MAYFLOWER WIND FUGRO GEOPHYSICAL SURVEY 2021 IHA FINAL PROTECTED SPECIES OBSERVER REPORT

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March 14, 2022

rpsgroup.com

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Approval for issue

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Acronyms and Abbreviations

BOEM – Bureau of Ocean Energy Management

COP – Construction and Operations Plan

CPA – Closest Point of Approach

DMA - Dynamic Management Areas

DSLR – Digital Single Lens Reflex

ECC – Export Cable Corridor

EMP – Environmental Monitoring Plan

EOL – End of Line

EZ – Exclusion Zone

HRG – High Resolution Geophysical

IHA – Incidental Harassment Authorization

LF – Low Frequency

NARW – North Atlantic right whale

NMFS – National Marine Fisheries Service

OCS – Outer Continental Shelf

PSO – Protected Species Observer

RPS- PSO Provider company name (not an acronym)

SBP – Sub-bottom Profiler

SOL – Start of Line

TVG – Transverse Gradiometer

USBL – Ultra Short Baseline

1 EXECUTIVE SUMMARY

This is the Protected Species Report for the Mayflower Wind high resolution geophysical (HRG) site characterization survey completed under: the Mayflower Wind 2021 Incidental Harassment Authorization (IHA); the 2021 Mayflower Wind Geophysical and Geotechnical Survey Plan, including addendums and modifications approved by the Bureau for Ocean Energy Management (BOEM), and stipulations in the Commercial Lease for Renewable Energy Development in Outer Continental Shelf (OCS) lease area OCS-A 0521 (Lease), as modified by waivers approved by BOEM.

The Mayflower Wind HRG survey was conducted by Fugro within state and federal waters in the Mayflower Wind Offshore Project Area including two export cable corridors (ECC) from the lease area to Falmouth, MA and to Brayton Point in Somerset, MA. The report covers the protected species mitigation and monitoring efforts undertaken by Protected Species Observers (PSOs) that were provided by RPS and deployed to each HRG survey vessel.

Fugro conducted HRG operations using four survey vessels: *GO Liberty* from 02 May to 10 September 2021; *GO Pursuit* from 17 April to 08 September 2021 and 01 December to 15 December 2021; *Westerly* from 14 April to 14 October 2021; and *Fugro Brasilis* from 29 November to 08 December 2021.

In 2021, Mayflower conducted HRG surveys under the 2020 IHA from 14 April 2021 through 06 July 2021. NMFS signed Mayflower's 2021 IHA on 01 July 2021 (Appendix A), and surveys continued under the 2021 IHA until 15 December 2021. The 2021 HRG Survey Environmental Monitoring Plan (EMP) is included as Appendix B.

Four PSOs were deployed to the *GO Pursuit* and *Fugro Brasilis* to undertake 24-hour visual monitoring and implement mitigation during survey operations. Two PSOs were deployed to the *GO Liberty* to undertake visual observations and implement mitigation to support their daytime-only survey operations. One PSO was deployed to the *Westerly* to conduct visual observation and implement mitigation to support daytime-only survey operations. Mitigation protocols for the survey included: establishment of exclusion zones (EZ) for marine mammals and other protected species including sea turtles; visual monitoring; and strike avoidance mitigation measures.

Visual observations were conducted by PSOs for a total of 3223 hours and 43 minutes.

A total of 187 visual detection events of marine mammals were made during the survey, consisting of three whale species, two delphinid species, and one seal species. Whale species observed included fin whales (*Balaenoptera physalus*), humpback whales (*Megaptera novaeangliae*), and minke whales (*Balaenoptera acutorostrata*). Delphinids observed included common dolphins (*Delphinus delphis*) and bottlenose dolphins (*Tursiops truncatus*). Seal sightings consisted of gray seals (*Halichoerus grypus*). There were also additional unidentified whales, unidentified delphinids and unidentified seals.

There were 11 sightings of sea turtles that included a leatherback sea turtle (*Dermochelys coriacea*), Kemp's Ridley sea turtle (*Lepidochelys kempii)* and loggerhead sea turtle (*Caretta caretta).*

There was one sighting of a marine mammal carcass. The carcass was observed to be highly decomposed and there were no indications that the Mayflower Wind survey activities had caused or contributed to the death of the animal.

In accordance with stipulations set forth in BOEM Lease and the NMFS 2021 IHA conditions, a total of 31 mitigation actions were implemented for the HRG sound sources including shutdowns of the sound sources (23 times) and delays to activation of the acoustic sources (8 times). On three occasions strike avoidance maneuvers were executed during protected species detections, two times for gray seals and once for humpback whales.

The 2021 IHA authorized 3445 Level B takes for 13 species of marine mammals, including six whale species, five delphinids, two pinniped species and one species of porpoise. The IHA also included authorization for unidentified whales and dolphins. No Level A takes were authorized for any species.

A total of 395 individual marine mammals from three species were observed within the predicted 160 decibel radius (where there is a potential for a behavioral response) while an HRG source was active, constituting potential Level B takes. Potential Level B takes included one humpback whale, 33 bottlenose dolphins, and 359 common dolphins. An additional two unidentified whales that could not be identified to species level were observed inside the predicted Level B take zone.

2 INTRODUCTION

Fugro was contracted to Mayflower Wind to conduct a high resolution geophysical (HRG) survey off the coast of Massachusetts (MA) and Rhode Island (RI) within the Mayflower Wind Lease Area OCS-A 0521 and ECCs under consideration (Figure 1). The purpose of the HRG survey was to acquire data for inclusion in the Mayflower Wind Construction and Operations Plan (COP). Survey vessels used by Fugro are described in Section 3.1 and HRG instrumentation used is described in Section 3.2 of this report.

Fugro contracted with RPS to provide Protected Species Observers (PSOs) to conduct monitoring and mitigation for protected species, including marine mammals, sea turtles, and Atlantic sturgeon, during survey activities. Monitoring and mitigation procedures that were implemented during the 2021 surveys are described in Section 4 of this report.

HRG surveys were conducted in accordance with the Mayflower Wind 2021 Incidental Harassment Authorization (IHA) signed by the National Marine Fisheries Service (NMFS) on 01 July 2021, and the BOEM-approved Mayflower Wind 2021 Geophysical & Geotechnical Survey Plan.

Mayflower Wind submitted the 2021 Geophysical & Geotechnical Survey Plan to BOEM on 15 December 2020, and submitted an update to BOEM on 12 February 2021. By email dated 11 March 2021, BOEM informed Mayflower Wind that they had no further comments or questions regarding the 2021 Survey Plan, and that waivers of certain lease stipulations requested by Mayflower were approved. On April 9, 2021, Mayflower Wind submitted an Addendum to the 2021 Geophysical & Geotechnical Survey Plan to BOEM. BOEM notified Mayflower Wind by email dated 07 June 2021, that the Survey Plan Addendum was found to be consistent with applicable law, and BOEM had no further comments or questions that required resolution. The Mayflower Wind 2021 Geophysical & Geotechnical Survey Plan (2021 G&G Survey Plan) includes the original filing, the Addendum, and waivers to lease stipulations approved by BOEM.

NMFS and BOEM have advised that sound-producing survey equipment operating in the hearing range of marine species has the potential to cause acoustic harassment, in particular to marine mammals. Protected species monitoring was conducted in accordance with BOEM and NMFS standards.

2.1 BOEM and NMFS Reporting Requirements

This report summarizes the information required by the BOEM Lease OCS-A 0521 (Lease) and the IHA issued by the NMFS identified in Table 1.

Protected species monitoring was conducted in accordance with BOEM and NMFS standards and the IHA signed by NMFS on 01 July 2021. Implementation of the IHA in the survey began 07 July 2021. This report covers survey activities completed between 07 July 2021 and 15 December 2021, though the 2021 HRG Survey began operations on 14 April 2021 using a previous IHA issued to Mayflower Wind in 2020.

Table 1: BOEM Reporting Requirements per BOEM Lease OCS-A 0521 and NMFS IHA reporting requirements and location within this technical report.

