



DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XA869]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Site Characterization Surveys off the Coast of Massachusetts

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 Mayflower Wind Energy LLC (Mayflower) for authorization to take marine mammals incidental to site characterization surveys off the coast of Massachusetts in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0521) and along a potential submarine cable route to landfall at Falmouth, Massachusetts. 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-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 authorizations and agency responses will be summarized in the final notice of our decision.

DATES: Comments must be received by [INSERT DATE 30 DAYS AFTER THE 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.Pauline@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period.

Comments, 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: Robert Pauline, 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/permit/incidental-take-authorizations-under-marine-mammal-protection-act*. 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 issued or, if the taking is

limited to harassment, a notice of a proposed incidental take authorization may be 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 incidental harassment authorization) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (incidental harassment authorizations with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which NMFS has 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.

NMFS 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 October 23, 2020, NMFS received a request from Mayflower for an IHA to take marine mammals incidental to site characterization surveys in the area of the Lease Area OCS-A 0521 and a submarine export cable route connecting the Lease Area to landfall in Falmouth, Massachusetts. A revised application was received on December 15, 2020. NMFS deemed that request to be adequate and complete on February 1, 2021. Mayflower's request is for take of a small number of 14 species of marine mammals by Level B harassment only. Neither Mayflower nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

NMFS previously issued an IHA to Mayflower for similar work (85 FR 45578; July 29, 2020) in the same Lease Area and along the same submarine cable route that is effective from July 23, 2020 through July 22, 2021. However, the surveys began on July 23, 2020 and ended on October 23, 2020. Mayflower submitted a marine mammal monitoring report and complied with all the requirements (*e.g.*, mitigation, monitoring, and reporting) of the previous IHA. Information regarding their monitoring results may be found in the **Estimated Take** section.

Description of Proposed Activity

Overview

Mayflower proposes to conduct marine site characterization surveys, including high-resolution geophysical (HRG) and geotechnical surveys, in the Lease Area and along a potential submarine cable route to landfall at Falmouth, Massachusetts.

The objective of the activities is to acquire high resolution geophysical (HRG) and geotechnical 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 within the Lease Area and along the proposed export cable route corridor

Underwater sound resulting from Mayflower's proposed activities, specifically its proposed HRG surveys, have the potential to result in incidental take of marine mammals in the form of behavioral harassment.

Dates and Duration

The total duration of HRG survey activities would be approximately 471 survey days. Each day that a survey vessel is operating counts as a single survey day. Two survey vessels operating on the same day count as two survey days. This schedule is based on 24-hour operations in the offshore, deep-water portion of the Lease Area, and 12-hour operations in shallow-water and nearshore areas of the export cable route. Some shallow-water HRG activities would occur only during daylight hours. Mayflower proposes to begin survey activities on April 1, 2021 and conclude by November 30, 2021. However, the proposed IHA would be effective for one year from the date of issuance.

Specific Geographic Region

Mayflower's survey activities would occur in the Northwest Atlantic Ocean in the Lease Area which is located approximately 20 nautical miles (38 kilometers (km)) south-southwest of Nantucket, Massachusetts and covers approximately 515 km². All survey efforts would occur within U.S. Federal and state waters. Water depths in the Lease Area are approximately 38-62 meters (m). Surveys would occur within the Lease Area and along a potential submarine cable route connecting to landfall at Falmouth, MA (see Figure 1). For the purpose of this IHA, the Lease Area and export cable route are collectively referred to as the Project Area.

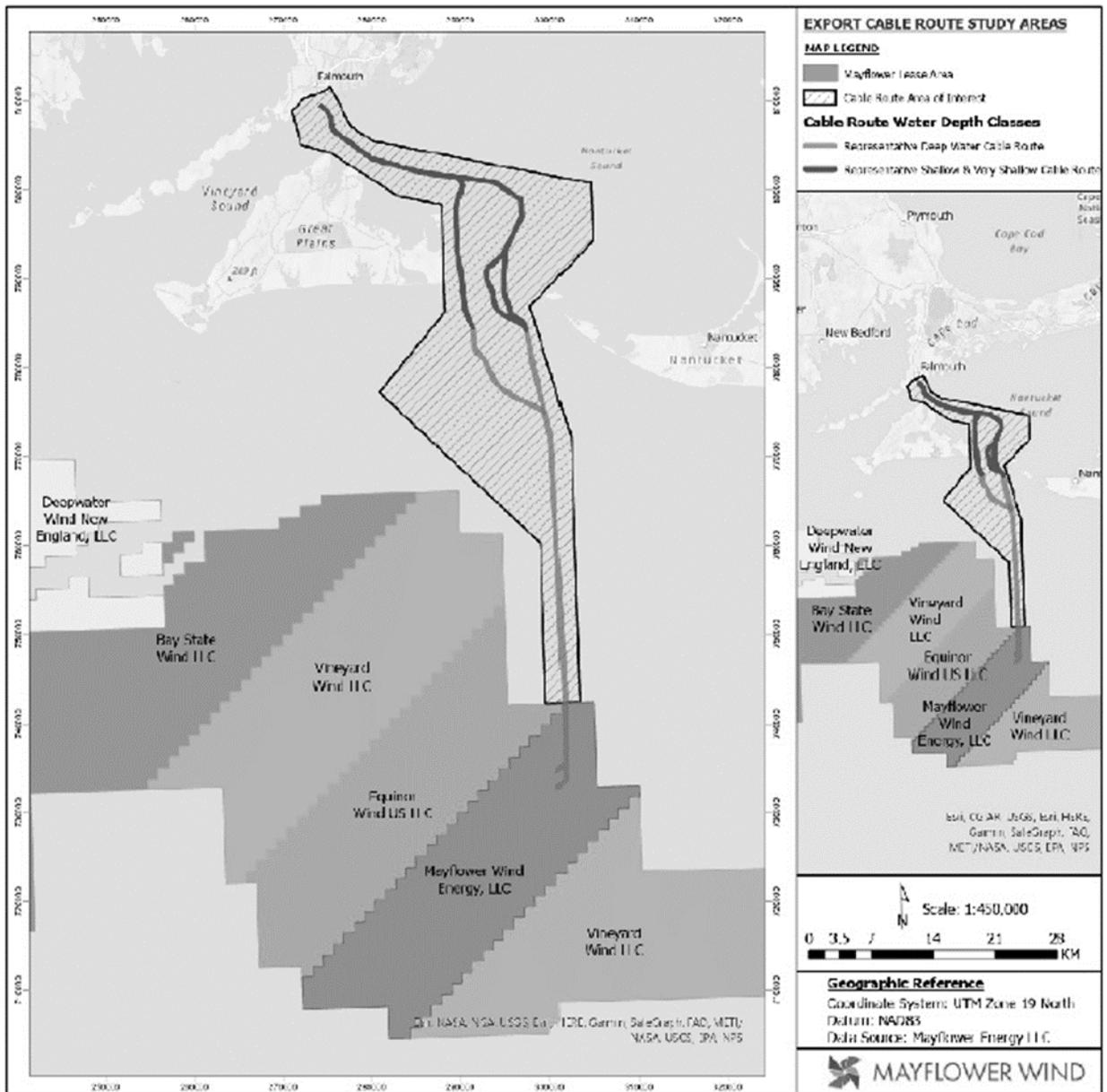


Figure 1 – Survey Area and Export Cable Route Corridor

Detailed Description of Specific Activity

Mayflower’s proposed marine site characterization surveys includes the use of HRG equipment. Survey activities would occur within the Lease Area and along an export cable route between the Lease Area and Falmouth, Massachusetts. Up to four (4) HRG survey vessels may operate concurrently as part of the proposed surveys and are anticipated to spend a total of 471 survey days at sea. One vessel would be operating primarily in the Lease Area and deep-water sections of the cable route (24 hr operations), with a second vessel operating primarily in the shallow water portion of the cable route

and sometimes into the deep water portion of the cable route (either daylight only operations or 24 hour operations). Up to two (2) shallow-draft vessels would work in very shallow waters (daylight only operations). Up to four additional vessels may be used to conduct geotechnical sampling activities (vibracores, seabed core penetration tests (CPTs), and boreholes) during the same period as the geophysical surveys but these activities are not expected to result in the harassment of marine mammals and will not be discussed further in this analysis.

