina and Florida (DoN, 2008; OBIS, 2021). Although most vessel sightings of rough-toothed dolphins along the Western Atlantic have occurred in oceanic waters at depths

greater than 1,000 m (Hayes *et al.,* 2019), a tagging study conducted by Wells *et al.* (2008) showed rough-toothed dolphins to transit through both deep and shallow waters as well as exhibit dives reaching a maximum of 50 m.

Off North Carolina, rough-toothed dolphins are expected to occur beyond the continental shelf break along the western edge of the Gulf Stream and occasionally more coastal waters (DoN, 2008; OBIS, 2021). According to the Roberts *et al*. (2022) density models, potential occurrence of rough-toothed dolphins increases south of Virginia.

Harbor Porpoise

The harbor porpoise inhabits shallow, coastal waters, often found in bays, estuaries, and harbors. In the western Atlantic, they occur from Cape Hatteras north to Greenland. During summer (July to September), harbor porpoises are concentrated in the northern Gulf of Maine and southern Bay of Fundy region, generally in waters less than 150 m deep with a few sightings in the upper Bay of Fundy and on Georges Bank. During fall (October-December) and spring (April-June), harbor porpoises are widely dispersed from New Jersey to Maine, with lower densities farther north and south (Hayes *et al.,* 2022). They occur from the coastline to deep waters (>1,800 m), although the majority of the population occurs over the continental shelf. The harbor porpoise is likely to occur in the waters of the mid-Atlantic, including North Carolina, during winter months, as this species prefers cold temperate and subarctic waters (Hayes *et al.* 2022). Harbor porpoise generally move out of the Mid-Atlantic during spring, migrating north to the Gulf of Maine. There does not appear to be a temporally coordinated migration or a specific migratory route to and from the Bay of Fundy region (Hayes *et al.* 2022).

Harbor porpoises may occur in the proposed study area during the winter months. One harbor porpoise was sighted in January off the coast of northern North Carolina during HRG surveys in 2019 (Normandeau-APEM, 2020).

Harbor Seal

Harbor seals are the most abundant seals in the waters of the eastern United States and are commonly found in all nearshore waters of the Atlantic Ocean from Newfoundland, Canada southward to northern Florida (Hayes *et al.* 2022). While harbor seals occur year-round north of Cape Cod, they only occur south of Cape Cod (southern New England to New Jersey) during winter migration, typically September through May (Kenney and Vigness-Raposa 2010; Hayes *et al.* 2022). During the summer, most harbor seals can be found north of Massachusetts within the coastal waters of central and northern Maine as well as the Bay of Fundy (Hayes *et al.* 2022).

In recent years, this species has been seen regularly as far south as North Carolina, and regular seasonal haul-out sites of up to 40-60 animals have been documented on the eastern shore of Virginia and the Chesapeake Bay (Jones and Rees 2020). Winter haul-out sites for harbor seals have been identified within the Chesapeake Bay region and Outer Banks, NC beaches; however, sightings as far south as the Carolinas are only occasionally recorded (Hayes *et al*. 2022).

Gray Seal

Gray seals occur on both coasts of the Northern Atlantic Ocean and are divided into three major populations (Hayes *et al.* 2021). The western north Atlantic stock occurs in eastern Canada and the northeastern United States, occasionally as far south as North Carolina. Gray seals inhabit rocky coasts and islands, sandbars, ice shelves and icebergs (Hayes *et al.* 2021). In the United States, gray seals congregate in the summer to give birth at four established colonies in Massachusetts and Maine (Hayes *et al.* 2021). From September through May, they disperse and can be abundant as far south as New Jersey.

Historically, gray seals were absent from North Carolina and South Carolina, however, the range of gray seals appears to be shifting south along the U.S. Atlantic coast (DiGiovanni *et al.,* 2011; Johnson *et al.,* 2015; DiGiovanni *et al.,* 2018). Harbor and gray seals are seen regularly between the fall and spring within the central Atlantic (DoN,

2018; Jones and Rees, 2020). Seals may occur within the proposed study area from November through May (Roberts *et al.,* 2016; Roberts and Halpin, 2022).

Since June 2022, an Unusual Mortality Event (UME) has been declared for Northeast pinnipeds in which elevated numbers of sick and dead harbor seals and gray seals have been documented along the southern and central coast of Maine (NOAA Fisheries, 2022b). Currently, 22 grays seals and 258 harbor seals have stranded. Preliminary sample testing results suggest many affected seals to test positive for avian influenza (NOAA Fisheries, 2022b). NMFS is collaborating with local, state, Federal, international, and tribal partners to gain a better understanding of the cause of this UME. Information on this UME is available online at: *https://www.fisheries.noaa.gov/2022-pinniped-unusual-mortality-event-along-maine-coast*.

The above event was preceded by a different UME occurring between 2018-2020 (closure of the 2018-2020 UME is pending). Additionally, stranded seals have shown clinical signs as far south as Virginia, although not in elevated numbers. Therefore, the UME investigation encompasses all seal strandings from Maine to Virginia. As of March 2020, there has been a total of 3,152 reported strandings (of all species), though only 10 occurred in Virginia while 8 were recorded in Maryland. Full or partial necropsy examinations have been conducted on some of the seals and samples have been collected for testing. Based on tests conducted thus far, the main pathogen found in the seals is phocine distemper virus. NMFS is performing additional testing to identify any other factors that may be involved in this UME. This UME is non-active and pending closure, and therefore, it is not discussed further in this notice. Information on this UME is available online at: *www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-distress/2018-2020-pinniped-unusual-mortality-event-along*.

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. 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, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, etc.). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (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. Marine mammal hearing groups and their associated hearing ranges are provided in Table 4.

Table 4 -- Marine Mammal Hearing Groups (NMFS, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz
* Represents the generalized hearing range for the entire group as a composite (*i.e.*, all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al*., 2007) and PW pinniped (approximation).	