Required Content	Source Reference	Location Addressed in Technical Report
The Lessee must ensure that sightings of any dead or injured protected species (e.g., marine mammals, sea turtles, giant manta ray or sturgeon) are reported to the Lessor, NMFS, and the NMFS Greater Atlantic (Northeast) Region's Stranding Hotline (866-755-6622) within 24 hours of sighting, regardless of whether the injury is caused by a vessel. In addition, if the injury or death was caused by a collision with a project-related vessel, the Lessee notify the Lessor of the strike within 24 hours. The Lessee must use the form included as Appendix A to Addendum "C" to report the sighting or incident. If the Lessee's activity is responsible for the injury or death, the Lessee must ensure the vessel assist in any salvage effort as requested by NMFS.	BOEM Lease Section 4.4.4	6.4.5 Protected species incident reporting
The Lessee must report any observed takes of listed marine mammals, sea turtles, or sturgeon resulting in injury or mortality within 24 hours to the Lessor and NMFS	BOEM Lease Section 4.4.5.1	6.4.3 Incidental Harassment Authorization (IHA) Level B Exposures
The Lessee must ensure that the protected species observers record all observations of protected species using standard marine mammal observer data collection protocols. The required elements are Vessel name, Observers' name and affiliations, date, time and latitude/longitude when daily visual survey began, time and latitude/longitude when daily visual survey ended, Average environmental conditions (wind speed, wind direction, sea state, swell, overall visibility), species, certainty of identification, total number of animals, number of juveniles, characteristic description, direction of animal's travel relative to the vessel, behavior of animals, and activity of vessel when sighting occurred.	BOEM Lease section 4.4.6	Appendix H: Excel Data Sheets of Monitoring Effort, Source Operations and Detections of Protected Species During the Survey
Each report must include a summary of survey activities.	BOEM Lease section 4.4.3	5.1 Operation Activity
Each report must include a summary of all protected species observers	BOEM Lease section 4.3.4	Appendix D: Protected Species Observers

Required Content	Source Reference	Location Addressed in Technical Report
Data on all PSO observations must be recorded based on standard PSO collection requirements. PSOs must use standardized data forms, whether hard copy or electronic. The following information must be reported: (i) PSO names and affiliations (ii) Dates of departures and returns to port with port name (iii) Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort Vessel location (latitude/longitude) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts (v) Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change (vi) Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including wind speed and direction, Beaufort sea state, Beaufort wind force, swell height, weather conditions, cloud cover, sun glare, and overall visibility to the horizon (vii) Factors that may be contributing to impaired observations during each PSO shift change or as needed as environmental conditions change (e.g., vessel traffic, equipment malfunctions) (viii) Survey activity information, such as 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.) (ix) If a marine mammal is sighted, the following information should be recorded: (A) Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform); (B) PSO who sighted the animal; (C) Time of sighting; (D) Vessel location at time of sighting; (E) Water depth; (F) Direction of vessel's travel (compass direction); (G) Direction of animal's travel relative to the vessel; (H) Pace of the animal; (I) Estimated distance to the animal and its heading relative to vessel at initial sighting; (J) Identification of the animal (e.g., genus/species, lowest possible taxonomic level, or unidentified); also note the composition of the group if there is a mix of species; (K) Estimated number of animals (high/low/best) ; (L) Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.); (M) Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics); (N) Detailed behavior observations (e.g., number of blows, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior); (O) Animal's closest point of approach and/or closest distance from the center point of the acoustic source; (P) Platform activity at time of sighting (e.g., deploying, recovering, testing, data acquisition, other); (Q) Description of any actions implemented in response to the sighting (e.g., delays, shutdown, ramp-up, speed or course alteration, etc.) and time and location of the action: and (R) Documentation and recording of take by Level B harassment if a marine mammal is estimated to have been within 141 meters of active survey equipment.	IHA 5(n)	Appendix H: Excel Data Sheets of Monitoring Effort, Source Operations and Detections of Protected Species During the Survey
A final technical monitoring report must be provided to NMFS within 90 days after completion of survey activities that fully documents the methods and monitoring protocols, summarizes the data recorded during both visual and passive acoustic monitoring, estimates the number of marine mammals that	IHA 6(a)	This Technical Report

Required Content	Source Reference	Location Addressed in Technical Report
may have been taken during survey activities, describes, assesses and compares the effectiveness of monitoring and mitigation measures. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS. PSO datasheets or raw sightings data must also be provided with the draft and final monitoring report.		
If a North Atlantic right whale is observed at any time by 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.	IHA 6(b)(i)	6.4.4 NARW sightings reporting
Reporting injured or dead marine mammal – In the event that personnel involved in the survey activities covered by the authorization discover an injured or dead marine mammal, Mayflower must report to the NMFS New England/Mid-Atlantic Regional Stranding Coordinator by phone (866-755-6622) or by email (nmfs.gar.stranding@noaa.gov) as soon as feasible. The report must include the following information: (A) Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable); (B) Species identification (if known) or description of the animal(s) involved; (C) Condition of the animal(s) (including carcass condition if the animal is dead); (D) Observed behaviors of the animal(s), if alive; (E) If available, photographs or video footage of the animal(s); and (F) General circumstances under which the animal was discovered.	IHA 6(c)(i)	6.4.5 Protected species incident reporting
In the event of a vessel strike of a marine mammal by any vessel involved in the activities covered by the authorization, Mayflower must report the incident to the NMFS New England/Mid-Atlantic Regional Stranding Coordinator (866-755-6622) and NMFS Office of Protected Resources (PR.ITP.MonitoringReports@noaa.gov) as soon as feasible. The report must include the following information: (A) Time, date, and location (latitude/longitude) of the incident; (B) Species identification (if known) or description of the animal(s) involved; (C) Vessel's speed during and leading up to the incident; (D) Vessel's course/heading and what operations were being conducted (if applicable); (E) Status of all sound sources in use; (F) 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; (G) Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike; (H) Estimated size and length of animal that was struck; (I) Description of the behavior of the marine mammal immediately preceding and following the strike; (J) If available, description of the presence and behavior of any other marine mammals immediately preceding the strike; (K) 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 (L) To the extent practicable, photographs or video footage of the animal(s).	IHA 6(c)(ii)	6.4.5 Protected species incident reporting

3 PROJECT OVERVIEW

The objectives of this HRG survey were to collect data to support: site characterization, development of a ground model, ensure the seabed is clear of obstructions, and identification of buried archaeological features in compliance with BOEM regulations and guidelines for the COP.

Each vessel port of call locations and dates of their HRG operations is summarized in Table 2. A high-level overview of survey events for each vessel is outlined in Table 3.

Table 2: Summary of Mayflower HRG Survey vessels and dates under the Mayflower Wind 2021 IHA between 07 July and 15 December 2021.

Vessel Name	Port of Call	Dates on Project
GO Liberty	Marine Commerce Terminal dock New Bedford, Massachusetts	07 July – 10 September 2021
Westerly	Falmouth, Massachusetts Martha's Vineyard, Massachusetts Fall River, Massachusetts	07 July – 14 October 2021
*GO Pursuit**	Marine Commerce Terminal dock New Bedford, Massachusetts	07 July – 08 September 2021 01 December – 15 December 2021
Fugro Brasilis	Marine Commerce Terminal dock New Bedford, Massachusetts	29 November – 08 December 2021

*GO Pursuit remobilized to the project to complete survey acquisition.

Table 3: Summary of key survey events by vessel on the Mayflower HRG Survey.

Event	*GO Liberty*	*GO Pursuit*	*Westerly*	*Fugro Brasilis*
PSO team mobilizes	18 April 2021*	16 April 2021*	10 April 2021*	28 November 2021
		30 November 2021		
Kick-off meetings	03 May 2021*	18 April 2021*	13 April 2021*	29 November 2021
		01 December 2021		
Vessel departs dock. PSO effort begins.	05 May 2021*	19 April 2021*	14 April 2021*	29 November 2021
		01 December 2021		
Data acquisition complete. PSO monitoring complete	10 September 2021	08 September 2021	14 October 2021	15 December 2021
		15 December 2021		

*Dates of operation under the 2020 IHA, prior to implementation of 2021 IHA included.