The proposed HRG survey activities are described below.

HRG Survey Activities

For assessing potential impacts to marine mammals, the survey has been divided into two areas. The Deep-water Survey Area shows the Lease Area where wind turbine generators (WTGs) and inter-array cables will be installed as well as the deep-water section of the export cable route. The proposed survey in this area will primarily consist of 24-hour vessel operations, with some 12-hour per day vessel operations possible. The Shallow-water Survey Area includes the rest of the export cable route in shallow waters and very shallow nearshore waters. Depending on vessel availability, survey operations in the shallow water area may occur only during daylight periods or involve 24-hour survey operations. In the very shallow water areas, one or two shallow-draft (<5 m) vessels will conduct nearshore surveys operating only during daylight hours.

The linear distance (survey tracklines) and number of active sound source days for the anticipated survey activity are summarized in Table 1. The number of active sound source days was calculated by dividing the total survey trackline lengths in each area by the approximate survey distance per day anticipated to be achieved in each of the three zones shown in Table 1. The range of estimates provided for the shallow-water area result from assuming either daylight only (12-hours per day) survey operations or 24-hr per day operations.

Table 1–Activity Details for 2021 Mayflower HRG Surveys from April 1 through November 30

Location	Approximate Survey Trackline ¹ (km)	Approximate Survey Distance Per Day (km)	Active Sound Source Days
Lease Area and deep-water section of the cable route	7,000	80	88
Shallow-water section of the cable route	3,250	30–60	55–109
Very shallow cable route	4,100	15	274
Total	14,350	--	417-471

Some of the sources used during the planned surveys produce sounds that are audible to marine mammals and, therefore, may be detected by marine mammals (MacGillivray *et al.* 2014). Multiple factors related to source signal characteristics (*e.g.*, beamwidth) determine the likelihood of detection and, given detection, the likelihood that receipt of the signal would elicit a response to the degree that Level B harassment occurs. A geophysical survey contractor(s) has not yet been selected to conduct this work, so the exact equipment to be used is currently unknown. However, potential contractors provided representative sound-generating equipment that may be used during the survey activities. The survey activities proposed by Mayflower with acoustic source types that could result in take of marine mammals include the following.

- Shallow penetration, non-impulsive, non-parametric sub-bottom profilers (SBPs, also known as CHIRPs) are used to map the near-surface stratigraphy (top 0 to 10 m) of sediment below seabed. A CHIRP system emits signals covering a frequency sweep from approximately 0.01 to 1.9 kHz over time. The frequency range can be adjusted to meet project variables.
- Medium penetration, impulsive sources (boomers, sparkers) are used to map deeper subsurface stratigraphy as needed. A boomer is a broad-band sound source operating in the 3.5 Hz to 10 kHz frequency range. Sparkers are used to map deeper

subsurface stratigraphy as needed. Sparkers create acoustic pulses from 50 Hz to 4 kHz omni-directionally from the source.

Operation of the following survey equipment types is not reasonably expected to result in take of marine mammals for and will not be carried forward in the application analysis beyond the brief summaries provided below.

- Non-impulsive, parametric SBPs are used for providing high data density in sub-bottom profiles that are typically required for cable routes, very shallow water, and archaeological surveys. They have a narrow beamwidth which significantly reduces the impact range of the source while the high frequencies of the source are rapidly attenuated in sea water. Because of the high frequency of the source and narrow bandwidth, parametric SBPs produce small Level B harassment isopleths. No Level B harassment exposures should be reasonably expected from the operation of these sources.

- Ultra-short baseline (USBL) positioning systems are used to provide high accuracy ranges by measuring the time between the acoustic pulses transmitted by the vessel transceiver and a transponder (or beacon) necessary to produce the acoustic profile. USBLs have been shown to produce extremely small acoustic propagation distances in their typical operating configuration. Based on this information, no Level B harassment exposures should be reasonably expected from the operation of these sources.

- Multibeam echosounders (MBESs) are used to determine water depths and general bottom topography. The proposed MBESs all have operating frequencies >180 kHz, and are therefore outside the general hearing range of marine mammals likely to occur in the Project Area and are not likely to affect these species.

- Side scan sonars (SSS) are used for seabed sediment classification purposes and to identify natural and man-made acoustic targets on the seafloor. The proposed SSSs all have operating frequencies >180 kHz, and are therefore outside the

general hearing range of marine mammals likely to occur in the Project Area and are not likely to affect these species.

Table 2 identifies the representative survey equipment that may be used in support of planned HRG survey activities that operate below 180 kilohertz (kHz) (*i.e.*, at frequencies that are audible to and therefore may be detected by marine mammals) and have the potential to cause acoustic harassment to marine mammals. The make and model of the listed geophysical equipment may vary depending on availability and the final equipment choices will vary depending upon the final survey design, vessel availability, and survey contractor selection. Geophysical surveys are expected to use several equipment types concurrently in order to collect multiple aspects of geophysical data along one transect. Selection of equipment combinations is based on specific survey objectives. Source levels for all equipment listed in Table 2 came from Crocker and Fratantonio (2016). Detailed explanations of source specification are found in Table 7 in Appendix A in the IHA application.

Table 2–Summary of HRG Survey Equipment Proposed for Use that Could Result in Take of Marine Mammals

Specific HRG Equipment	Operating Frequency Range (kHz)	Source Level (dB rms)	Beamwidth (degrees)	Typical Pulse Duration (ms)	Pulse Repetition rate (Hz)
Sparker					
Geomarine Geo-Spark 400 tip 800 J system	0.01 - 1.9	203	180	3.4	2
Applied Acoustics Dura-Spark UHD 400 tips, up to 800 J	0.01 - 1.9	203	180	3.4	2
Boomer					
Applied Acoustics S-Boom Triple Plate	0.01 – 5	205	61	0.6	3
Applied Acoustics S-Boom	0.01 – 5	195	98	0.9	3
Sub-bottom Profiler					
Edgetech 3100 with SB-2-16S towfish	2 - 16	179	51	9.1	10
Edgetech DW-106	1 - 6	176	66	14.4	10

Teledyne Benthos Chirp III – towfish	2 - 7	199	82	5.8	10
Knudson Pinger SBP	15	180	71	4	2

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

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS’s Stock Assessment Reports (SARs; <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>) and more general information about these species (e.g., physical and behavioral descriptions) may be found on NMFS’s website (<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 action, and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. For taxonomy, NMFS follows Committee on Taxonomy (2020). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS’s SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

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 Project Area. NMFS’s stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS’s U.S. Atlantic SARs. All values presented in Table 3 are the most recent available at the time of publication and are available in the 2019 Atlantic and Gulf of Mexico Marine Mammal SARs (Hayes *et al.*, 2020), available online at: www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region and draft 2020 Atlantic and Gulf of Mexico Marine Mammal SARs available online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports>.