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 (2018) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section provides a discussion of the ways in which components of the specified activity may impact marine mammals and their habitat. Detailed descriptions of the potential effects of similar specified activities have been provided in other recent **Federal Register** notices, including for survey activities using the same methodology, over a similar amount of time, and occurring in the southeast Atlantic region, including the southeast Virginia and North Carolina areas (*e.g.*, 84 FR 31032, June 28, 2019; 85 FR 55415, September 8, 2020; 86 FR 43212, August 6, 2021; 87 FR 25452, April 29, 2022). No significant new information is available, and we incorporate by reference the detailed discussions in those documents rather than repeating the details here. 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 whether those impacts are reasonably expected to, or reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Summary on Specific Potential Effects of Acoustic Sound Sources

For general information on sound, its interaction with the marine environment, and a description of acoustic terminology, please see, *e.g.,* ANSI (1986, 1995), Au and Hastings (2008); Hastings and Popper (2005); Mitson (1995), NIOSH (1998) Richardson *et al.* (1995); Southall *et al.,* (2007), and Urick (1983). Underwater sound from active acoustic sources can include one or more of the following: Temporary or permanent hearing impairment, behavioral disturbance, masking, stress, and non-auditory physical effects. The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and duration of the sound exposure. 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; permanent threshold shift), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS; temporary threshold shift), in which case the animal's hearing threshold would recover over time (Southall *et al.* 2007).

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.

Animals in the vicinity of TerraSond's proposed HRG survey activites are unlikely to incur even TTS due to the characteristics of the sound sources, which include a relatively low source level (203 dB re 1 µPa m), and generally very short pulses and potential duration of exposure. These characteristics mean that instantaneous exposure is unlikely to cause TTS because it is unlikely that exposure would occur close enough to the vessel for received levels to exceed peak pressure TTS criteria, and the cumulative

duration of exposure would be insufficient to exceed cumulative sound exposure level (SEL) criteria. Even for high-frequency cetacean species (*e.g.,* harbor porpoises), which have the greatest sensitivity to potential TTS, individuals would have to make a very close approach and remain very close to vessels operating these sources in order to receive multiple exposures at relatively high levels necessary to cause TTS. Intermittent exposures—as would occur due to the brief, transient signals produced by these sources—require a higher cumulative SEL to induce TTS than would continuous exposures of the same duration (*i.e.,* intermittent exposure results in lower levels of TTS). 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.

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; Southall *et al.,* 2021). 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, the stock, or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.,* Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2003). As mentioned earlier, the proposed survey area overlaps with a NARW migration BIA and is located adjacent to ESA-designated critical calving habitat and a reproduction BIA. Due to the mobile nature and short duration of the proposed acoustic sources as well as proposed mitigation measures further described in the **Proposed Mitigation** section, we expect minimal impacts to NARW mother calf pairs.

In addition, sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.,* those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity and may occur whether the sound is natural (*e.g.,* snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.,* shipping, sonar, seismic exploration) in origin. Marine mammal communications would not likely be masked appreciably by the acoustic signals given the directionality of the signals for the HRG survey equipment planned for use (Table 2) and the brief period for when an individual mammal would likely be exposed.

An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.,* Seyle, 1950; Moberg, 2000). In many cases, an animal's first and sometimes most economical (in terms of

energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

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

Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.,* crustaceans, cephalopods, fish, and zooplankton) (*i.e.,* effects to marine mammal habitat). Prey species exposed to sound might move away from the sound source, experience TTS, experience masking of biologically relevant sounds, or show no obvious direct effects. The most likely impacts (if any) for most prey species in a given area would be temporary avoidance of the area. Surveys using active acoustic sound sources move through an area relatively quickly, limiting exposure to multiple pulses. In all cases, sound levels would return to ambient once a survey ends and the noise source is shut down and, when exposure to sound ends, behavioral and/or physiological responses are expected to end relatively quickly. Finally, the HRG survey equipment will not have significant impacts to the seafloor and does not represent a source of pollution.

Vessel Strike

Vessel collisions with marine mammals, or ship strikes, can result in death or serious injury of the animal. These interactions are typically associated with large whales, which are less maneuverable than are smaller cetaceans or pinnipeds in relation to large vessels. Ship strikes generally involve commercial shipping vessels, which are normally larger and of which there is much more traffic in the ocean than geophysical survey vessels. Jensen and Silber (2004) summarized ship strikes of large whales worldwide from 1975-2003 and found that most collisions occurred in the open ocean and involved large vessels (*e.g.,* commercial shipping). For vessels used in geophysical survey activities, vessel speed while towing gear is typically only 4-5 knots. At these speeds, both the possibility of striking a marine mammal and the possibility of a strike resulting in serious injury or mortality are so low as to be discountable. At average transit speed for geophysical survey vessels, the probability of serious injury or mortality resulting from a strike is less than 50 percent. However, the likelihood of a strike actually happening is again low given the smaller size of these vessels and generally slower speeds. Notably in the Jensen and Silber study, no strike incidents were reported for geophysical survey vessels during that time period.

The potential effects of TerraSond's specified survey activity are expected to be limited to Level B behavioral harassment. No permanent or temporary auditory effects, or significant impacts to marine mammal habitat, including prey, are expected.

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 determinations.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of 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, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to sound produced by the sparker. Based primarily on the characteristics of the signals produced by the acoustic source planned for use, Level A harassment is neither anticipated (even absent mitigation), nor proposed to be authorized. As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the proposed take numbers are estimated.

For acoustic impacts, generally speaking, 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) the number of days of activities. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Thresholds

NMFS recommends the use of 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 source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.,* 2007, 2021; Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 160 dB re 1 µPa for impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Generally speaking, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

TerraSond's proposed activity includes the use of impulsive (*i.e.,* sparkers) sources, and therefore, the RMS SPL thresholds of 160 dB re 1 µPa is applicable.

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

The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

TerraSond's proposed activity includes the use of impulsive (*i.e.*, sparkers) sources. However, as discussed above, NMFS has concluded that Level A harassment is not a reasonably likely outcome for marine mammals exposed to noise through use of the sources proposed for use here, and the potential for Level A harassment is not evaluated further in this document. Please see TerraSond's application (Section 6.3.1 Level A) for details of a quantitative exposure analysis exercise, *i.e.*, calculated Level A harassment isopleths and estimated Level A harassment exposures. TerraSond did not request authorization of take by Level A harassment, and no take by Level A harassment is proposed for authorization by NMFS.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

NMFS has developed a user-friendly methodology for estimating the extent of the Level B harassment isopleths associated with relevant HRG survey equipment (NMFS, 2020). This methodology incorporates frequency and directionality (when relevant) to

refine estimated ensonified zones. The sparkers proposed for use by TerraSond are omnidirectional and, therefore, beamwidth does not factor into the calculations.