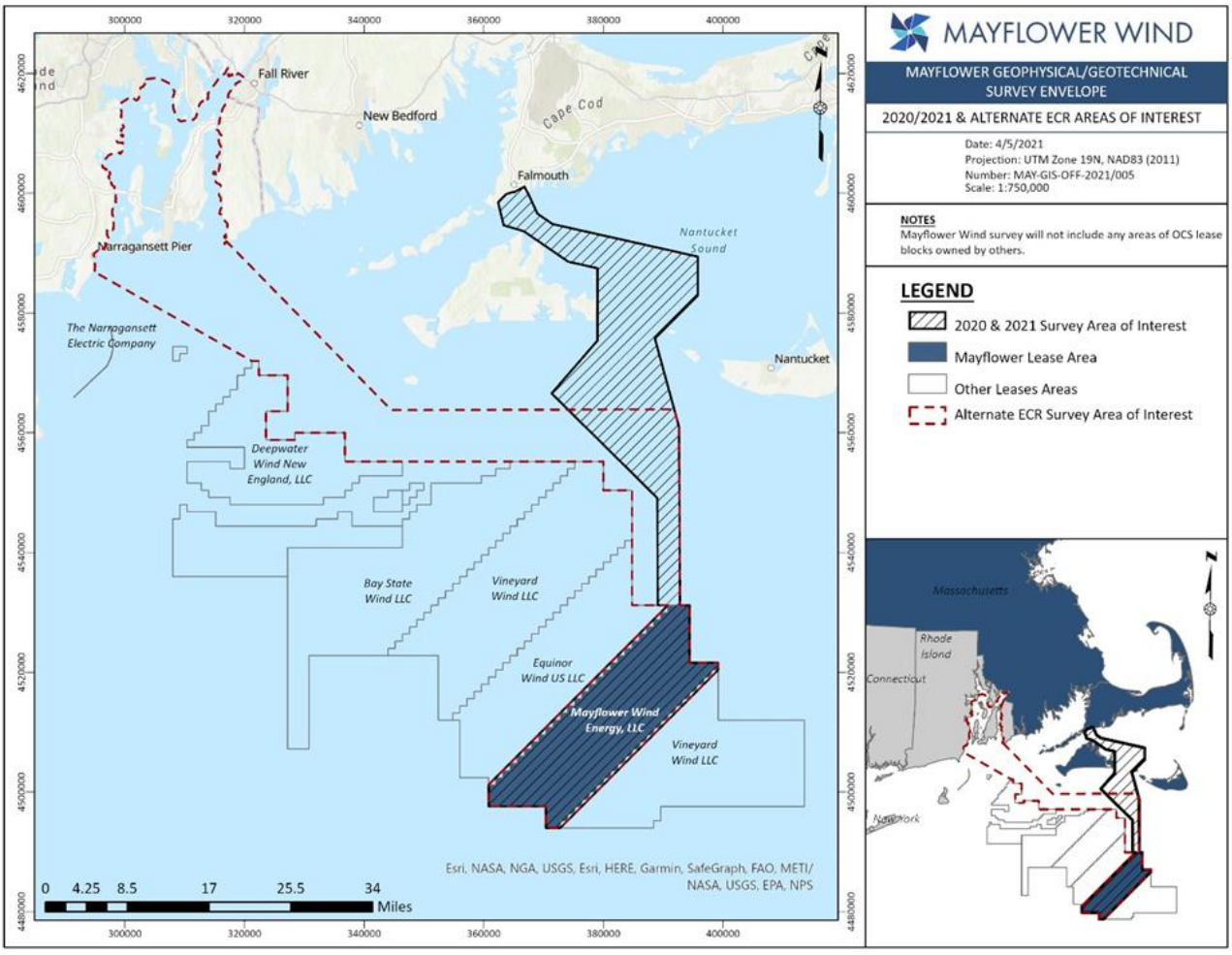

Figure 1: Mayflower Wind Survey Area of Interest

3.1 Vessel Summary

The Mayflower HRG Survey from 07 July 2021 to 15 December 2021 was completed by the *Fugro Brasilis, GO Liberty, Westerly* and *GO Pursuit*. Specifications of each vessel are provided in Table 4 and photos of each vessel are included in Appendix C.

Table 4: Vessel specifications

Vessel Name	Length	Speed	Vessel Configuration description
Go Liberty	44m	Less than 10 kts (Transit) 3-5 kts (Survey)	Shallow draft multi-role survey vessel for inland waters and shallow coastal zones
Westerly	14 m	Less than 10 kts (Transit) 3-5 kts (Survey)	Multi-role survey vessel for ultra-shallow water survey areas
GO Pursuit	51 m	10 kts (Transit) 3-5 kts (Survey)	Multi-role survey vessel for coastal and offshore survey areas
Fugro Brasilis	66 m	10 kts (Transit) 3-5 kts (Survey)	Multi-role survey vessel for coastal and offshore survey areas

3.2 Summary of Geophysical Survey Equipment Used

The survey equipment operated on each vessel is summarized in Table 5. Low-frequency sources (operating below 200 kHz) for which monitoring, and mitigation were conducted in order to minimize potential impacts to protected species, are hereafter referred to as the regulated sound sources. Other equipment that either did not produce sound or produced sound outside of the hearing range of protected species and, as such, not regulated by BOEM or NMFS, was operated by the survey vessels but it is not considered further in this technical report.

On *Fugro Brasilis, GO Liberty*, *Westerly,* and *GO Pursuit*, two pieces of survey equipment were operated below 200kHz: Sub-Bottom Profiler (SBP) and the sparker.

Table 5: HRG survey equipment operated by each survey vessel

Fugro Brasilis	
Energy Source	**Frequency/Energy Specifications**
Multibeam Echo Sounder	200 – 400 kHz
Side Scan Sonar	300 / 600 kHz
USBL	21 - 31 kHz
Magnetometer operating in transverse gradiometer configuration (TVG)	N/A
High Resolution Sub-Bottom Profiler	8 – 10 kHz
Medium Penetrating Dual Seismic Sparker	1 Hz - 10 kHz
GO Liberty	
Energy Source	**Frequency/Energy Specifications**
Multibeam Echo Sounder	200 - 400 kHz
Side Scan Sonar	300 / 600 kHz
USBL	21 – 31 kHz
Magnetometer operating in transverse gradiometer configuration (TVG)	N/A
High Resolution Sub-Bottom Profiler	8 – 10 kHz
Medium Penetrating Dual Seismic Sparker	1 Hz – 10 kHz
Westerly	
Energy Source	**Frequency/Energy Specifications**
Multibeam Echo Sounder	200 - 400 kHz
High-resolution Side Scan Sonar	300 / 600 kHz
USBL	21 – 31 kHz
Magnetometer operating in transverse gradiometer configuration (TVG)	N/A
High Resolution Sub-Bottom Profiler	8 – 10 kHz
Medium Penetrating Dual Seismic Sparker	1 Hz – 10 kHz
GO Pursuit	
Energy Source	**Frequency/Energy Specifications**
Multibeam Echo Sounder	200 - 400 kHz
Side Scan Sonar	300 / 600 kHz
USBL	21 – 31 kHz
Magnetometer operating in transverse gradiometer configuration (TVG)	N/A
High Resolution Sub-Bottom Profiler	8 – 10 kHz
Medium Penetrating Dual Seismic Sparker	1 Hz – 10 kHz

4 MONITORING AND MITIGATION PROGRAM

This section describes the protected species monitoring and mitigation measures established to meet the requirements of the BOEM Lease and the NMFS 2021 IHA. Survey mitigation measures were designed to minimize potential impacts of the survey activities on marine mammals, sea turtles, and other protected species of interest.

The following monitoring protocols were implemented to meet these objectives, and each are described in detail in a sub-section below:

GO Liberty

- Visual observations were conducted daily to provide real-time sighting data, allowing for the implementation of mitigation procedures as necessary.
- Nighttime strike avoidance was conducted by the vessel crew as required. No HRG operations were conducted at night onboard the vessel.
- Species-specific exclusion zones (EZs) were established around the regulated HRG sound sources where delays to initiation and shutdowns of active sources were implemented when protected species were detected inside

Westerly

- Visual observations were conducted daily to provide real-time sighting data, allowing for the implementation of mitigation procedures as necessary.
- Due to the limited capacity of the vessel, additional day-time visual watches were conducted by the trained vessel crew as required for appropriate monitoring breaks for the PSO. No HRG operations were conducted at night onboard the vessel.
- Species-specific exclusion zones (EZs) were established around the regulated HRG sound sources where delays to initiation and shutdowns of active sources were implemented when protected species were detected inside

GO Pursuit and Fugro Brasilis

- Visual observations were conducted day and night to provide real-time sighting data, allowing for the implementation of mitigation procedures as necessary.
- Species-specific exclusion zones (EZs) were established around the regulated HRG sound sources where delays to initiation and shutdowns of active sources were implemented when protected species were detected inside

4.1 Monitoring: Protected Species Observers

Trained and experienced PSOs were on board each survey vessel during survey activities to:

- conduct protected species monitoring,
- record and report detections, and
- request mitigation actions in accordance with the established regulatory requirements and monitoring plan.

The PSO contractor was responsible for ensuring each deployed PSO met the minimum requirements set forth in the BOEM Lease stipulations and by NMFS. BOEM and NMFS PSO requirements include training in protected species identification and behavior, in addition to field experience in protected species observation in the Atlantic Ocean or the Gulf of Mexico.

The PSO contractor was responsible for the provision of training certifications and curriculum vitaes to be reviewed and approved by Mayflower and BOEM prior to deployment on the vessel.

The PSO contractor was responsible for providing the PSOs with vessel-specific and survey contractor-specific training. Environmental Project Inductions specific to Mayflower were provided by RPS, Fugro and Mayflower during project kick-off meetings, conducted prior to the start of survey operations and prior to scheduled crew changes.

All certified PSOs who were deployed during the Mayflower 2021 HRG survey operations are listed in Appendix D.

4.2 Visual Monitoring: Protocols and Methods

A team of PSOs were deployed on each survey vessel in sufficient numbers to meet the monitoring requirements of that vessel as outlined in Table 6. PSOs monitored while the vessel was in transit and prior to and during all Low Frequency (LF), less than 200 kHz, sound source operations conducted by the vessel. PSOs also conducted visual monitoring during all periods between LF sound source activities to collect additional protected species data. One or two PSOs monitored at a times depending on the needs of the vessel (i.e., 24-hour operations or 12-hour operations). PSOs rotated monitoring shifts as needed to maximize concentration and to meet the watch requirements of the BOEM Lease (watch periods not to exceed four hours without a minimum two-hour break, and a maximum duration of 12 hours in a 24-hour period).

Visual monitoring locations on each vessel were selected using the following factors:

1. They afford PSOs a 360-degree viewpoint around the vessel and acoustic sources, such that the EZs around the sound sources and the strike avoidance separation distances could be simultaneously monitored,
2. They provide the highest vantage point possible to allow monitoring out to the greatest distances ahead and around the vessel,
3. They provide shelter from inclement weather, as needed,
4. They provide real-time communication with vessel and LF HRG equipment operators.

PSOs conducted visual monitoring by actively scanning with the naked eye out to the furthest observation points visible, methodically sweeping areas closer to the vessel and focusing on the EZs and ahead of the vessel. PSOs conducted regular sweeps of the surrounding areas using magnification devices as described in Table 6. PSOs monitored for cues that might indicate the presence of protected species including but not limited to splashing, footprints, blows, and presence of other marine species (diving seabirds, fish feeding activity).