Table 3—Marine Mammals Likely to Occur in the Project Area That May be Affected by Mayflower’s Proposed Activity

Common name	Scientific name	Stock	ESA/MMP A status; Strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR ³	Annual M/SI ³
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic right whale	<i>Eubalaena glacialis</i>	Western North Atlantic	E/D; Y	412 (0; 408; 2018)	0.89	18.6
Family Balaenopteridae (rorquals)						
Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	-/ -; Y	1,393 (0; 1,375; 2016)	22	58
Fin whale	<i>Balaenoptera physalus</i>	Western North Atlantic	E/D; Y	6,820 (0.24; 5,573; 2016)	12	2.35
Sei whale	<i>Balaenoptera borealis</i>	Nova Scotia	E/D; Y	6292 (1.02; 3,098; 2016)	6.2	1.2
Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian East Coast	-/ -; N	21,968 (0.31; 17,002; 2016)	170	10.6

Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Physeteridae						
Sperm whale	<i>Physeter macrocephalus</i>	NA	E; Y	4,349 (0.28;3,451 ; See SAR)	3.9	0
Family Delphinidae						
Long-finned pilot whale	<i>Globicephala melas</i>	Western North Atlantic	-/-; N	39,215 (0.3; 30,627; See SAR)	306	21
Bottlenose dolphin	<i>Tursiops spp.</i>	Western North Atlantic Offshore	-/-; N	62,851 (0.213; 51,914; See SAR)	519	28
Common dolphin	<i>Delphinus delphis</i>	Western North Atlantic	-/-; N	172,897 (0.21; 145,216; 2016)	1,452	399
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western North Atlantic	-/-; N	92,233 (0.71; 54,433; See SAR)	544	26
Risso's dolphin	<i>Grampus griseus</i>	Western North Atlantic	-/-; N	35,493 (0.19; 30,289; See SAR)	303	54.3
Family Phocoenidae (porpoises)						
Harbor porpoise	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy	-/-; N	95,543 (0.31; 74,034; 2016)	851	217
Order Carnivora – Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Gray seal ⁴	<i>Halichoerus grypus</i>	Western North Atlantic	-/-; N	27,131 (0.19; 23,158, 2016)	1,389	4,729
Harbor seal	<i>Phoca vitulina</i>	Western North Atlantic	-/-; N	75,834 (0.15; 66,884, 2012)	2,006	350

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

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

3 - Potential biological removal, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size (OSP). Annual M/SI, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, subsistence hunting, ship strike). Annual M/SI values often cannot be determined precisely and is in some cases presented as a minimum value.

4 - NMFS stock abundance estimate applies to U.S. population only, actual stock abundance is approximately 505,000.

As indicated above, all 14 species (with 14 managed stocks) in Table 3 temporally and spatially co-occur with the proposed activity to the degree that take is reasonably likely to occur, and NMFS has proposed authorizing it. All species that could potentially

occur in the proposed survey areas are included in Table 5 of the IHA application. However, the temporal and/or spatial occurrence of several species listed in Table 5 in the IHA application is such that take of these species is not expected to occur. The blue whale (*Balaenoptera musculus*), Cuvier's beaked whale (*Ziphius cavirostris*), four species of Mesoplodont beaked whale (*Mesoplodon* spp.), dwarf and pygmy sperm whale (*Kogia sima* and *Kogia breviceps*), and striped dolphin (*Stenella coeruleoalba*), typically occur further offshore than the Project Area, while short-finned pilot whales (*Globicephala macrorhynchus*) and Atlantic spotted dolphins (*Stenella frontalis*) are typically found further south than the Project Area (Hayes *et al.*, 2020). There are stranding records of harp seals (*Pagophilus groenlandicus*) in Massachusetts, but the species typically occurs north of the Project Area and appearances in Massachusetts usually occur between January and May, outside of the proposed survey dates (Hayes *et al.*, 2020). As take of these species is not anticipated as a result of the proposed activities, these species are not analyzed further.

A description of the marine mammals for which take is likely to occur may be found in the documents supporting Mayflower's previous IHA covering the Lease Area and potential submarine cable routes (85 FR 45578; July 29, 2020), the same geographic areas where Mayflower has proposed activities for this IHA. The most recent draft SARs data has been included in Table 3. The only other notable changes from the previous IHA pertain to updated Unusual Mortality Event (UME) data for North Atlantic right whales, humpback whales, minke whales, and pinnipeds.

At the time of the issuance of the previous IHA to Mayflower 85 FR 45578; July 29, 2020), 30 North Atlantic right whales have been recorded as confirmed dead or stranded. As of January 21, 2021, the number has increased to 32. Humpback whale mortalities have increased from 111 to 145 and minke whale mortalities increased from 79 to 103 cases over the same time period. The number of recorded pinniped mortalities

has not been updated since issuance of Mayflower's previous IHA and remains at 3,152 cases.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, in 2018 NMFS published a *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* which 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, <i>Kogia</i> , river dolphins, cephalorhynchid, <i>Lagenorhynchus cruciger</i> & <i>L. australis</i>)	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>i.e.</i> , 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 <i>et al.</i> 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 *et al.*, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. Fourteen marine mammal species (12 cetacean and two pinniped (both phocid) species) have the reasonable potential to co-occur with the proposed survey activities. Of the cetacean species that may be present, six are classified as low-frequency cetaceans (*i.e.*, all mysticete species), five are classified as mid-frequency cetaceans (*i.e.*, all delphinid species and the sperm whale), and one is classified as high-frequency cetaceans (*i.e.*, harbor porpoise).

Potential Effects of Specified Activities on Marine Mammals and their Habitat

A description of the potential effects of the specified activities on marine mammals and their habitat may be found in the documents supporting Mayflower's previous IHA covering the Lease Area and potential submarine cable routes (85 FR 45578; July 29, 2020). There is no new information on potential effects which would impact our analysis.

Estimated Take

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

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, 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 HRG sources. Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (*i.e.*, exclusion zones and shutdown measures), discussed in detail below in Proposed Mitigation section, Level A harassment is neither anticipated nor proposed to be authorized even in the absence of mitigation

As described previously, no mortality is anticipated or proposed to be authorized for this activity even without the employment of mitigation measures. Below NMFS describes how the take is estimated.

Generally speaking, NMFS estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. NMFS notes that while these basic factors can contribute to a basic

calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, NMFS describes the factors considered here in more detail and present the proposed take estimate.

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 permanent threshold shift (PTS) of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – 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 (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner NMFS considers Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μ Pa (rms) for continuous (*e.g.*, vibratory pile-driving, drilling) and above 160 dB re 1 μ Pa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Mayflower's proposed activity includes the use of intermittent sources (geophysical survey equipment), and therefore use of the 160 dB re 1 μ Pa (rms) threshold is applicable.

Level A harassment for non-explosive sources - 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). Mayflower's proposed activities that could result in take by harassment include the use of impulsive and non-impulsive sources.

Predicted distances to Level A harassment isopleths, which vary based on marine mammal functional hearing groups were calculated. The updated acoustic thresholds for impulsive and non-impulsive sounds (such as HRG survey equipment) contained in the Technical Guidance (NMFS, 2018) were presented as dual metric acoustic thresholds using both SEL_{cum} and peak sound pressure level metrics. As dual metrics, NMFS considers onset of PTS (Level A harassment) to have occurred when either one of the two metrics is exceeded (*i.e.*, metric resulting in the largest isopleth). The SEL_{cum} metric considers both level and duration of exposure, as well as auditory weighting functions by marine mammal hearing group.

These thresholds are provided in Table 5 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance>.