NMFS considers the data provided by Crocker and Fratantonio (2016) to represent the best available information on source levels associated with HRG survey equipment and, therefore, recommends that source levels provided by Crocker and Fratantonio (2016) be incorporated in the method described above to estimate distances to harassment isopleths. In cases where the source level for a specific type of HRG equipment is not provided in Crocker and Fratantonio (2016), NMFS recommends either the source levels provided by the manufacturer be used, or, in instances where source levels provided by the manufacturer are unavailable or unreliable, a proxy from Crocker and Fratantonio (2016) be used instead. TerraSond plans to use the Applied Acoustics Dura-spark sparker UHRS 400 + 400. For all source configurations (Table 1), the maximum power expected to be discharged from the sparker source is 800 J. However, Crocker and Fratantonio (2016) did not measure the Applied Acoustics Dura-spark with an energy near 800 J and the manufacturer does not provide these specifications. A similar alternative system, the SIG ELC 820 sparker, was measured by Crocker and Fratantonio (2016) with an input voltage of 750 J, and these measurements were used as a proxy for the Applied Acoustics Dura-spark sparker. Table 2 shows the source parameters associated with this proxy. Using the measured source level of 203 dB RMS of the proxy, SIG ELC 820 sparker with an input voltage of 750 J, modeling results of modeling indicated that the Applied Acoustics Dura-spark UHRS 400 + 400 would produce a distance of 141 m to the Level B harassment isopleth.

Daily ensonified area for each of the three survey phases (Table 1) was calculated by using the following equation: Daily survey distance (km) x 2 x (Level B isopleth (km) + separation distance between sparkers (km)) + area of a circle with a radius of Level B isopleth (km). For each phase, the daily survey distance is estimated to be approximately

100 km (Table 6). Phases 2 and 3 would include multiple sparker sources in their tow configurations (Table 1). Table 5 shows the daily ensonified area for each survey phase. In order to calculate the monthly ensonified area for each phase, the daily ensonified area was multiplied by the number of estimated survey days per month for each phase. Monthly ensonified area for each phase is shown in Table 5.

Table 5 -- Ensonified Area for each Survey Phase

Phase	Total survey distance (km)	Average daily survey distance (km)	Survey days per month	Number of sparker sources	Daily ensonified area (km^2)	Monthly ensonified area (km^2)
1	4,054	100	3.4	1	28.3	95.5
2	1,300	100	1.2	3 [1]	58.5	68.2
3	12,488	100	10.4	2 [2]	31.3	325.5

[1] 150 m horizontal separation distance between sparkers
[2] 30 m horizontal separation distance between sparkers

Marine Mammal Occurrence

In this section we provide information about the occurrence of marine mammals, including density or other relevant information that will inform the take calculations.

Habitat-based density models produced by the Duke University Marine Geospatial Ecology Laboratory (Roberts *et al.,* 2016; Roberts and Halpin, 2022) represent the best available information regarding marine mammal densities in the proposed survey area. The density data presented by Roberts and Halpin (2022) incorporates aerial and shipboard line-transect survey data from NMFS and other organizations and incorporates data from 8 physiographic and 16 dynamic oceanographic and biological covariates, and controls for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting. These density models were originally developed for all cetacean taxa in the U.S. Atlantic (Roberts *et al.,* 2016). In subsequent years, certain models have been updated based on

additional data as well as certain methodological improvements. More information is available online at *https://seamap.env.duke.edu/models/Duke/EC/*.

The Roberts and Halpin (2022) density-based habitat models provided density estimates for species or species guilds within 5 km x 5 km grids cells on a monthly or annual basis, depending upon the species. TerraSond selected a representative sample of grid cells in and near the proposed survey area by creating a 5 km wide perimeter around the survey area using GIS (ESRI, 2017), and intersecting the perimeter with the density grid cells to select those nearest to the proposed survey area. The average density of each species per month was then calculated from the selected grid cells. Density estimates for each species derived from this method are shown in Table 10 of TerraSond's application. After careful review of this methodology, NMFS agrees with this approach.

Seal species were represented as a single guild by the Roberts density-based habitat models (Roberts *et al.,* 2016; Roberts and Halpin, 2022). In order to determine seal density by species, the proportion of abundance for each seal species was calculated using the stock abundance estimate from the most recent NMFS stock assessment report (Hayes *et al.,* 2022). For example, the stock abundance estimate for harbor seals (61,336) was divided by the sum of the stock abundance estimates for harbor seals (61,336) and gray seals (27,300). This proportion was calculated for harbor seals and gray seals. The proportion was then multiplied by the density estimate for seals as a guild to determine a density-based estimate for each seal species. NMFS has reviewed this methodology for deriving density-based estimates for each seal species from a seal guild estimate, and agrees with this approach.

Take Estimation

Here we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization. In order to estimate the number of marine mammals predicted to be

exposed to sound levels that would result in Level B harassment, estimated take was first calculated by month for each phase. The monthly density for each species in the proposed survey area (Table 10 of the application) was multiplied by the respective monthly ensonified area for each phase (Table 5) according to the following equation: Estimated monthly take = average monthly density (individuals/km^2) x monthly ensonified area (km^2). Estimated monthly take for each phase was summed across twelve months and is shown for each phase by species in Table 6. Density-based take estimates for each phase were added together for each species to receive a total requested take estimate (Table 6). The percent of each stock abundance requested for take was calculated using the most updated abundance estimates from the NMFS stock assessment report (Hayes *et al.,* 2022) (Table 6).