Table 6: Visual monitoring methodology on each survey vessel

	Fugro Brasilis	*GO Liberty*	*Westerly*	*GO Pursuit*
Total Number of PSOs	4	2	1	4
Number of PSOs on Watch - Day	1	1	1	1
Visual monitoring equipment- Day	Reticle binoculars 10x50 & 7x50 magnification	Reticle binoculars 10x50 & 7x50 magnification	Reticle binoculars 10x50 & 7x50 magnification	Reticle binoculars 10x50 & 7x50 magnification
Visual monitoring conducted at night	Yes, 2PSOs on watch	Strike Avoidance conducted at night, during transit, or at anchor	No visual monitoring conducted at night as vessel is dockside	Yes, 2 PSOs on watch
Visual monitoring equipment- Night	Night Vision Devices, Thermal clip-ons, and infrared LED handheld spotlights	No HRG operations at night	No HRG Operations at night	Night Vision Devices, Thermal clip-ons, and infrared LED handheld spotlights
Range Estimation	Calibrated Reticle Binoculars	Calibrated Reticle Binoculars	Calibrated Reticle Binoculars	Calibrated Reticle Binoculars
Primary Monitoring Location	Bridge wings Bridge	Bridge wings	Bridge and back deck	Bridge wings Bridge

Displays inside the bridge showed operational information about the vessel (e.g. position, speed, heading, etc.), sea conditions (e.g. water depth, sea temperature, etc.), and weather (e.g. wind speed and direction, air temperature, etc.). Environmental conditions, along with vessel and acoustic source activity, were recorded at least once an hour, or every time there was a change of one or more variables.

4.2.1 Daylight Visual

The PSOs on board were equipped with 7x50 reticle binoculars and 10x50 reticle binoculars, as well as DSLR cameras with 200mm and 300mm zoom lens to aid in visual monitoring watches conducted during the day. PSO teams used field notebooks to record data while on watch and laptops were used to enter data.

Range estimates were made by comparison to object of known distance, as well as with reticle binoculars. Reticle binoculars were calibrated whenever possible to ensure accuracy of distance data. These reticle calibration tables are provided in Appendix E.

4.2.2 Nighttime and Reduced Visibility Visual Observations

GO Liberty and Westerly

The *GO Liberty* and *Westerly* did not conduct any nighttime HRG survey operations. No equipment was utilized to augment visual monitoring during periods of reduced visibility during the daytime. During periods of reduced visibility when EZs were obscured to a sufficient degree to prevent the PSOs from being confident in their ability to detect protected species inside those respective EZs, LF sound source operations were disabled.

Fugro Brasilis and GO Pursuit

Two PSOs conducted visual monitoring during all nighttime operations, whenever the vessel was not in port or at anchor.

PSOs on the *Fugro Brasilis* and *GO Pursuit* conducting nighttime monitoring watches were equipped with infrared LED handheld spotlights and night vision goggles with head mounts and thermal clip-ons. Specifications for the night monitoring equipment can be found in Appendix F.

4.3 Monitoring: Data Collection

During or immediately after each sighting event, the PSOs recorded detection details in a standardized detection datasheet provided to them by RPS. Excel data forms included tabs for project data, monitoring effort data, geophysical operations data, and protected species detection data. RPS supplied a set of standardized variables for specific data fields that were to be implemented on the data form provided to their PSOs.

Each sighting event was linked to an entry on an effort datasheet where specific environmental conditions and vessel activity were logged.

Species identifications were made whenever the distance of the animal(s), length of the sighting, and visual observation conditions allowed. Whenever possible during detections, photographs were taken with DSLR cameras that had telephoto lenses. Marine mammal identification manuals were consulted, and photos were examined during observation breaks to confirm identifications.

4.3.1 Data Collection Requirements & Methods

Data was collected to meet the requirements of BOEM and NMFS as summarized earlier in Table 1.

PSOs collected data in handwritten notepads or on portable / tablet devices during watches. During watch breaks and at the end of daylight hours, data was compiled in proprietary data forms on laptop computers and backed up on portable hard drives.

4.3.2 Methods of Cross-Vessel Detection Coordination

Where possible during concurrent program operations, protected species detections were communicated to other ships on the project by email and by portable device messenger applications (WhatsApp). RPS project managers coordinated these communications between vessel teams and monitored them in real time throughout the project, assisting in disseminating the information when necessary.

4.3.3 North Atlantic Right Whale External Sighting Monitoring Protocol

PSOs monitored for Dynamic Management Areas (DMA) in their permitted survey area and surrounding areas regularly:

1. Lead PSOs checked the NMFS website for new DMAs at the start of each day
2. PSOs used mobile devices to check the web application Whale Alert
3. RPS project managers were signed up to receive automatic notifications of DMAs and NARW sightings throughout survey operations

4.4 Mitigation Measures

4.4.1 2021 HRG Survey Mitigation Methodology

The following mitigation protocols were implemented during the Mayflower 2021 HRG survey starting 07 July 2021 under the 2021 NMFS issued IHA. All of protocols were implemented as described.

- Establishment of Buffer Zones (BZ)

  Prior to the initiation of sound sources operating below 200 kHz from silence, a clearance search period of 30 minutes for marine mammals and 60 minutes for sea turtles must be completed. During this time, the following BZ apply:

  – 500 meters: North-Atlantic right whales
  – 100 meters: All other marine mammals with no exception to voluntarily approaching delphinids.
  – 100 meters: Sea turtles

- Establishment of Exclusion Zones (EZ)

  During use of sources with the potential to result in marine mammal harassment (i.e., anytime the acoustic source is active, including ramp-up), occurrences of marine mammals within the EZ must be communicated to the vessel operator to prepare for potential shutdown of the acoustic source.

  – 500 meters: North Atlantic right whales
  – 100 meters: All other marine mammals with the exception of voluntary approaching delphinids
  – 100 meters: Sea turtles
  – 141 m: Level B harassment zone for marine mammals. (Shutdowns are required at this distance for marine mammals where take has not been granted or where the authorized takes have been met.)

- Following a detection of a protected species within its respective BZ required delays to initiation of sound sources operating below 200 kHz. The delays were implemented until:

  – All marine protected species that were observed inside the BZ were confirmed to have left their relevant BZ
    OR
  – An additional time period has lapsed with no further sightings within the relevant BZ
    - 15 minutes for odontocetes and seals
    - 30 minutes for all other marine mammals
    - 30 minutes for sea turtles

- A shutdown of sound sources operating below 200 kHz was implemented when protected species entered their respective EZ. Shutdown of SBP and Sparker were implemented for NARW and sea turtles, while only the Sparker was shutdown for all other marine mammals.

- An exception was applied to shutdown procedures for some delphinid species and some pinniped species that are observed voluntarily approaching the vessel where the following requirements apply:

  - The exception applies only to delphinids in the genera *Delphinus*, *Lagenorhynchus*, *Stenela* (*frontalis* only) or *Tursiops.*
  - The exception applies only to gray seals or harbor seals.

- If there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the genera for which shutdown is waived), PSOs must use best professional judgment in making the decision to call for a shutdown.
- If delphinids from the shut-down exempt genera are observed within or entering the EZ but do not voluntarily approach the vessel or towed survey equipment, shutdown is required.
- The determination of whether the animal has “voluntarily” approached will be made by the PSO on watch.
- Shutdowns are required for marine mammals where take has not been granted or where the authorized takes have been met even if those species fall into the exemption genera.

Mitigation actions to be undertaken were summarized in a flow chart that was provided to each PSO team and is included in Appendix G.

4.5 Reporting

Reporting requirements of the BOEM Lease and the IHA were outlined in Table 1. Both agencies require a final survey report be prepared detailing operations, PSO effort, and detection of protected species.

4.5.1 Injured or Dead Protected Species

Any injured or dead marine mammal or sea turtle observed either by a PSO on watch or by a crew member was required be reported to BOEM and NMFS as described in Table 1. Reporting requirements included a phone notification to the NMFS Regional Stranding hotline as soon as practicably possible, made by either the Lead PSO or shore based PSO Provider, as communications permitted from the vessel.

The Lead PSO would also prepare a written report in accordance with NMFS standard reporting guidelines and using the template provided in the BOEM Lease, which would be submitted to Mayflower for submittal to the agencies.

4.5.2 NARW Sightings

Reporting of NARW sightings to external monitoring resources was a requirement of the IHA.

PSOs were to use the following applications to report any NARW sightings made during survey operations:

1. To their PSO Project Manager who would then inform the Mayflower Environmental Manager.
2. PSOs would then prepare a sighting report including a description of the detection event including date, time, distance to vessel, vessel and geophysical equipment activity, observed behaviors and any photographs or screenshots taken during the sighting.
3. RPS makes the notification to the NARW Sightings Hotline.

4.5.3 90 Day Close Out Report

RPS has prepared this Technical Report to meet the NMFS IHA 2021 reporting requirements outlined in Table 1 of this report. Each of the elements of BOEM Lease and NMFS IHA required final PSO reporting is provided in Table 1 with the section in this report in which the element is addressed.

5 DATA RECORDS AND ANALYSIS METHODS

5.1 Operation Activity

PSOs collected the regulated HRG equipment's operational status each day that they were deployed on the vessel.