Table 5–Thresholds Identifying the Onset of Permanent Threshold Shift

Hearing Group	PTS Onset Acoustic Thresholds* (Received Level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	<i>Cell 1</i> $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	<i>Cell 2</i> $L_{E,LF,24h}$: 199 dB

Mid-Frequency (MF) Cetaceans	<i>Cell 3</i> $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	<i>Cell 4</i> $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	<i>Cell 5</i> $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	<i>Cell 6</i> $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	<i>Cell 7</i> $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	<i>Cell 8</i> $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	<i>Cell 9</i> $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	<i>Cell 10</i> $L_{E,OW,24h}$: 219 dB
<p>* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.</p> <p><u>Note:</u> Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1 μPa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (<i>i.e.</i>, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.</p>		

Ensonified Area

Here, NMFS describes operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds, which include source levels and transmission loss coefficient.

The proposed survey activities would entail the use of HRG equipment. The distance to the isopleth corresponding to the threshold for Level B harassment was calculated for all HRG equipment with the potential to result in harassment of marine mammals. NMFS has developed methodology for determining the rms sound pressure level (SPL_{rms}) at the 160-dB isopleth for the purposes of estimating take by Level B harassment resulting from exposure to HRG survey equipment. This methodology incorporates frequency and some directionality to refine estimated ensonified zones. Mayflower used the methods specified in the interim methodology. For sources that

operate with different beam widths, the maximum beam width was used. The lowest frequency of the source was used when calculating the absorption coefficient. The formulas used to apply the methodology are described in detail in Appendix A of the IHA application.

NMFS considers the data provided by Crocker and Fratantonio (2016) to represent the best available information on source levels associated with HRG equipment and therefore recommends that source levels provided by Crocker and Fratantonio (2016) be incorporated in the method described above to estimate isopleth distances to the Level B harassment threshold. Table 2 shows the HRG equipment types that may be used during the proposed surveys and the sound levels associated with those HRG equipment types.

Table 6—Estimated Distances to Level A and Level B harassment Thresholds for the Planned Survey Equipment

Representative System(s)	Distance (m) to Level A Harassment Threshold ¹					Distance to Level B Harassment Threshold (m)
	LFC	MFC	HFC	PPW	OPW	All Marine Mammals
Sparker						
SIG ELC 820 @ 750 J	1	<1	4 ²	<1	<1	141
Sub-bottom Profiler						
Teledyne Benthos Chirp III	2	<1	57	1	<1	66
Boomer						
Applied Acoustics S-boom @ 700 J	<1	<1	1 ²	<1	<1	90

1— Distances to the Level A harassment threshold based on the larger of the dual criteria (peak SPL and SEL_{cum}) are shown.

2—Peak SPL pressure level resulted in larger isopleth than SEL_{cum}.

Modeling of distances to isopleths corresponding to the Level A harassment threshold was performed for all types of HRG equipment proposed for use with the

potential to result in harassment of marine mammals. Mayflower used a model developed by JASCO to calculate distances to Level A harassment isopleths based on both the peak SPL and the SEL_{cum} metric. For the peak SPL metric, the model is a series of equations that accounts for both seawater absorption and HRG equipment beam patterns (for all HRG sources with beam widths larger than 90° , it was assumed these sources were omnidirectional). For the SEL_{cum} metric, a model was developed that accounts for the hearing sensitivity of the marine mammal group, seawater absorption, and beam width for downwards-facing transducers. Details of the modeling methodology for both the peak SPL and SEL_{cum} metrics are provided in Appendix A of the IHA application. This model entails the following steps:

1. Weighted broadband source levels were calculated by assuming a flat spectrum between the source minimum and maximum frequency, weighted the spectrum according to the marine mammal hearing group weighting function (NMFS 2018), and summed across frequency;
2. Propagation loss was modeled as a function of oblique range;
3. Per-pulse SEL was modeled for a stationary receiver at a fixed distance off a straight survey line, using a vessel transit speed of 3.5 knots and source-specific pulse length and repetition rate. The off-line distance is referred to as the closest point of approach (CPA) and was performed for CPA distances between 1 m and 10 km. The survey line length was modeled as 10 km long (analysis showed longer survey lines increased SEL by a negligible amount). SEL is calculated as $SPL + 10 \log_{10} T / 15$ dB, where T is the pulse duration;
4. The SEL for each survey line was calculated to produce curves of weighted SEL as a function of CPA distance; and
5. The curves from Step 4 above were used to estimate the CPA distance to the impact criteria.

Note that in the modeling methods described above and in Appendix A of the IHA application, sources that operate with a repetition rate greater than 10 Hz were assessed with the non-impulsive (intermittent) source criteria while sources with a repetition rate equal to or less than 10 Hz were assessed with the impulsive source criteria. NMFS does not agree with this step in the modeling assessment, which results in nearly all HRG sources being classified as impulsive.

Modeled distances to isopleths corresponding to the Level A harassment threshold are very small (<1 m in most cases) for three of the four marine mammal functional hearing groups that may be impacted by the survey activities (*i.e.*, low frequency and mid frequency cetaceans, and phocid pinnipeds). Based on the extremely small Level A harassment zones for these functional hearing groups, the potential for species within these functional hearing groups to be taken by Level A harassment is considered so low as to be discountable. These three functional hearing groups encompass all but one of the marine mammal species that may be impacted by the planned activities, listed in Table 1. There is one species (harbor porpoise) within the high frequency functional hearing group that may be impacted by the planned activities. However, the largest modeled distance to the Level A harassment threshold for the high frequency functional hearing group was 57 m (Table 6) for the Chirp III. This is likely a conservative assessment given that the JASCO model treats all devices as impulsive and results in gross overestimates for non-impulsive devices. Level A harassment would also be more likely to occur at close approach to the sound source or as a result of longer duration exposure to the sound source, and mitigation measures—including a 100 m exclusion zone for harbor porpoises—are expected to minimize the potential for close approach or longer duration exposure to active HRG sources. In addition, harbor porpoises are a notoriously shy species which is known to avoid vessels. Harbor porpoises would also be expected to avoid a sound source prior to that source reaching a level that would result in injury

(Level A harassment). Therefore, NMFS has determined that the potential for take by Level A harassment of harbor porpoises or any other species is so low as to be discountable and does not propose authorizing take by Level A harassment of any marine mammals.

The largest distance to the 160 dB SPL_{rms} Level B harassment threshold is expected to be 141 m from the sparkers. This distance was used as described in this section to estimate the area of water potentially exposed above the Level B harassment threshold by the planned activities.

As shown in Table 1, up to 14,350 km of survey activity may occur from April through November 2021, including turns between lines or occasional testing of equipment while not collecting geophysical data. For the purposes of calculating take, Mayflower's HRG survey activities have been split into two different areas, 1) the lease area plus the deep-water portion of the cable route, and 2) the shallow water portion of the cable route including very shallow water sections of the cable route.

Within the Lease Area and deep-water portion of the cable route, the vessel will conduct surveys at a speed of approximately 3 knots (5.6 km/hr) during mostly 24-hr operations. Allowing for weather and equipment downtime, the survey vessel is expected to collect geophysical data over an average distance of 80 km per day. Using a 160 dB SPL_{rms} threshold distance of 141 m, the total daily ensonified area is estimated to be 22.6 km² within the Lease Area and deep-water portion of the cable route.

Along the shallow-water portion of the cable route, survey vessels will also conduct surveys at a speed of approximately 3 knots (5.6 km/hr) during either daylight only or 24-hour operations. Survey operations in very shallow water will occur only during daylight hours. Allowing for weather and equipment downtime, the survey vessels are expected to cover an average distance of approximately 30–60 km per day in shallow waters and only 15 km per day in very shallow waters. Assuming daylight only

operations and 30 km per day of surveys in shallow waters results in slightly larger ensonified area estimates. Distributing the 3,250 km of survey data to be collected in shallow waters and the 4,100 km to be collected in very shallow waters across the 8-month period of anticipated activity results in approximately 13.5 and 34.2 survey days per month in shallow and very-shallow waters, respectively. Using a 160 dB SPL_{rms} threshold distance of 141 m, the total daily ensonified area in shallow waters is estimated to be 8.5 km², and in very-shallow waters 4.3 km².