As the Roberts density-based habitat models (Roberts *et al.,* 2016; Roberts and Halpin, 2022) did not distinguish between short-finned and long-finned pilot whales, the requested take estimate in Table 6 represents both species of pilot whale. NMFS calculated the percent of stock abundance requested assuming all take was from the stock of short-finned pilot whales. NMFS also calculated the percent of stock abundance requested assuming all take was from the stock of long-finned pilot whales. NMFS then compared these calculations to determine which percentage was greater, and found that the calculation assuming all take was from the stock of short-finned pilot whales represented a larger percentage. The percent of take that represents the greatest impact (short-finned pilot whale) is displayed in Table 6. A similar approach was used when calculating percent of take requested for bottlenose dolphins, as two stocks (southern migratory coastal stock and offshore Western North Atlantic stock) may occur within the proposed study area. The percent of take that represents the greatest impact (southern migratory coastal stock) is shown in Table 6.

When determining requested take numbers, TerraSond also considered mean group size estimates for each species based upon available sighting data collected through recent aerial/vessel-based surveys in the southwest Atlantic region (Kraus *et al.,* 2016; Palka *et al.,* 2017). Mean group size estimates were compared to density-based estimates. If the mean group size was greater than the density-based estimate, the requested estimated take was increased to the mean group size value. Requested take was adjusted for mean group size for the following species, as shown in Table 6: Fin whale, humpback whale, NARW, sperm whale, common dolphin, Cuvier's beaked whale, pilot whales, Mesoplodont whales, rough-toothed dolphin, harbor porpoise, harbor seal, and gray seal.

The estimated density-based exposure value was calculated to be and/or rounded to zero for the fin whale, humpback whale, sperm whale, Cuvier's beaked whale, harbor porpoise, Mesoplodont beaked whales, gray seal, and harbor seal. Therefore, TerraSond has requested a small amount of take for these species in the event that they do occur during project activities. The North Carolina coast is part of a migratory pathway for humpback whales moving seasonally between winter foraging grounds and summer breeding grounds (Hayes *et al.,* 2022). Juvenile humpback whales are typically sighted off the Virginia and North Carolina coasts during the winter months (Swingle *et al.,* 1993), and therefore, may potentially occur within the proposed study area. Fin and sperm whale sightings have occurred off of Cape Hatteras, North Carolina, just north of the proposed study area. Fin whales may use the Central Atlantic coast as a calving area, while sperm whales likely calve near Cape Hatteras, NC (Hayes *et al.,* 2022). In addition, Cuvier's beaked whale and harbor porpoise sightings have occurred off of Cape Hatteras, NC (Hayes *et al.,* 2022). Due to the relatively close proximity of Cape Hatteras to the proposed study area, it is possible these species may occur off Carolina Long Bay as well. Based upon documented stranding records, Mesoplodont whale strandings may occur within the proposed study area as well. Mesoplodont strandings have been

documented as far south as Florida, and True's, Gervais', and Sowerby's beaked whales are considered temperature species. Over time, harbor seals and gray seals have expanded their range further south along the U.S. Atlantic coast with harbor seal sightings occurring off North Carolina during the fall and spring (Hayes *et al.,* 2022). Harbor seals may also occasionally haul out in northern North Carolina during the winter. Due to documented sighting and stranding records, it is also possible that harbor and gray seals may occur with the proposed study area as well. NMFS has carefully reviewed TerraSond's methodology for calculating estimated requested take and adjusting estimated take based upon mean group size estimates. NMFS agrees with this approach and proposes to authorize the requested take numbers.

Table 6 -- Estimated Take Numbers and Total Take Proposed for Authorization

Species	Density-based take estimates			Total proposed take	Percent stock abundance proposed for take
	Phase 1	Phase 2	Phase 3		
Fin whale	0	0	0	2*	0.03
Humpback whale	0	0	0	2*	0.14
North Atlantic right whale	0.1	0	0	3*	0.82
Sperm whale	0	0	0	1*	0.02
Pilot whale [1]	0.1	0.1	0	26*	0.09
Cuvier's beaked whale	0	0	0	3*	0.05
Mesoplodont whales	0	0	0	3*	0.09
Bottlenose dolphin [2]	130.6	93.3	445	669	17.8
Atlantic spotted dolphin	122.4	87.5	417	628	1.57
Common dolphin	0.8	0.6	3	49*	0.03
Rough-toothed dolphin	1.5	1	5	19*	14
Harbor porpoise	0	0	0	3*	0.003
Harbor seal	0	0	0	2*	0.003
Gray seal	0	0	0	2*	0.007

*Adjusted for group size
[1] Represents short-finned and long-finned pilot whales
[2] Represents offshore and southern migratory coastal stocks of bottlenose dolphins

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 the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (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 the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

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, NMFS considers 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 cost and impact on operations.

NMFS proposes the following mitigation measures be implemented during TerraSond's proposed HRG surveys. Pursuant to section 7 of the ESA, TerraSond would also be required to adhere to relevant Project Design Criteria (PDC) of the NMFS'

Greater Atlantic Regional Fisheries Office (GARFO) programmatic consultation (specifically PDCs 4, 5, and 7) regarding geophysical surveys along the U.S. Atlantic coast (*https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-take-reporting-programmatics-greater-atlantic#offshore-wind-site-assessment-and-site-characterization-activities-programmatic-consultation*).

Visual Monitoring and Shutdown Zones

TerraSond must employ independent, dedicated, trained PSOs, meaning that the PSOs must (1) be employed by a third-party observer provider, (2) have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammals and mitigation requirements (including brief alerts regarding maritime hazards), and (3) have successfully completed an approved PSO training course appropriate for geophysical surveys. Visual monitoring must be performed by qualified, NMFS-approved PSOs. PSO resumes must be provided to NMFS for review and approval prior to the start of survey activities.

During survey operations (*e.g.,* any day on which use of the sparker source is planned to occur, and whenever the sparker source is in the water, whether activated or not), a minimum of one visual marine mammal observer (PSO) must be on duty on each source vessel and conducting visual observations at all times during daylight hours (*i.e.,* from 30 minutes prior to sunrise through 30 minutes following sunset). A minimum of two PSOs must be on duty on each source vessel during nighttime hours. Visual monitoring must begin no less than 30 minutes prior to ramp-up (described below) and must continue until one hour after use of sparker source ceases.