All vessels recorded the start of line (SOL) times and the end of line (EOL) times for the equipment during acquisition. The vessels also recorded the status of the equipment while acquisition occurred by noting full power or shutdowns due to mitigation actions. These entries were made for each regulated source or for combinations of regulated sources (for example, Sub-Bottom profiler and sparker).

5.2 Monitoring Effort

PSOs recorded monitoring effort by entering start of watch and end of watch times into data sheets where the vessel position and environmental data was also documented for that duration.

Total monitoring effort was calculated by summing the durations of each watch period. Where the monitoring effort entry did not also indicate the source status for that monitoring period, source data was cross referenced during analysis to calculate the duration of monitoring conducted while regulated sources were on and off.

Visual monitoring while the acoustic source was off included monitoring conducted during transit to survey sites and any other recorded silent periods (mitigation action, equipment downtime, or weather standby time).

5.2.1 Summary of Environmental Conditions

Each PSO monitoring effort data form included environmental conditions present during that watch period. Environmental variables were recorded every 30 to 60 minutes or when conditions changed.

Beaufort Sea state was recorded for each monitoring period using the accepted scale (Table 7):

Table 7: Beaufort Sea state scale

Beaufort number	Description	Wave height	Sea conditions
0	Calm	0 m	Sea like a mirror
1	Light air	0–0.3 m	Ripples with appearance of scales are formed, without foam crests
2	Light breeze	0.3–0.6 m	Small wavelets still short but more pronounced; crests have a glassy appearance but do not break
3	Gentle breeze	0.6–1.2 m	Large wavelets: crests begin to break; foam of glassy appearance; perhaps scattered white horses
4	Moderate breeze	1–2 m	Small waves becoming longer; fairly frequent white horses
5	Fresh breeze	2–3 m	Moderate waves taking a more pronounced long form; many white horses are formed; chance of some spray
6	Strong breeze	3–4 m	Large waves begin to form; the white foam crests are more extensive everywhere; probably some spray
7	High wind,	4–5.5 m	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind; spindrift begins to be seen
8	Gale	5.5–7.5 m	Moderately high waves of greater length; edges of crests break into spindrift; foam is blown in well-marked streaks along the direction of the wind

Beaufort number	Description	Wave height	Sea conditions
9	Severe gale	7–10 m	High waves; dense streaks of foam along the direction of the wind; sea begins to roll; spray affects visibility
10	Storm	9–12.5 m	Very high waves with long overhanging crests; resulting foam in great patches is blown in dense white streaks along the direction of the wind; on the whole the surface of the sea takes on a white appearance; rolling of the sea becomes heavy; visibility affected
11	Violent storm	11.5–16 m	Exceptionally high waves; small- and medium-sized ships might be for a long time lost to view behind the waves; sea is covered with long white patches of foam; everywhere the edges of the wave crests are blown into foam; visibility affected
12	Hurricane force	>14 m	The air is filled with foam and spray; sea is completely white with driving spray; visibility very seriously affected

Swell heights in meters were recorded by all the vessel PSO teams. The swell heights were either provided as the actual estimated height in meters or categorized (< 2 m, 2 – 4 m, and > 4 m). To calculate the overall monitoring effort across vessels for each swell height, the data was assigned to the appropriate swell height category.

PSOs categorized visibility during monitoring effort in kilometers and/or meters where values were selected from categories.

5.3 Visual Sightings of Protected Species

PSOs used standardized reporting forms provided by RPS to record all detections of marine mammals and sea turtles made during survey operations. These records were completed any time a sighting was made, regardless of distance, not just for detections where mitigation was implemented.

Sighting ID or detection event numbers were assigned chronologically for all protected species observed on a vessel throughout that vessel's survey activity. A new detection number was assigned for a new species sighting or when enough time had passed between observations of animals of the same species such that PSOs could not be certain that they were observing the same animals previously documented. A standard duration of time was to be applied between observations: 15 minutes for delphinid and pinniped detections and 30 minutes for large whales. If there were multiple species in a single detection, the same sighting ID or detection event was used.

Protected species movement relative to the vessel, pace, and initial and subsequent behavior states were recorded for each protected species sighting where standardized categories for each were provided as controlled fields in the provided data form.

5.3.1 Closest point of approach

All PSOs recorded closest point of approach (CPA) and the source status at the closest point of approach.

5.3.2 Detection rate

Detection rate was calculated using the number of protected species events per hour of monitoring effort for all vessels. On vessels where more than one PSO was on watch simultaneously, effort was not duplicated: one hour of monitoring effort by two PSOs consisted of one hour of effort for the purpose of detection rate calculations.

5.3.3 Behavior and behavior change

The PSO protected species detection template included an initial behavior and initial pace field for the detection. It included the direction of travel relative to the vessel at initial detection, pace and direction of travel at final detection and other behaviors documented throughout the event. Where these data points were not included as specific entries in the data form, the information was sometimes available in a detection summary.

Protected species detection events were reviewed and categorized as having exhibited a change in behavior state or no observed change in behavior state.

The variables utilized to analyze change in behavior state are provided in Table 8.

Table 8: Change in behavior state analysis variables

Data field	Variables	Analysis method
Change in Behavior	Yes	• A detection narrative was provided that described a change. • Initial and final pace were provided and were different. • Initial and final direction of travel relative to vessel were provided and were different.
	No	• If of the above criteria for an observed behavior change were satisfied, 'No change' was selected and detection data was then evaluated to determine whether no change was in fact observed or whether there was insufficient data provided to indicate whether a behavior change had been observed.
Behavior change description	Insufficient data	• Initial and final pace data fields were empty. • Initial and final direction of travel relative fields were empty. • No detection narrative was provided. • No subsequent behaviors after initial behavior state were provided. • Detection duration (difference between initial and final detection time) suggested that observations may have occurred that were not documented in the data form.
	Other direction change	• Any direction change that could not classified as moving away or approaching.
	Pace change	• Any change in pace.

5.4 Level B Take / Exposure Estimation

The BOEM Lease defines take as "having the same meaning as the term "take" as defined in 16 U.S.C. § 1532(19)" where take is defined as "means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

The MMPA definition of harassment refers to acts that have the potential to disturb (but not injure) a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

NMFS considers that marine mammals that have been exposed to received sound levels of 160 dB (rms) to have potentially disturbed and therefore classified as a Level B take.

In the IHA issued to Mayflower by NMFS, defines the Level B harassment zone as marine mammals observed within 141 meters of active geophysical survey in section 4 (d).

5.5 Mitigation Measures Implemented

Mitigation measures were implemented on each survey vessel as previously described. The onboard PSO team communicated requested mitigation in real time to survey operators who operated the regulated sound sources or to the vessel crew operating the vessel, depending on the action required. Communications were conducted over handheld radios or in person.

Implemented mitigation actions were recorded on PSO data sheets in the detection data form and also in the operations activity logs.

For each mitigation action, the mitigation downtime associated with that action was calculated. Mitigation downtime was the duration of the break in regulated source operations as required by the regulatory protocols: the duration of time that an animal was observed inside an exclusion zone and any additional clearance time required before regulated sources could be activated. Mitigation downtime did not include any additional downtime that a survey operator needed to resume acquisition which may include additional vessel maneuvering time, time to deploy or calibrate equipment etc. Some detections included this additional downtime as a different field, production loss, but this variable was not recorded for every mitigation action taken.

5.6 Data Quality Control

The RPS data analysts reviewed all the PSO data sets received from every vessel and conducted QC as described in Table 9.

Table 9: Quality control editing performed by RPS on PSO datasets by data field

Data type	Data field	Corrections made
Monitoring effort	Start of watch / End of watch	• Times were corrected or added where error was evident, typically by inconsistency with adjacent times.
	Day time vs. Nighttime	• Failures to adjust time to UTC were corrected. • Times were corrected when end of effort overlapped with start of subsequent effort.
Source operations	Testing	• Testing status was not used as a separate category. Based on the survey days and monitoring effort times, testing was either added to the “on” status or not added to operations totals at all.
Protected species detections	Position	• Positions that plotted out of place were corrected using effort positions of corresponding times, where available • When positions could not be corrected and position was on land, detection was removed from detection plots.
	Combining Unidentified categories	• Unidentified baleen whale was combined with the Unidentified whale category for data analysis.

6 RESULTS

This section of the report details LF sound source operations, protected species monitoring effort, environmental conditions during monitoring effort and distribution, and sighting data inside and outside the Lease Area during source operation and source silence.

The monitoring effort, source operations and protected species detections for each vessel are provided as an Excel dataset in Appendix H.

6.1 Operation Activity

HRG survey operations began with each vessel conducting source calibrations in the survey area before proceeding to acquisition, according to the survey plan. Survey operations were briefly suspended when necessary for weather, equipment maintenance, or port calls for provisions and crew change.

The dates of operation, total days of survey activity and hours of regulated source operations by survey vessel are provided in Table 10.