Marine Mammal Occurrence

In this section NMFS provides the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. Note that Mayflower submitted a marine mammal monitoring report under the previous IHA covering a period of 330 vessel days utilizing three survey vessels. A total of 415 individual marine mammals from six species were observed within the predicted Level B harassment zone while an HRG source was active. These observations included one humpback whale, two minke whales, two sei whales, three bottlenose dolphins and 405 common dolphins. There were also two unidentified seal observations. An additional 24 unidentified dolphins and one unidentified whale were observed inside the estimated Level B harassment zone but those observations could not be identified to the species level. All mitigation and monitoring requirements were followed and Mayflower did not exceed authorized take limits for any species.

Density estimates for all species within the two survey areas were derived from habitat-based density modeling results reported by Roberts *et al.* (2016, 2017, 2018, 2020). Those data provide abundance estimates for species or species guilds within 10 km x 10 km grid cells (100 km²) on a monthly or annual basis, depending on the species (but see North Atlantic right whale discussion below).. The average monthly abundance for each species in each survey area was calculated as the mean value of the grid cells

within each survey area in each month and then converted to density (individuals / 1 km²) by dividing by 100 km² (Table 7, Table 8). The estimated monthly densities of North Atlantic right whales were based on updated model results from Roberts *et al.* (2020). These updated data for North Atlantic right whale are provided as densities (individuals/1 km²) within 5 km x 5 km grid cells (25 km²) on a monthly basis. The same GIS process described above was used to select the appropriate grid cells from each month and the monthly North Atlantic right whale density in each survey area was calculated as the mean value of the grid cells within each survey area as shown Table 7 and Table 8.

The estimated monthly density of seals provided in Roberts *et al.* (2018) includes all seal species present in the region as a single guild. Mayflower did not separate this guild into the individual species based on the proportion of sightings identified to each species within the dataset because so few of the total sightings used in the Roberts *et al.* (2018) analysis were actually identified to species (Table 7, Table 8).

For comparison purposes and to account for local variation not captured by the predicted densities provided by Roberts *et al.* (2016, 2017, 2018, 2020), Protected Species Observers (PSOs) data from Mayflower's 2020 HRG surveys were analyzed to assess the appropriateness of the density-based take calculations. To do this, the total number of individual marine mammals sighted by Protected Species Observers (PSOs) within 150 m of a sound source (rounding up from the 141-m Level B harassment distance) from April 19 through September 19, 2020, a period of 23 weeks, were summed by species or "unidentified" species group when sightings were not classified to the species level. As a conservative approach, all sightings were included in this calculation regardless of whether the source was operating at the time. In order to include the "unidentified" individuals in the species-specific calculations, the number of individuals in each unidentified species group (*e.g.*, unidentified whale) was then added to the sums of the known species within that group (*e.g.*, humpback whale, fin whale, etc.) according

to the proportion of individuals within that group positively identified to the species level. With individuals from “unidentified” species sightings proportionally distributed among the species, Mayflower then divided the total number of individuals of each species by the number of survey weeks to calculate the average number of individuals of each species sighted within 150 m of the sound sources per week during the surveys. See section 6.4 in application for additional detail.

As described in the Dates and Duration section, Mayflower currently proposes for its survey activities to be concluded in November 2021. Note that if the proposed survey activities extend beyond November 2021, the monthly densities for the marine mammals listed below may change, potentially affecting take values. In that situation, Mayflower would need to contact NMFS to determine a path forward to ensure that they remain in compliance with the MMPA.

Table 7–Average monthly densities for species that may occur in the Lease Area and along the deep-water section of the cable route during the planned survey period

Species	Estimated Monthly Densities (Individuals/km ²)							
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Mysticetes								
Fin Whale*	0.0028	0.0031	0.0033	0.0033	0.0030	0.0025	0.0015	0.0013
Humpback Whale	0.0012	0.0013	0.0014	0.0011	0.0005	0.0011	0.0011	0.0005
Minke Whale	0.0016	0.0026	0.0025	0.0010	0.0007	0.0008	0.0008	0.0003
North Atlantic Right Whale*	0.0081	0.0038	0.0003	0.0000	0.0000	0.0000	0.0001	0.0006
Sei Whale*	0.0006	0.0005	0.0002	0.0001	0.0000	0.0001	0.0000	0.0000
Odontocetes								
Atlantic White-Sided Dolphin	0.0360	0.0685	0.0656	0.0465	0.0250	0.0256	0.0326	0.0357
Common Bottlenose Dolphin	0.0104	0.0118	0.0262	0.0541	0.0415	0.0517	0.0574	0.0278
Harbor Porpoise	0.0846	0.0404	0.0184	0.0122	0.0112	0.0091	0.0081	0.0197
Pilot Whales	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068
Risso’s Dolphin	0.0001	0.0002	0.0002	0.0005	0.0010	0.0008	0.0003	0.0004
Short-Beaked Common Dolphin	0.0266	0.0462	0.0572	0.0623	0.1078	0.1715	0.1806	0.1214
Sperm Whale*	0.0001	0.0001	0.0001	0.0004	0.0004	0.0002	0.0002	0.0001
Pinnipeds								
Seals (Harbor and Gray)	0.1491	0.1766	0.0262	0.0061	0.0033	0.0041	0.0059	0.0102

Table 8-Average monthly densities for species that may occur along the shallow-water section of the cable route during the planned survey period

Species	Estimated Monthly Densities (Individuals/km ²)							
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Mysticetes								
Fin Whale*	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0001
Humpback Whale	0.0001	0.0000	0.0001	0.0001	0.0000	0.0001	0.0002	0.0001
Minke Whale	0.0003	0.0004	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000
North Atlantic Right Whale*	0.0004	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
Sei Whale*	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Odontocetes								
Atlantic White-Sided Dolphin	0.0009	0.0012	0.0010	0.0006	0.0005	0.0008	0.0014	0.0011
Common Bottlenose Dolphin	0.0211	0.0377	0.2308	0.4199	0.3211	0.3077	0.1564	0.0813
Harbor Porpoise	0.0010	0.0013	0.0048	0.0023	0.0037	0.0036	0.0003	0.0214
Pilot Whales	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Risso's Dolphin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Short-Beaked Common Dolphin	0.0003	0.0004	0.0003	0.0002	0.0006	0.0009	0.0008	0.0010
Sperm Whale*	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pinnipeds								
Seals (Harbor and Gray)	1.3897	1.0801	0.2496	0.0281	0.0120	0.0245	0.0826	0.5456

Take Calculation and Estimation

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

The potential numbers of takes by Level B harassment were calculated by multiplying the monthly density for each species in each survey area shown in Table 7 and Table 8 by the respective monthly ensonified area within each survey area. The results are shown in the “Calculated Take” columns of Table 9. The survey area estimates were then summed to produce the “Total Density-based Calculated Take” and then rounded up to arrive at the number of “Density-based Takes” for each species (Table 9).

To account for potential local variation in animal presence compared to the predicted densities, the average weekly number of individuals for each species observed

within 150 m of the HRG survey sound sources in 2020, regardless of their operational status at the time were multiplied by the anticipated 35-week survey period in 2021.

These results are shown in the “Sightings-based Takes” column of Table 9. The larger of the take estimates from the density-based and sightings-based methods are shown in the “Requested Take” column, except as noted below.