Visual PSOs shall coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and shall conduct visual observations using binoculars and the naked eye while free from distractions in a consistent, systematic, and

diligent manner. PSOs shall establish and monitor application shutdown zones (see below). These zones shall be based upon the radial distance from the sparker source (rather than being based around the vessel itself).

Two shutdown zones are defined, depending on the species and context. Here, an extended shutdown zone encompassing the area at and below the sea surface out to a radius of 500 meters from the sparker source (0-500 m) is defined for NARWs. For all other marine mammals, the shutdown zone encompasses a standard distance of 100 meters (0-100 m). Any observations of marine mammals by crew members aboard any vessel associated with the survey shall be relayed to the PSO team.

Visual PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period

Pre-start Clearance and Ramp-Up

A ramp-up procedure, involving a gradual increase in source level output, is required at all times as part of the activation of the sparker source when technically feasible. Operators should ramp up sparkers to half power for 5 minutes and then proceed to full power. A 30-minute pre-start clearance observation period must occur prior to the start of ramp-up. The intent of the 30-minute pre-start clearance observation period is to ensure no marine mammals are within the shutdown zones prior to the beginning of ramp-up. The intent of ramp-up is to warn marine mammals of pending operations and to allow sufficient time for those animals to leave the immediate vicinity. All operators must adhere to the following pre-start clearance and ramp-up requirements:

- The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time should not be less than 60 minutes prior to the planned ramp-up in order to allow the PSOs time to monitor the shutdown zones for 30

minutes prior to the initiation of ramp-up (pre-start clearance). During this 30-minute pre-start clearance period, the entire shutdown zone must be visible, except as indicated below.

- Ramp-ups shall be scheduled so as to minimize the time spent with the source activated.
- A visual PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed.
- Any PSO on duty has the authority to delay the start of survey operations if a marine mammal is detected within the applicable pre-start clearance zone.
- The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that mitigation commands are conveyed swiftly while allowing PSOs to maintain watch.

- The pre-start clearance requirement is waived for small delphinids and pinnipeds. Detection of a small delphinid (individuals belonging to the following genera of the Family Delphinidae: *Steno, Delphinus, Lagenorhynchus, Stenella,* and *Tursiops*) or pinniped within the shutdown zone does not preclude beginning of ramp-up, unless the PSO confirms the individual to be of a genus other than those listed, in which case normal pre-clearance requirements apply.
- If there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which the pre-clearance requirement is waived), PSOs may use the best professional judgment in making the decision to call for a shutdown.

- Ramp-up may not be initiated if any marine mammal to which the pre-start clearance requirement applies is within the shutdown zone. If a marine mammal is observed within the shutdown zone during the 30-minute pre-start clearance period, ramp up may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (30 minutes for all baleen whale species and sperm whales and 15 minutes for all other species).
- PSOs must monitor the shutdown zones 30 minutes before and during ramp-up, and ramp-up must cease and the source must be shut down upon observation of a marine mammal within the applicable shutdown zone.
- Ramp-up may occur at times of poor visibility, including nighttime, if appropriate visual monitoring has occurred with no detections of marine mammals in the 30 minutes prior to beginning ramp-up. Sparker activation may only occur at night where operational planning cannot reasonably avoid such circumstances.

- If the acoustic source is shut down for brief periods (*i.e.,* less than 30 minutes) for reasons other than implementation of prescribed mitigation (*e.g.,* mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant visual observation and no detections of marine mammals have occurred within the applicable shutdown zone. For any longer shutdown, pre-start clearance observation and ramp-up are required.

Shutdown Procedures

All operators must adhere to the following shutdown requirements:

    - Any PSO on duty has the authority to call for shutdown of the sparker source if a marine mammal is detected within the applicable shutdown zone.
    - The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.
    - When the sparker source is active and a marine mammal appears within or enters the applicable shutdown zone, the source must be shut down. When shutdown is instructed by a PSO, the source must be immediately deactivated and any dispute resolved only following deactivation.
- The shutdown requirement is waived for small delphinids and pinnipeds. If a small delphinid (individual belonging to the following genera of the Family Delphinidae: *Steno, Delphinus, Lagenorhynchus, Stenella,* and *Tursiops*) or pinniped is visually detected within the shutdown zone, no shutdown is required unless the PSO confirms the individual to be of a genus other than those listed, in which case a shutdown is required
- If there is uncertainty regarding identification of a marine mammal species (*i.e.,* whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger shutdown zone), PSOs may use best professional judgment in making the decision to call for a shutdown.
    - Upon implementation of shutdown, the source may be reactivated after the marine mammal has been observed exiting the applicable shutdown zone or following a clearance period (30 minutes for all

baleen whale species and sperm whales and 15 minutes for all other species) with no further detection of the marine mammal.

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 the Level B harassment zone, shutdown must occur.

Vessel Strike Avoidance

Crew and supply vessel personnel should use an appropriate reference guide that includes identifying information on all marine mammals that may be encountered. Vessel operators must comply with the below measures except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question. These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply.

- Vessel operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel(s), or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammals. A visual observer aboard the vessel must monitor a vessel strike avoidance zone based on the appropriate separation distance around the vessel (distances stated below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (*i.e.,* PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to (1) distinguish protected species from other phenomena and (2) broadly to identify a marine mammal as a NARW, other whale (defined in this context as sperm whales or baleen whales other than NARW), or other marine mammal.
- All survey vessels, regardless of size, must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of NARWs from vessel

strikes. These include all Seasonal Management Areas (SMA) under 50 CFR 224.105 (when in effect), any dynamic management areas (DMA) (when in effect), and Slow Zones. See *www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales* for specific detail regarding these areas.

- All vessels must reduce their speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel;
- All vessels must maintain a minimum separation distance of 500 m from NARWs. If a NARW is sighted within the relevant separation distance, the vessel must steer a course away at 10 knots or less until the 500-m separation distance has been established. If a whale is observed but cannot be confirmed as a species other than a right whale, the vessel operator must assume that it is a right whale and take appropriate action.
- All vessels must maintain a minimum separation distance of 100 m from sperm whales and all other baleen whales.