Table 10: Summary of regulated sound source operations on each survey vessel

Vessel	Dates of Operation	Total Survey Days	Total Hours of Regulated Source Operations (HH.HH)
GO Liberty	07 July 2021 – 10 September 2021	65	709.22
GO Pursuit	07 July 2021 – 08 September 2021	63	1296.35
	01 December 2021 – 15 December 2021	15	118.80
Westerly	07 July 2021 – 14 October 2021	99	788.88
Fugro Brasilis	29 November 2021 – 08 December 2021	10	186.88
Total		252	3100.13

*HH.HH is time in decimal hours

6.2 Monitoring Effort

Visual and monitoring effort for all survey vessels during the Mayflower 2021 HRG Survey is summarized in Table 11, shown by survey vessel, by activity of the regulated HRG sources and by monitoring conducted during day and night.

Table 11: Summary of visual monitoring effort by vessel and by source activity status (HH.HH)

Monitoring Effort (HH.HH)	*GO Liberty*	*GO Pursuit*		*Westerly*	*Fugro Brasilis*
		(Part 1)	(Part 2)		
Source active	494.55	764.72	118.80	521.20	66.45
Source not active	214.67	531.63	123.58	267.68	120.43
Daytime	709.22	810.58	100.90	788.88	78.83
Night-time	00.00	485.77	141.48	00.00	108.05
Total	**709.22**	**1296.35**	**242.38**	**788.88**	**186.88**

6.3 Environmental Conditions

Environmental conditions can impact the probability of detecting protected species in a survey area. The environmental conditions present during visual observations undertaken during this survey program were mild to moderate.

Visibility was classified as ‘excellent’ if it extended to five kilometers or greater, ‘moderate’ if it was between two to four kilometers, and ‘poor’ if it was less than two kilometers. Visibility conditions were excellent for 68% of the overall visual monitoring effort for the survey. Visibility conditions were moderate for 12% of the overall visual monitoring effort. Poor visibility conditions occurred for 20% of the overall visual monitoring effort. Poor visibility consisted of periods of rain or fog, brief periods of lighting, and night-vision monitoring.

Table 12: Summary of visibility during visual monitoring effort

Visibility	Duration (HH.HH)	% of Overall Monitoring Effort
Greater than 5 km	2206.38	68
2 to 5 km	425.90	12
Less than 2 km	645.48	20

Monitoring effort was conducted in Beaufort Sea states ranging from Level 0 through Level 8, but the majority was accumulated at sea states at or below Level 4, which is generally considered to be favorable monitoring conditions for most marine mammal species. Visual observations at Level 4 Beaufort Sea states or below accounted for 97% of the total visual monitoring effort.

Table 13: Summary of Beaufort Sea state during visual monitoring during the survey

Beaufort Sea State	Duration (HH.HH)	% of Overall Monitoring Effort
B0	20.25	<1
B1	384.42	12
B2	1488.96	46
B3	930.16	29
B4	288.94	9
B5	69.09	2
B6	38.83	1
B7	2.00	<1
B8	1.00	<1

Swell heights during visual observations were generally low, with less than two-meter swells recorded for 96% of visual monitoring effort (Table 14).

Table 14: Summary of Swell Height during visual monitoring during the survey

Swell Height	Duration (HH.HH)	% of Overall Monitoring Effort
Less than 2 meters	3103.83	96
2 to 4 meters	104.88	3
Greater than 4 meters	15.00	1

6.4 Visual Sightings

This section of the report summarizes visual sightings of protected species (marine mammals and sea turtles) made during the Mayflower 2021 IHA portion of the HRG survey. There were a total 198 protected species detection events both inside and outside the Lease Area; 146 delphinid detections, 34 whale detections, and seven pinniped detections. There were also eight detection of unidentified dolphins, nine unidentified whales and one unidentified seal. Detections consisted of seven different marine mammal species (two delphinid species, three whale species, one pinniped species). There were 11 sea turtle sightings consisting of three sea turtle species. No Atlantic sturgeon were sighted during any of the survey activities.

Of the 198 detection events, 91% (180 events) were animals that were identified to the species level while the remaining animals (18 detection events) were identified to family level or a higher taxonomic level (classified as unidentified delphinids, unidentified whales, and unidentified seal).

A table of all protected species detections is provided as part of an Excel datasheet attachment in Appendix H. Photographs of the identified protected species visually detected during the survey are provided in Appendix I.

The distribution of protected species detections both inside and outside the Lease Area provided in Figure 2 through Figure 6 below.

Table 15 shows the total number of detection records and the number of individuals detected for each protected species during the survey program.

Table 15: Detection records collected for each protected species detected during the survey program

Species	Total Number of Detection Records	Total Number of Animals
Dolphins		
Bottlenose dolphin	12	264
Common dolphin	127	2249
Unidentified dolphins	10	46
Whales		
Fin whale	5	13
Humpback whale	12	21
Minke whale	7	8
Unidentified whales	9	11
Pinnipeds		
Gray seal	6	6
Unidentified seals	1	1
Sea turtles		
Kemp's Ridley sea turtle	1	1
Leatherback sea turtle	8	8
Loggerhead seas turtle	2	2
Total	**200**	**2630**

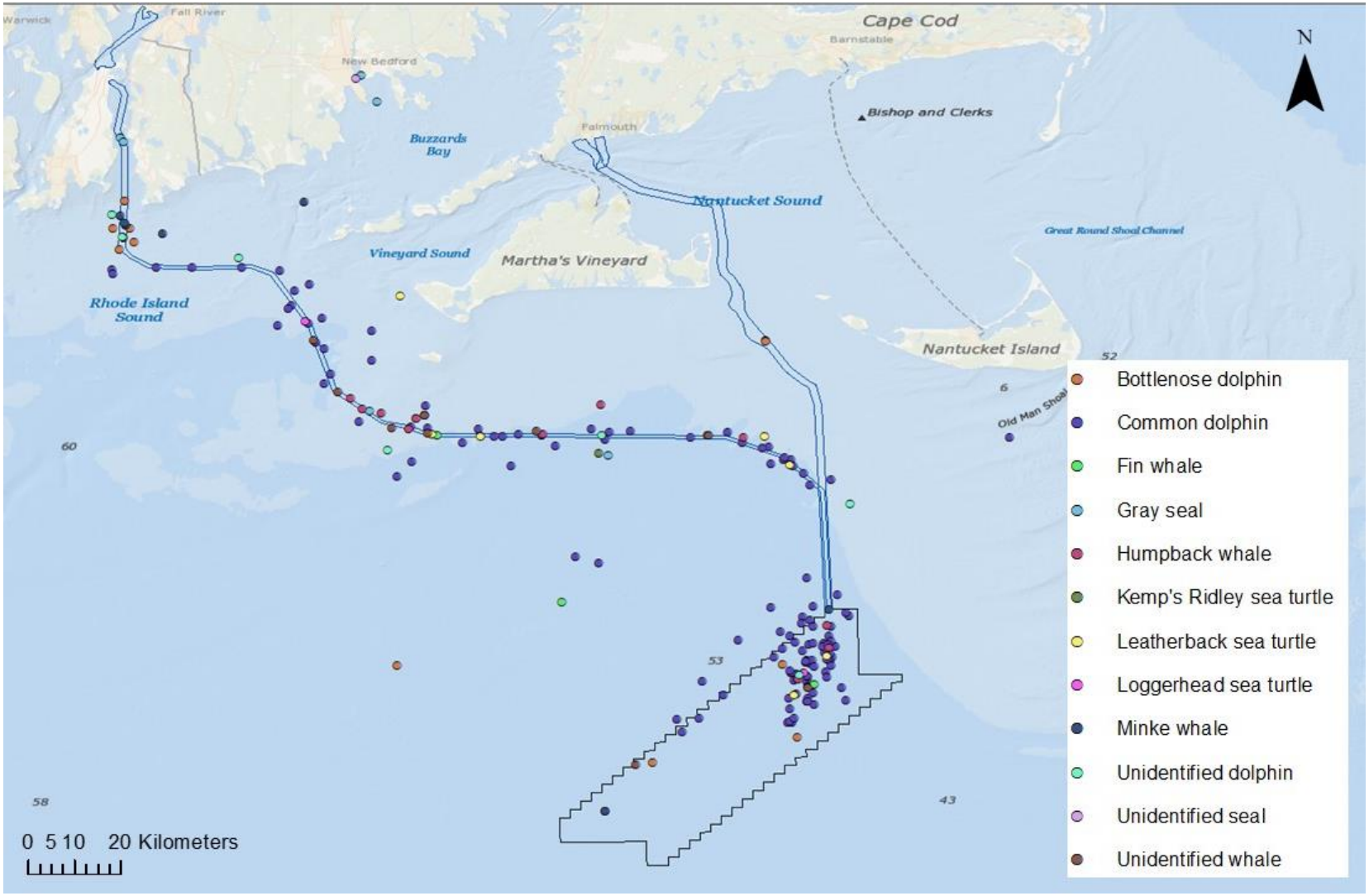

Figure 2: Distribution of all protected species detections during Mayflower 2021 geophysical survey.

*Map includes detections outside of the survey area from transits and storm avoidance locations.