Based on the sightings data Mayflower requested authorization of 37 humpback whale, 15 minke whale, and 2,153 common dolphin takes by Level B harassment. Using the best available density data (Roberts *et al.* 2016, 2017, 2018, 2020), Mayflower requested 85 white-sided dolphin, 483 bottlenose dolphin, 61 harbor porpoise takes by Level B harassment. NMFS agrees with Mayflower requests and proposes to authorize take of these species in the numbers requested.

For five species, North Atlantic right whale, sei whale, pilot whales, Risso’s dolphin, and sperm whale the Requested Take column reflects a rounding up of three times the mean group size calculated from survey data in this region (Kraus *et al.* 2016; Palka *et al.* 2017). Mayflower requested that three times the average group size be used rather than a single group size to account for more than one chance encounter with these species during the surveys. NFMS concurred with this assessment and, therefore, proposes the authorization of 9 North Atlantic right whale, 6 fin whale, 6 sei whale, 27 pilot whale, 18 Risso’s dolphin, and 6 sperm whale takes by Level B harassment.

The requested number of takes by Level B harassment as a percentage of the “best available” abundance estimates provided in the NMFS Stock Assessment Reports (Hayes *et al.* 2020) are also provided in Table 9. For the seal guild, the estimated abundance for both gray and harbor seals was summed in Table 9. Mayflower requested and NMFS proposes to authorize 989 incidental takes of harbor and gray seal by Level B harassment.

Bottlenose dolphins encountered in the survey area would likely belong to the Western North Atlantic Offshore Stock (Hayes *et al.* 2020). However, it is possible that a

few animals encountered during the surveys could be from the North Atlantic Northern Migratory Coastal Stock, but they generally do not range farther north than New Jersey. Also, based on the distributions described in Hayes *et al.* (2020), pilot whale sightings in the survey area would most likely be long-finned pilot whales, although short-finned pilot whales could be encountered in the survey area during the summer months.

For North Atlantic right whales, the implementation of a 500 m exclusion zone means that the likelihood of an exposure to received sound levels greater than 160 dB SPL_{rms} is very low. In addition, most of the survey activity will take place during the time of year when right whales are unlikely to be present in this region. Nonetheless, it is possible that North Atlantic right whales could occur within 500 m of the vessel without first being detected by a PSO, so Mayflower requested and NMFS proposes to authorize take consistent with other species (*i.e.* three times average group size).

Table 9–Number of Level B harassment takes proposed and percentages of each stock abundance

Species	Density-based Take by Survey Region		Total Density-based Calculated Takes	Density-based Takes	Sightings-based Takes	Requested Take	Abundance NMFS	Percent of NMFS Stock Abundance
	Lease Area & Deep Water Cable Route	Shallow Water Cable						
Fin Whale*	5.1	0.5	5.7	6	2	6	3,006	0.2
Humpback Whale	2.0	0.2	2.2	3	37	37	1,396	2.7
Minke Whale	2.5	0.3	2.8	3	15	15	2,591	0.6
North Atlantic Right Whale*	3.2	0.2	3.4	4	0	9 ¹	428	2.1
Sei Whale*	0.4	0.0	0.4	1	0	6 ¹	28	21.4
Atlantic White-Sided Dolphin	83.0	2.0	85.0	85	0	85	31,912	0.3
Common Bottlenose Dolphin	69.5	413.0	482.5	483	64	483	62,851	0.8
Harbor Porpoise	50.4	10.1	60.5	61	0	61	75,079	0.1
Pilot Whales	13.4	0.0	13.5	14	18	27 ¹	68,139	0.0
Risso's Dolphin	0.8	0.0	0.8	1	0	18 ¹	35,493	0.1
Short-Beaked Common Dolphin	191.4	1.2	192.6	193	2,153	2,153	80,227	2.7
Sperm Whale*	0.4	0.0	0.4	1	0	6 ¹	4,349	0.1
Seals (Harbor and Gray)	94.4	894.2	988.6	989	154	989	102,965	1.0

* Denotes species listed under the Endangered Species Act

¹ Value reflects a rounding up of three (3) times the mean group size calculated from survey data in this region

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 carefully 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.

Marine Mammal Exclusion Zones and Harassment Zones

NMFS proposes the following mitigation measures be implemented during Mayflower's proposed marine site characterization surveys.

Marine mammal exclusion zones (EZ) would be established around the HRG survey equipment and monitored by PSOs during HRG surveys as follows:

- A 500-m EZ would be required for North Atlantic right whales during use of all acoustic sources; and
- 100 m EZ for all marine mammals, with certain exceptions specified below, during operation of impulsive acoustic sources (boomer and/or sparker).

If a marine mammal is detected approaching or entering the EZs during the HRG survey, the vessel operator would adhere to the shutdown procedures described below to minimize noise impacts on the animals. These stated requirements will be included in the site-specific training to be provided to the survey team.

Pre-Clearance of the Exclusion Zones

Mayflower would implement a 30-minute pre-clearance period of the exclusion zones prior to the initiation of ramp-up of HRG equipment. During this period, the exclusion zone will be monitored by the PSOs, using the appropriate visual technology. Ramp-up may not be initiated if any marine mammal(s) is within its respective exclusion zone. If a marine mammal is observed within an exclusion zone during the pre-clearance period, ramp-up may not begin until the animal(s) has been observed exiting its respective exclusion zone or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for small odontocetes and seals, and 30 minutes for all other species).

Ramp-Up of Survey Equipment

When technically feasible, a ramp-up procedure would be used for HRG survey equipment capable of adjusting energy levels at the start or restart of survey activities. The ramp-up procedure would be used at the beginning of HRG survey activities in order to provide additional protection to marine mammals near the Project Area by allowing

them to vacate the area prior to the commencement of survey equipment operation at full power.

A ramp-up would begin with the powering up of the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey. When technically feasible, the power would then be gradually turned up and other acoustic sources would be added.

Ramp-up activities will be delayed if a marine mammal(s) enters its respective exclusion zone. Ramp-up will continue if the animal has been observed exiting its respective exclusion zone or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for small odontocetes and seals and 30 minutes for all other species).

Activation of survey equipment through ramp-up procedures may not occur when visual observation of the pre-clearance zone is not expected to be effective (*i.e.*, during inclement conditions such as heavy rain or fog).

Shutdown Procedures

An immediate shutdown of the impulsive HRG survey equipment would be required if a marine mammal is sighted entering or within its respective exclusion zone. The vessel operator must comply immediately with any call for shutdown by the Lead PSO. Any disagreement between the Lead PSO and vessel operator should be discussed only after shutdown has occurred. Subsequent restart of the survey equipment can be initiated if the animal has been observed exiting its respective exclusion zone or until an additional time period has elapsed (*i.e.*, 30 minutes for all other species).

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 (48 m, non-impulsive; 141 m impulsive), shutdown would occur.

If the acoustic source is shut down for reasons other than mitigation (*e.g.*, mechanical difficulty) for less than 30 minutes, it may be activated again without ramp-up if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective exclusion zones. If the acoustic source is shut down for a period longer than 30 minutes and PSOs have maintained constant observation, then pre-clearance and ramp-up procedures will be initiated as described in the previous section.

The shutdown requirement would be waived for small delphinids of the following genera: *Delphinus*, *Lagenorhynchus*, *Stenella*, and *Tursiops* and seals. Specifically, if a delphinid from the specified genera or a pinniped is visually detected approaching the vessel (*i.e.*, to bow ride) or towed equipment, shutdown is not required. Furthermore, 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), PSOs must use best professional judgement in making the decision to call for a shutdown. Additionally, shutdown is required if a delphinid or pinniped detected in the exclusion zone and belongs to a genus other than those specified.