- All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (*e.g.,* for animals that approach the vessel).
- When marine mammals are sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distance (*e.g.,* attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area, reduce speed and shift the engine to neutral). This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

Members of the monitoring team would consult NMFS NARW reporting system and Whale Alert, daily and as able, for the presence of NARWs throughout survey operations, and for the establishment of DMAs and/or Slow Zones. It is TerraSond's responsibility to maintain awareness of the establishment and location of any such areas and to abide by these requirements accordingly.

Based on our evaluation of TerraSond's proposed measures, as well as other measures considered by NMFS, 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 while conducting the activities. 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 activity; 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.

TerraSond must submit PSO resumes for NMFS review and approval prior to commencement of the survey. Resumes should include dates of training and any prior NMFS approval, as well as dates and description of last experience, and must be accompanied by information documenting successful completion of an acceptable training course. For prospective PSOs not previously approved, or for PSOs whose approval is not current, NMFS must review and approve PSO qualifications. Resumes must be accompanied by relevant documentation of successful completion of necessary training.

NMFS may approve PSOs as conditional or unconditional. A conditionally-approved PSO may be one who is trained but has not yet attained the requisite experience. An unconditionally-approved PSO is one who has attained the necessary experience. For unconditional approval, the PSO must have a minimum of 90 days at sea

performing the role during a geophysical survey, with the conclusion of the most recent relevant experience not more than 18 months previous.

At least one of the visual PSOs aboard the vessel must be unconditionally-approved. One unconditionally-approved visual PSO shall be designated as the lead for the entire PSO team. This lead should typically be the PSO with the most experience, who would coordinate duty schedules and roles for the PSO team and serve as primary point of contact for the vessel operator. To the maximum extent practicable, the duty schedule shall be planned such that unconditionally-approved PSOs are on duty with conditionally-approved PSOs.

At least one PSO aboard each acoustic source vessel must have a minimum of 90 days at-sea experience working in the role, with no more than eighteen months elapsed since the conclusion of the at-sea experience. One PSO with such experience must be designated as the lead for the entire PSO team and serve as the primary point of contact for the vessel operator. (Note that the responsibility of coordinating duty schedules and roles may instead be assigned to a shore-based, third-party monitoring coordinator.) To the maximum extent practicable, the lead PSO must devise the duty schedule such that experienced PSOs are on duty with those PSOs with appropriate training but who have not yet gained relevant experience.

PSOs must successfully complete relevant training, including completion of all required coursework and passing (80 percent or greater) a written and/or oral examination developed for the training program.

PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver shall

be submitted to NMFS and must include written justification. Alternate experience that may be considered includes, but is not limited to (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; and (3) previous work experience as a PSO (PSO must be in good standing and demonstrate good performance of PSO duties).

TerraSond must work with the selected third-party PSO provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals, and to ensure that PSOs are capable of calibrating equipment as necessary for accurate distance estimates and species identification. Such equipment, at a minimum, shall include:

- At least one thermal (infrared) imagine device suited for the marine environment;
- Reticle binoculars (*e.g.,* 7 × 50) of appropriate quality (at least one per PSO, plus backups);
- Global Positioning Units (GPS) (at least one plus backups);
- Digital cameras with a telephoto lens that is at least 300-mm or equivalent on a full-frame single lens reflex (SLR) (at least one plus backups). The camera or lens should also have an image stabilization system;
- Compass (at least one plus backups);
- Means of communication among vessel crew and PSOs; and
- Any other tools deemed necessary to adequately and effectively perform PSO tasks.

The equipment specified above may be provided by an individual PSO, the third-party PSO provider, or the operator, but TerraSond is responsible for ensuring PSOs have the proper equipment required to perform the duties specified in the IHA.

The PSOs will be responsible for monitoring the waters surrounding the survey vessel to the farthest extent permitted by sighting conditions, including shutdown zones, during all HRG survey operations. PSOs will visually monitor and identify marine mammals, including those approaching or entering the established shutdown zones during survey activities. It will be the responsibility of the PSO(s) on duty to communicate the presence of marine mammals as well as to communicate the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate.

PSOs must be equipped with binoculars and have the ability to estimate distance and bearing to detect marine mammals, particularly in proximity to shutdown zones. Reticulated binoculars must also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine mammals. During nighttime operations, night-vision goggles with thermal clip-ons and infrared technology must be available for use. Position data would be recorded using hand-held or vessel GPS units for each sighting.

During good conditions (*e.g.,* daylight hours; Beaufort sea state (BSS) 3 or less), to the maximum extent practicable, PSOs must also conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the active acoustic sources and between acquisition periods. Any observations of marine mammals by crew members aboard the vessel associated with the survey would be relayed to the PSO team. Data on all PSO observations would be recorded based on standard PSO collection requirements (see *Proposed Reporting Measures*). This would include dates, times, and locations of survey operations; dates and

times of observations, location and weather; details of marine mammal sightings (*e.g.,* species, numbers, behavior); and details of any observed marine mammal behavior that occurs (*e.g.,* noted behavioral disturbances). Members of the PSO team shall consult the NMFS NARW reporting system and Whale Alert, daily and as able, for the presence of NARWs throughout survey operations.

Proposed Reporting Measures

TerraSond shall submit a draft summary report to NMFS on all activities and monitoring results within 90 days of the completion of survey activities or expiration of the IHA, whichever comes sooner. The report must describe all activities conducted and sightings of marine mammals, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all marine mammals sightings (dates, times, locations, activities, associated survey activities). The draft report shall also include geo-referenced, time-stamped vessel tracklines for all time periods during which acoustic sources were operating. Tracklines should include points recording any change in acoustic source status (*e.g.,* when the sources began operating, when they were turned off, or when they changed operational status such as from full array to single gun or vice versa). GIS files shall be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. In addition to the report, all raw observational data shall be made available. The report must summarize the information. A final report must be submitted within 30 days following resolution of any comments on the draft report. All draft and final marine mammal monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *nmfs.gar.incidental-take@noaa.gov.*

PSOs must use standardized electronic data forms to record data. PSOs shall record detailed information about any implementation of mitigation requirements, including the

distance of marine mammal to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances. At a minimum, the following information must be recorded:

1. Vessel name (source vessel), vessel size and type, maximum speed capability of vessel;
2. PSO names and affiliations;
3. Dates of departures and returns to port with port name;
4. Date and participants of PSO briefings;
5. Visual monitoring equipment used;
6. PSO location on vessel and height of observation location above water surface;
7. Dates and times (Greenwich Mean Time) of survey on/off effort and times corresponding with PSO on/off effort;
8. Vessel location (latitude/longitude) when survey effort begins and ends, and vessel location at beginning and end of visual PSO duty shifts;
9. Vessel location at 30-second intervals if obtainable from data collection software, otherwise at practical regular interval;
10. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;
11. Water depth (if obtainable from data collection software);
12. 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;

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

Upon visual observation of any marine mammal, the following information must be recorded:

1. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
2. Vessel/survey activity at time of sighting (*e.g.,* deploying, recovering, testing, shooting, data acquisition, other);
3. PSO who sighted the animal;
4. Time of sighting;
5. Initial detection method;
6. Sightings cue;
7. Vessel location at time of sighting (decimal degrees);
8. Direction of vessel's travel (compass direction);
9. Speed of the vessel(s) from which the observation was made;
10. 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;
11. Species reliability (an indicator of confidence in identification);
12. Estimated distance to the animal and method of estimating distance;

13. Estimated number of animals (high/low/best);
14. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
15. 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);
16. 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 before and after point of closest approach);
17. Mitigation actions; description of any actions implemented in response to the sighting *(e.g.,* delays, shutdowns, ramp-up, speed or course alteration, etc.) and time and location of the action;
18. Equipment operating during sighting;
19. Animal's closes point of approach and/or closest distance from the center point of the acoustic source; and
20. Description of any actions implemented in response to the sighting (*e.g.,* delays, shutdown, ramp-up) and time and location of the action.

If a NARW is observed at any time by PSOs or personnel on any project vessels, during surveys or during vessel transit, TerraSond must report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866-755-6622) within two hours of occurrence, when practicable, or no later than 24 hours after occurrence. NARW sightings in any location may also be reported to the U.S. Coast Guard via channel 16 and through the Whale Alert app (*www.whalealert.org*).

In the event that personnel involved in the survey activities discover an injured or dead marine mammal, the incident must be reported to NMFS as soon as feasible by

phone (877-942-5343) and by email (*nmfs.gar.stranding@noaa.gov* and *PR.ITP.monitoringreports@noaa.gov*). The report must include the following information:

1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
2. Species identification (if known) or description of the animal(s) involved;
3. Condition of the animal(s) (including carcass condition if the animal is dead);
4. Observed behaviors of the animal(s), if alive;
5. If available, photographs or video footage of the animal(s); and
6. General circumstances under which the animal was discovered.

In the event of a ship strike of a marine mammal by any vessel involved in the activities covered by the IHA, TerraSond must report the incident to the NMFS by phone (877-942-5343) and by email (*nmfs.gar.stranding@noaa.gov* and *PR.ITP.monitoringreports@noaa.gov*) as soon as feasible. The report would include the following information:

1. Time, date, and location (latitude/longitude) of the incident;
2. Species identification (if known) or description of the animal(s) involved;
3. Vessel's speed during and leading up to the incident;
4. Vessel's course/heading and what operations were being conducted (if applicable);
5. Status of all sound sources in use;
6. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;
7. Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;

8. Estimated size and length of animal that was struck;
9. Description of the behavior of the marine mammal immediately preceding and following the strike;
10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
11. Estimated fate of the animal (*e.g.,* dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
12. To the extent practicable, photographs or video footage of the animal(s).

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), 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' 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 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, the majority of our analysis applies to all the species listed in Table 3, given that many of the anticipated effects of this activity on different marine mammal stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks, as in the case of the NARW, they are included as separate sub-sections below. NMFS does not anticipate that serious injury or mortality would occur as a result from HRG surveys, even in the absence of mitigation, and no serious injury or mortality is proposed to be authorized. As discussed in the **Potential Effects of Specified Activities on Marine Mammals and their Habitat** section, non-auditory physical effects, auditory physical effects, and vessel strike are not expected to occur. NMFS expects that all potential Level B harassment takes would be in the form of temporary avoidance of the area or decreased foraging (if such activity was occurring), reactions that are considered to be of low severity and with no lasting biological consequences (*e.g.,* Southall *et al.,* 2007; Ellison *et al.,* 2012). Even repeated Level B harassment of some small subset of an overall stock is unlikely to result in any significant realized decrease in viability for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. As described above, Level A harassment is not expected to occur, even absent mitigation, given the nature of the operations and the estimated size of the Level A harassment zones. In addition to being temporary, the ensonified area surrounding the acoustic source is relatively small, with a behavioral harassment zone radius of 141 m associated with the sparker, as compared to the overall distribution of the animals in the area and their use of the habitat.

North Atlantic Right Whales

The status of the NARW population is of heightened concern and, therefore, merits additional analysis. As noted previously, elevated NARW mortalities began in

June 2017 and there is currently an active UME. Overall, preliminary findings support human interactions, specifically vessel strikes and entanglements, as the cause of death for the majority of NARWs.

As mentioned earlier, the proposed survey area is within the NARW migratory BIA (November 1 – April 30), which extends from Massachusetts to Florida, from the coast to beyond the shelf break. (LaBrecque *et al.,* 2015). This BIA is extensive and sufficiently large (approximately 269,448 km^2), and the acoustic footprint of the proposed survey is sufficiently small (445.4 km^2) that NARW migration would not be impacted by the proposed survey. If NARWs are temporarily displaced, they are expected to be able to resume their migration activities after moving away from areas with disturbing levels of noise. Required vessel strike avoidance measures in addition to the slow survey speed of the vessel (approximately 1.8 m/s or 3.5 knots) would also decrease risk of ship strike during migration such that no ship strike is expected to occur during TerraSond's proposed activities. Additionally, TerraSond would be required to adhere to a 10-knot speed restriction in an active SMA, and any DMA(s), should NMFS establish one (or more) in the proposed survey area.