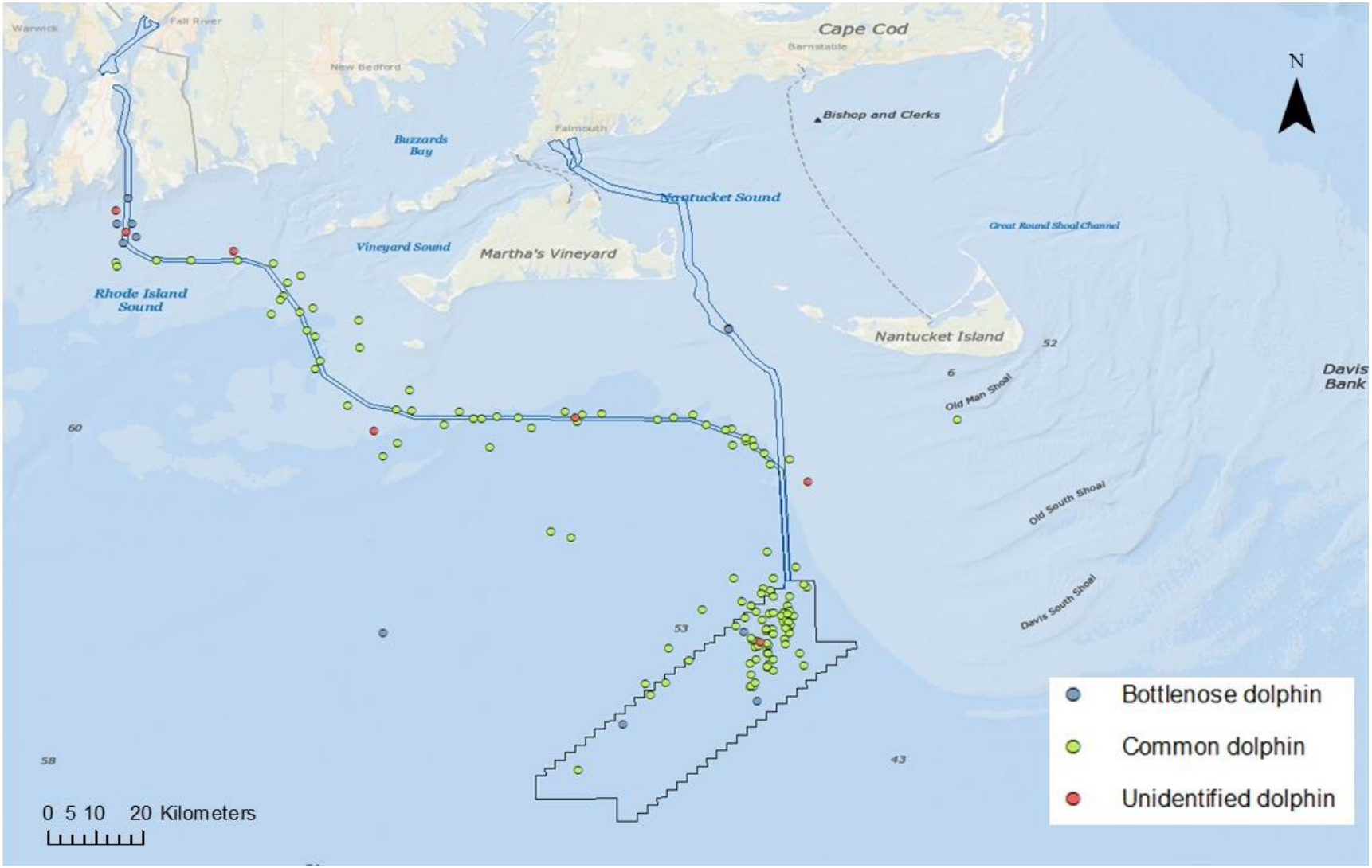

Figure 3: Distribution of delphinid detections during Mayflower 2021 geophysical survey.

*Map includes detections outside of the survey area from transits and storm avoidance locations.

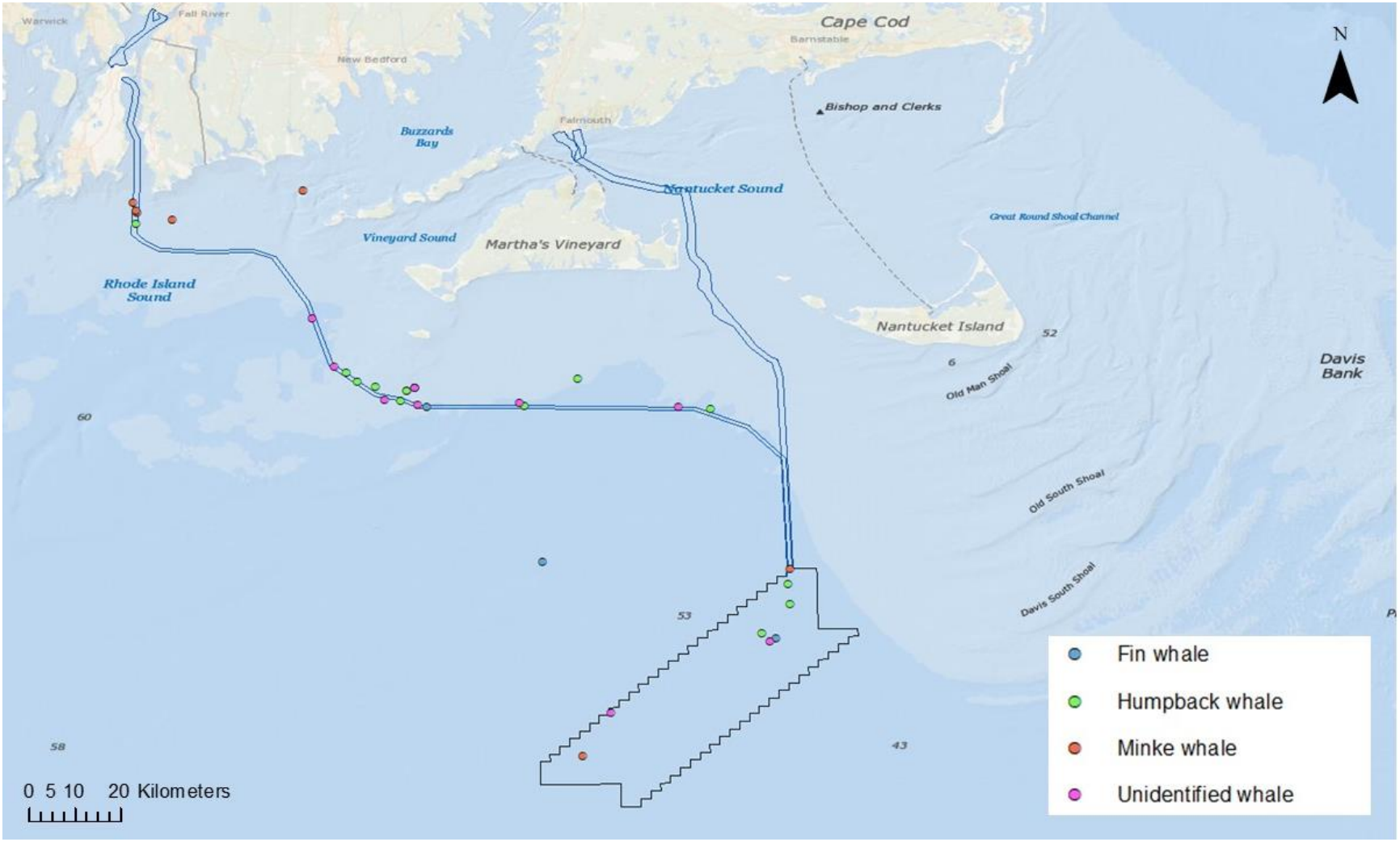

Figure 4: Distribution of whale detections during Mayflower 2021 geophysical survey.

*Map includes detections outside of the survey area from transits.