Vessel Strike Avoidance

Mayflower will ensure that vessel operators and crew maintain a vigilant watch for cetaceans and pinnipeds and slow down or stop their vessels to avoid striking these species. Survey vessel crew members responsible for navigation duties will receive site-specific training on marine mammals sighting/reporting and vessel strike avoidance measures. Vessel strike avoidance measures would include the following, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk.

- Vessel operators and crews must maintain a vigilant watch for all protected species and slow down, stop their vessel, or alter course, as appropriate and

regardless of vessel size, to avoid striking any protected species. 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 right whale, other whale (defined in this context as sperm whales or baleen whales other than right whales), or other marine mammal.

- All vessels (*e.g.*, source vessels, chase vessels, supply vessels), regardless of size, must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes including seasonal management areas (SMAs) and dynamic management areas (DMAs) when in effect;
- All vessels greater than or equal to 19.8 m in overall length operating from November 1 through April 30 will operate at speeds of 10 knots or less while transiting to and from Project Area;
- 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 right whales. 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 shall 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). If marine mammals are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

- 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.

- Members of the monitoring team will consult NMFS North Atlantic right whale reporting system and Whale Alert, as able, for the presence of North Atlantic right whales throughout survey operations, and for the establishment of a DMA. If NMFS should establish a DMA in the Lease Areas during the survey, the vessels will abide by speed restrictions in the DMA.

Project-specific training will be conducted for all vessel crew prior to the start of a survey and during any changes in crew such that all survey personnel are fully aware and understand the mitigation, monitoring, and reporting requirements. Prior to implementation with vessel crews, the training program will be provided to NMFS for review and approval. Confirmation of the training and understanding of the requirements will be documented on a training course log sheet. Signing the log sheet will certify that the crew member understands and will comply with the necessary requirements throughout the survey activities.

Based on our evaluation of the applicant'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 marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

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

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

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

- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

Proposed Monitoring Measures

Visual monitoring will be performed by qualified, NMFS-approved PSOs, the resumes of whom will be provided to NMFS for review and approval prior to the start of survey activities. Mayflower would 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 their designated task. On a case-by-case basis, non-independent observers may be approved by NMFS for limited, specific duties in support of approved, independent PSOs on smaller vessels with limited crew capacity operating in nearshore waters.

The PSOs will be responsible for monitoring the waters surrounding each survey vessel to the farthest extent permitted by sighting conditions, including exclusion zones, during all HRG survey operations. PSOs will visually monitor and identify marine mammals, including those approaching or entering the established exclusion zones during survey activities. It will be the responsibility of the Lead PSO 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.

During all HRG survey operations (*e.g.*, any day on which use of an HRG source is planned to occur), a minimum of one PSO must be on duty during daylight operations on each survey vessel, conducting visual observations at all times on all active survey vessels during daylight hours (*i.e.*, from 30 minutes prior to sunrise through 30 minutes following sunset). Two PSOs will be on watch during nighttime operations. The PSO(s) would ensure 360° visual coverage around the vessel from the most appropriate observation posts and would conduct visual observations using binoculars and/or night vision goggles and the naked eye while free from distractions and in a consistent, systematic, and diligent manner. PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches and may conduct a maximum of 12 hours of observation per 24-hour period. In cases where multiple vessels are surveying concurrently, any observations of marine mammals would be communicated to PSOs on all nearby survey vessels.

Vessels conducting HRG survey activities in very-shallow waters using shallow-draft vessels are very limited in the number of personnel that can be onboard. In such cases, one visual PSO will be onboard and the vessel captain (or crew member on watch) will conduct observations when the PSO is on required breaks. All vessel crew conducting PSO watches will receive training in monitoring and mitigation requirements and species identification necessary to reliably carry out the mitigation requirements. Given the small size of these vessels, the PSO would effectively remain available to confirm sightings and any related mitigation measures while on break.

PSOs must be equipped with binoculars and have the ability to estimate distance and bearing to detect marine mammals, particularly in proximity to exclusion 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 would be used. 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 would 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. Any observations of marine mammals by crew members aboard any 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. 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).

Proposed Reporting Measures

Within 90 days after completion of survey activities or expiration of this IHA, whichever comes sooner, a final technical report will be provided to NMFS that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, summarizes the number of marine mammals observed during survey activities (by species, when known), summarizes the mitigation actions taken during surveys (including what type of mitigation and the species and number of animals that prompted the mitigation action, when known), and provides an interpretation of the results and effectiveness of all mitigation and monitoring. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS. All draft and final marine mammal and acoustic monitoring reports must be submitted to

PR.ITP.MonitoringReports@noaa.gov and *ITP.Pauline@noaa.gov*. The report must

contain, at minimum, the following:

- PSO names and affiliations;
- Dates of departures and returns to port with port name;
- Dates and times (Greenwich Mean Time) of survey effort and times

corresponding with PSO effort;

- Vessel location (latitude/longitude) when survey effort begins and ends;

vessel location at beginning and end of visual PSO duty shifts;

- Vessel heading and speed at beginning and end of visual PSO duty shifts

and upon any line change;

- 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;

- 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

- Survey activity information, such as type of survey equipment in

operation, acoustic source power output while in operation, and any other notes of

significance (*i.e.*, pre-clearance survey, ramp-up, shutdown, end of operations, etc.).

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

- Watch status (sighting made by PSO on/off effort, opportunistic, crew,

alternate vessel/platform);

- PSO who sighted the animal;

- Time of sighting;

- Vessel location at time of sighting;

- Water depth;
- Direction of vessel's travel (compass direction);
- Direction of animal's travel relative to the vessel;
- Pace of the animal;
- Estimated distance to the animal and its heading relative to vessel at initial sighting;
- 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;
- Estimated number of animals (high/low/best) ;
- Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
- 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);
- 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);
- Animal's closest point of approach and/or closest distance from the center point of the acoustic source;
- Platform activity at time of sighting (*e.g.*, deploying, recovering, testing, data acquisition, other); and
- Description of any actions implemented in response to the sighting (*e.g.*, delays, shutdown, ramp-up, speed or course alteration, etc.) and time and location of the action.

If a North Atlantic right whale is observed at any time by PSOs or personnel on any project vessels, during surveys or during vessel transit, Mayflower must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System: (866) 755-6622. North Atlantic right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16.

In the event that Mayflower personnel discover an injured or dead marine mammal, Mayflower would report the incident to the NMFS Office of Protected Resources (OPR) and the NMFS New England/Mid-Atlantic Stranding Coordinator as soon as feasible. The report would include the following information:

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

In the unanticipated event of a ship strike of a marine mammal by any vessel involved in the activities covered by the IHA, Mayflower would report the incident to the NMFS OPR and the NMFS New England/Mid-Atlantic Stranding Coordinator as soon as feasible. The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Species identification (if known) or description of the animal(s) involved;
- Vessel's speed during and leading up to the incident;
- Vessel's course/heading and what operations were being conducted (if applicable);

- Status of all sound sources in use;
- 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;
- Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
- Estimated size and length of animal that was struck;
- Description of the behavior of the marine mammal immediately preceding and following the strike;
- If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
- 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
- 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 responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. NMFS also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status.

Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, our analysis applies to all the species listed in Table 9 given that NMFS expects the anticipated effects of the proposed survey to be similar in nature. Where there are meaningful differences between species or stocks, as in the case of the North Atlantic right whale, they are included as separate subsections 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** section, non-auditory physical effects and vessel strike are not expected to occur. NMFS expects that all potential takes would be in the form of short-term Level B harassment behavioral harassment 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). 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 given the nature of the operations, the estimated size of the Level A harassment zones, and the required shutdown zones for certain activities - and is not proposed to be authorized.