A small portion of the northwest corner of the proposed survey area overlaps with the NARW reproduction BIA and the Wilmington, NC to Brunswick, GA SMA (November 1 through April). The reproductive BIA is large in size (43,783 $km^{2)}$ in comparison to the acoustic footprint of the proposed survey (454.4 km^2), thus reproductive opportunities would not be reduced appreciably. In addition, TerraSond would adhere to the 10-knot speed restriction within the boundaries of the SMA. Due to the temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, the impacts to NARWs are not expected to cause significant or long-term consequences for individuals of the population. Furthermore, the 500-m shutdown zone for NARWs is conservative (considering the distance to the Level

B harassment isopleth for the acoustic source is estimated to be 141 m), and thereby minimizes the potential for behavioral harassment of this species.

Again, Level A harassment is not expected due to the small PTS zones associated with HRG equipment type proposed for use. The proposed behavioral harassment takes of NARW are not expected to exacerbate or compound upon the ongoing UME. The limited NARW behavioral harassment takes proposed for authorization are expected to be of a short duration, and given the number of estimated takes, repeated exposures of the same individual are not expected. As stated previously, it is unlikely that NARW migration or reproduction would be adversely affected given the relatively small size of the ensonified area during TerraSond's proposed survey activities as well as the small degree of overlap between the proposed survey area and NARW reproduction BIA. Accordingly, NMFS does not anticipate potential take of NARWs that would result from TerraSond's proposed activities would impact annual rates of recruitment or survival nor result in population level impacts.

Other Marine Mammal Species with Active UMEs

As noted above, there are several active UMEs occurring in the vicinity of TerraSond's proposed survey area. Elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through Florida since January 2016. Of the cases examined, approximately half had evidence of human interaction (ship strike or entanglement). The UME does not yet provide cause for concern regarding population-level impacts. Despite the UME, the relevant population of humpback whales (the West Indies breeding population, or DPS) remains stable at approximately 12,000 individuals (Hayes *et al.,* 2022).

As mentioned earlier, a UME has been declared for Northeast pinnipeds (including harbor seals and gray seals). However, we do not expect takes that may be authorized to exacerbate the ongoing UME. No injury, serious injury, or mortality is

expected or will be authorized, and Level B harassment of humpback whales, harbor seals, and gray seals will be reduced through the incorporation of the required mitigation measures. For the Western North Atlantic stock of harbor seals, the estimated abundance is 61,336 individuals, and the annual M/SI (339) for harbor seals is well below PBR (1,729) (Hayes *et al.,* 2022). The estimated stock abundance for the U.S. portion of the Western North Atlantic gray seal stock is 27,300 animals, and the abundance of gray seals is likely increasing in both the U.S. Atlantic as well as in Canada (Hayes *et al.,* 2022). Given that only two takes by Level B harassment may be authorized for each of these stocks, we do not expect these proposed takes to compound upon the ongoing UME.

The required mitigation measures are expected to reduce the number and/or severity of proposed takes for all species listed in Table 3, including those with active UMEs, to the level of least practicable adverse impact. In particular, ramp-up procedures would provide animals in the vicinity of the survey vessel the opportunity to move away from the sound source before HRG survey equipment reaches full energy, thus preventing them from being exposed to sound levels that have the potential to cause injury (Level A harassment) or more severe type of Level B harassment. As discussed previously, take by Level A harassment (injury) is considered unlikely, even absent mitigation, based on the characteristics of the signals produced by the acoustic source planned for use. Implementation of the required mitigation would further reduce this potential. Therefore, NMFS is not proposing any Level A harassment for authorization.

NMFS expects that takes would be in the form of short-term behavioral harassment by way of temporary vacating of the area, or decreased foraging (if such activity was occurring)—reactions that (at the scale and intensity anticipated here) are considered to be of low severity, with no lasting biological consequences. Since both the sources and marine mammals are mobile, animals would only be exposed briefly to a

small ensonified area that might result in take. Additionally, required mitigation measures would further reduce exposure to sound that could result in more severe behavioral harassment.

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 any of the species or stocks through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized;
- No Level A harassment (PTS) is anticipated, even in the absence of mitigation measures, or proposed for authorization;
- Any displacement or avoidance of the survey area is expected to be short-term and unlikely to cause significant impacts to any populations;
- Impacts on marine mammal habitat are expected to be minimal, and alternate areas of similar habitat value are readily available;
- Take is anticipated to be by Level B harassment only, consisting of brief startling reactions and/or temporary avoidance of the survey area;
- Survey activities would occur in such a comparatively small portion of the BIA for the NARW migration, including a small portion of the reproduction BIA and SMA, that any avoidance of the area due to survey activities would not affect migration or reproduction. In addition, the mitigation measure to shut down at 500 m to minimize potential for Level B harassment would limit both the number and severity of take of the species.
- Proposed mitigation measures, including visual monitoring and shutdowns, are expected to minimize the intensity of 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 previously, only take of small numbers of marine mammals may be authorized under sections 101(a)(5)(A) and (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. When the predicted number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

NMFS proposes to authorize incidental take (by Level B harassment only) of 18 marine mammal species (with 19 managed stocks). The total amount of takes proposed for authorization relative to the best available population abundance is less than 20 percent for all stocks, less than 15 percent for 18 stocks, and less than 2 percent for 17 stocks. 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 would 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 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species.

NMFS Office of Protected Resources is proposing to authorize take of four species of marine mammals which are listed under the ESA, including the NARW, humpback whale, fin whale, and sperm whale, and has determined that this activity falls within the scope of activities analyzed in NMFS GARFO's programmatic consultation regarding geophysical surveys along the U.S. Atlantic coast in the three Atlantic Renewable Energy Regions (completed June 29, 2021; revised September 2021).

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to TerraSond for conducting marine site characterization surveys in federal waters offshore of North Carolina and South Carolina in the BOEM Lease Areas OCS-A 0545 and 0546 from February 1, 2023 to January 31, 2024, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.*

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of the proposed IHA. We also request comment on the potential renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent renewal IHA.

On a case-by-case basis, NMFS may issue a one-time, one-year renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical activities as described in the **Description of Proposed Activities** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activities** section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (recognizing that the renewal IHA expiration date cannot extend beyond one year from expiration of the initial IHA); and
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take); 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 will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: December 16, 2022.

Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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