In addition to being temporary, the maximum expected harassment zone around a survey vessel is 141 m per vessel during use of sparkers. Therefore, the ensonified area surrounding each vessel is relatively small compared to the overall distribution of the

animals in the area and their use of the habitat. Feeding behavior is not likely to be significantly impacted as prey species are mobile and are broadly distributed throughout the Project Area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

Furthermore, the proposed Project Area encompasses or is in close proximity to feeding biologically important areas (BIAs) for right whales (February-April), humpback whales (March-December), fin whales (March-October), and sei whales (May-November) which were discussed in the previous IHA (85 FR 45578; July 29, 2020). Most of these feeding BIAs are extensive and sufficiently large (705 km² and 3,149 km² for right whales; 47,701 km² for humpback whales; 2,933 km² for fin whales; and 56,609 km² for sei whales), and the acoustic footprint of the proposed survey is sufficiently small, such that feeding opportunities for these whales would not be reduced appreciably. Any whales temporarily displaced from the parts of the BIAs that overlap with the proposed Project Area would be expected to have sufficient remaining feeding habitat available to them, and would not be prevented from feeding in other areas within the biologically important feeding habitat. In addition, any displacement of whales from the BIA or interruption of foraging bouts would be expected to be temporary in nature. Therefore, NMFS does not expect impacts to whales within feeding BIAs to affect the fitness of any large whales. Accordingly, NMFS does not anticipate impacts from the proposed survey that would impact annual rates of recruitment or survival and any takes that occur would not result in population level impacts.

There are no rookeries, mating or calving grounds known to be biologically important to marine mammals within the proposed Project Area. Furthermore, there is no designated critical habitat for any ESA-listed marine mammals in the proposed Project Area.

North Atlantic right whales

The status of the North Atlantic right whale population is of heightened concern and, therefore, merits additional analysis. As noted previously, elevated North Atlantic right whale mortalities began in June 2017 and there is an active UME. Overall, preliminary findings support human interactions, specifically vessel strikes and entanglements, as the cause of death for the majority of right whales. In addition to the right whale feeding BIA noted above, the proposed Project Area overlaps a migratory corridor Biologically Important Area (BIA) for North Atlantic right whales (effective March-April and November-December) that extends from Massachusetts to Florida (LeBrecque *et al.*, 2015). Off the coast of Massachusetts, this migratory BIA extends from the coast to beyond the shelf break. Due to the fact that that the proposed survey activities are temporary and the spatial extent of sound produced by the survey would be very small relative to the spatial extent of the available migratory habitat in the BIA, right whale migration is not expected to be impacted by the proposed survey. Given the relatively small size of the ensonified area, it is unlikely that prey availability would be adversely affected by HRG survey operations. Required vessel strike avoidance measures will also decrease risk of ship strike during migration; no ship strike is expected to occur during Mayflower's proposed activities. Additionally, only very limited take by Level B harassment of North Atlantic right whales has been requested and is being proposed by NMFS as HRG survey operations are required to maintain a 500 m EZ and shutdown if a North Atlantic right whale is sighted at or within the EZ. The 500 m shutdown zone for right whales is conservative, considering the Level B harassment isopleth for the most

impactful acoustic source (*i.e.*, GeoMarine Geo-Source 400 tip sparker) is estimated to be 141 m, and thereby minimizes the potential for behavioral harassment of this species. As noted previously, Level A harassment is not expected due to the small PTS zones associated with HRG equipment types proposed for use. NMFS does not anticipate North Atlantic right whales takes that would result from Mayflower's proposed activities would impact annual rates of recruitment or survival. Thus, any takes that occur would not result in population level impacts for the species.

Other marine mammal species with active UMEs

As noted in the previous IHA, there are several active UMEs occurring in the vicinity of Mayflower's proposed Project 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 distinct population segment (DPS)) remains stable at approximately 12,000 individuals.

Beginning in January 2017, elevated minke whale strandings have occurred along the Atlantic coast from Maine through South Carolina, with highest numbers in Massachusetts, Maine, and New York. This event does not provide cause for concern regarding population level impacts, as the population abundance is greater than 20,000 whales.

Elevated numbers of harbor seal and gray seal mortalities were first observed in July 2018 and have occurred across Maine, New Hampshire, and Massachusetts. Based on tests conducted so far, the main pathogen found in the seals is phocine distemper virus, although additional testing to identify other factors that may be involved in this UME are underway. The UME does not yet provide cause for concern regarding

population-level impacts to any of these stocks. For harbor seals, the population abundance is over 75,000 and annual M/SI (350) is well below PBR (2,006) (Hayes *et al.*, 2020). The population abundance for gray seals in the United States is over 27,000, with an estimated abundance, including seals in Canada, of approximately 505,000. In addition, the abundance of gray seals is likely increasing in the U.S. Atlantic EEZ as well as in Canada (Hayes *et al.*, 2020).

The required mitigation measures are expected to reduce the number and/or severity of proposed takes for all species listed in Table 9, including those with active UME's to the level of least practicable adverse impact. In particular they would provide animals the opportunity to move away from the sound source throughout the Project Area 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 Level B harassment. No Level A harassment is anticipated, even in the absence of mitigation measures, or proposed for authorization.

NMFS expects that takes would be in the form of short-term Level B harassment behavioral harassment by way of brief startling reactions and/or 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 ensounded 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 the species or stock through effects on annual rates of recruitment or survival:

- No mortality or serious injury is anticipated or proposed for authorization;
- No Level A harassment (PTS) is anticipated, even in the absence of mitigation measures, or proposed for authorization;
- Foraging success is not likely to be significantly impacted as effects on species that serve as prey species for marine mammals from the survey are expected to be minimal;
- Due to the relatively small footprint of the survey activities in relation to the size of feeding BIAs for right, humpback, fin, and sei whales, the survey activities would not affect foraging success of these whale species;
- The availability of alternate areas of similar habitat value for marine mammals to temporarily vacate the Project Area during the planned survey to avoid exposure to sounds from the activity;
- Take is anticipated to be limited to Level B behavioral harassment consisting of brief startling reactions and/or temporary avoidance of the Project Area;
- While the Project Area is within areas noted as a migratory BIA for North Atlantic right whales, the activities would occur in such a comparatively small area such that any avoidance of the Project Area due to activities would not affect migration. In addition, mitigation measures to shutdown at 500 m to minimize potential for Level B behavioral harassment would limit any take of the species; and
- The proposed mitigation measures, including visual monitoring and shutdowns, are expected to minimize potential impacts to marine mammals.

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

Small Numbers

As noted above, only small numbers of incidental take may be authorized under 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 of 14 marine mammal species. The total amount of takes proposed for authorization is less than 3 percent for all species and stocks authorized for take except for sei whales (less than 22 percent), which NMFS preliminarily finds are small numbers of marine mammals relative to the estimated overall population abundances for those stocks. See Table 9. Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

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

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally, in this case with the NMFS Greater Atlantic Regional Fisheries Office (GARFO), whenever NMFS proposes to authorize take for endangered or threatened species.

The NMFS Office of Protected Resources is proposing to authorize the incidental take of four species of marine mammals listed under the ESA: the North Atlantic right, fin, sei, and sperm whale. The OPR has requested initiation of section 7 consultation with NMFS GARFO for the issuance of this IHA. NMFS will conclude the ESA section 7 consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to Mayflower for conducting marine site characterization surveys offshore of Massachusetts in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0521) and along a potential submarine cable route to landfall at Falmouth, Massachusetts for a period of one year from the date of issuance, 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/permit/incidental-take-authorizations-under-marine-mammal-protection-act>.

Request for Public Comments

NMFS requests comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHA for the proposed marine site characterization

surveys. NMFS also requests at this time 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, 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);
- 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: February 24, 2021.

Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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