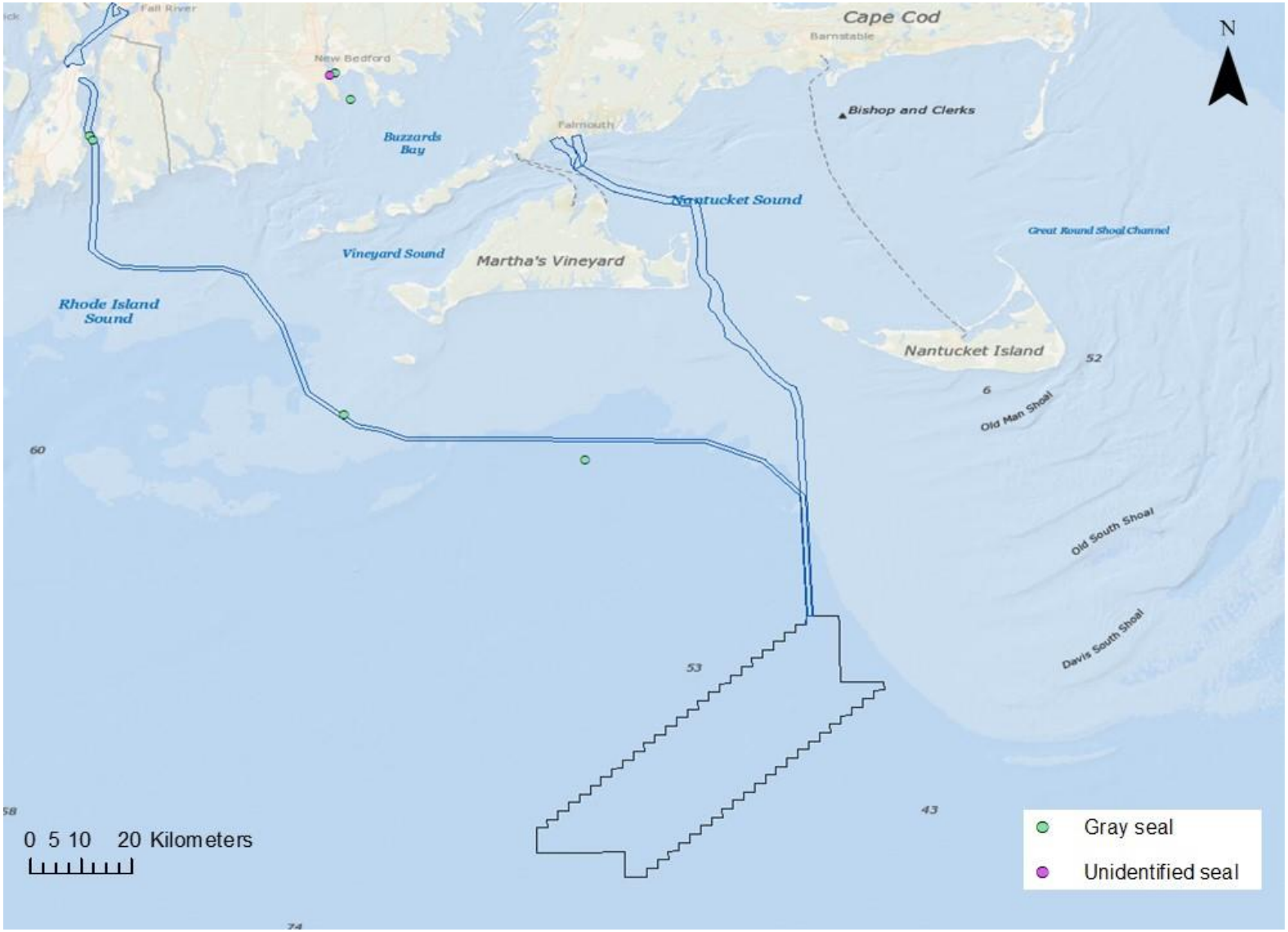

Figure 5: Distribution of pinniped detections during Mayflower 2021 geophysical survey.

*Map includes detections outside of the survey area from transits.

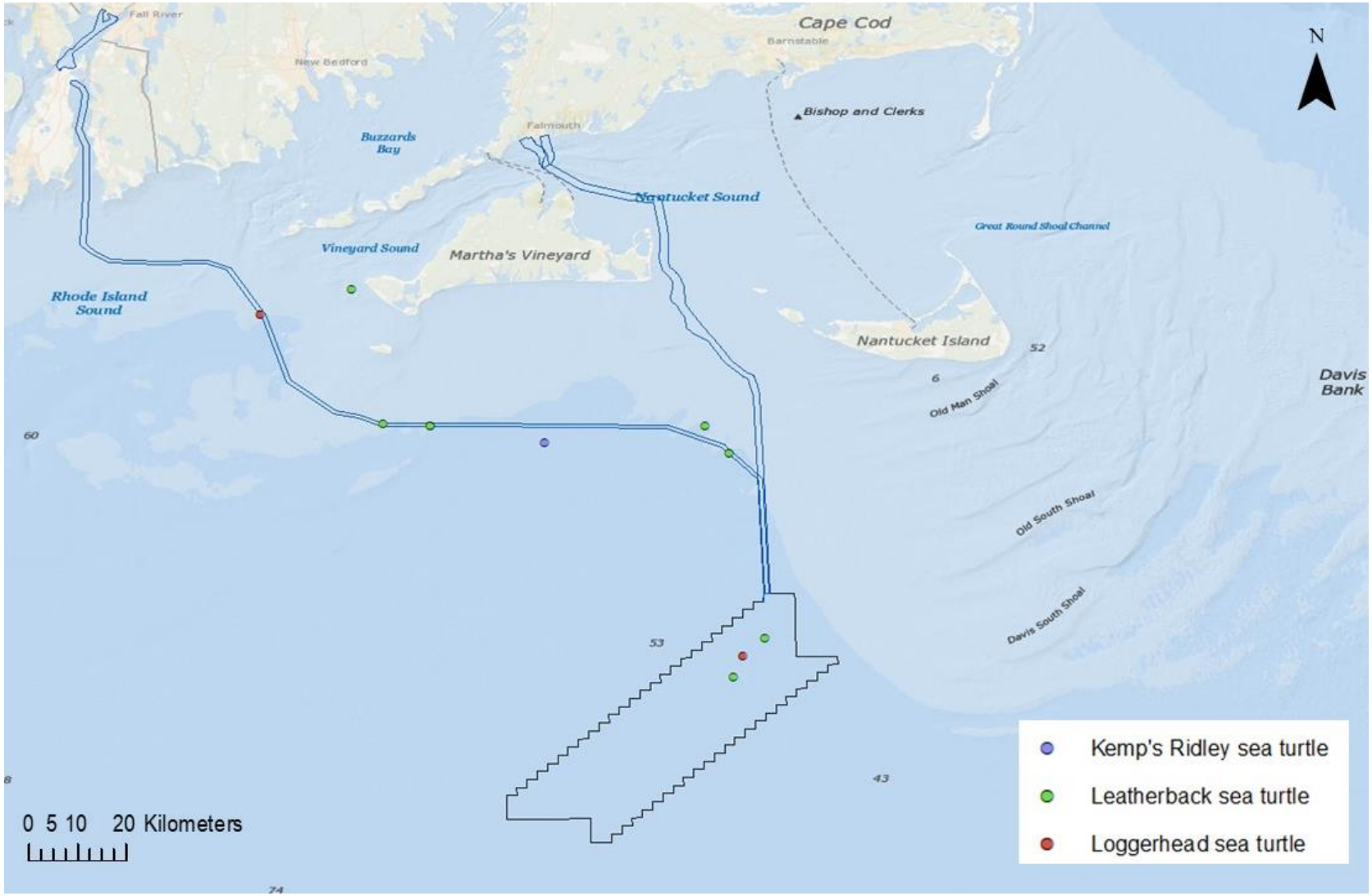

Figure 6: Distribution of sea turtle detections during Mayflower 2021 geophysical survey.

*Map includes detections outside of the survey area from transits.

6.4.1 Detection and Distance Summaries

Bottlenose dolphins had a larger mean group size than any other species (n=22) followed by the common dolphins (n=17.7). Common dolphins were the most frequently sighted species during the survey (n=127) and were observed much more often than the next most observed identified species, bottlenose dolphins (n=12) (Table 16).

Common dolphin detections had the closet mean detection distance at 361.33 meters, followed by unidentified dolphins at 532.13 meters. Bottlenose dolphins had the greatest mean distance at first detection at 593.67 meters.

Table 16: Detection summary of dolphins

Dolphins and Porpoise	Bottlenose dolphin	Common dolphin	Unidentified dolphin
# of Detection Records	12	127	10
Estimated # of individuals detected	264	2249	46
Mean Group Size	22	17.7	4.6
Mean Distance (m) at first detection	593.67	361.33	532.13
Detection rate	0.0037	0.0391	0.0025

Fin whales had a larger mean group size than any other species (n=2.6) (Table 17), while humpback whales had the highest number of detection records (n=13) and detected individuals (n=21). Minke whales had the closest mean distance at 302.14 meters.

Table 17: Detection summary for whales

Whales	Fin whale	Humpback whale	Minke whale	Unidentified whale
# of Detection Records	5	12	7	9
Estimated # of individuals detected	13	21	8	11
Mean Group Size	2.6	1.75	1.1	1.2
Mean Distance (m) at first detection	1125	889.08	302.14	812.33
Detection rate	0.0016	0.0040	0.0022	0.0028

Gray seals were detected more frequently than unidentified seals (n=6). All pinniped detections occurred in relatively close proximity to the vessels with mean distance at first detection of 132.85 meters for all pinnipeds (Table 18).

Table 18: Visual detection summary for pinnipeds

Pinnipeds	Gray seal	Unidentified seal
# of Detection Records	6	1
Estimated # of individuals detected	6	1
Mean Group Size	1	1
Mean Distance (m) at first detection	106	50
Detection rate	0.0019	0.0003

Sea turtle detections commonly consist of one animal, and mean detection distances are typically small with sightings occurring quite close to the vessel, both trends of which can be seen in the sea turtle sighting data collected during this Survey (Table 19).

Table 19: Visual detection summary for turtles

Turtles	Kemp's Ridley sea turtle	Loggerhead sea turtle	Leatherback sea turtle
# of Detection Records	1	2	8
Estimated # of individuals detected	1	2	8
Mean Group Size	1	1	1
Mean distance (m) at first detection	5	130	125
Detection rate	0.0003	0.0006	0.0025

When all species in a species group (dolphins, whales, pinnipeds and turtles) are grouped together to examine the mean closest approach to the active and inactive HRG sources, all marine mammal groups had closer mean closest approaches when the HRG sources were not active with the exception of the humpback whale, unidentified whale and unidentified seal (Table 20). This trend could be explained by the fewer number of detections while the equipment was active for the fin whale and gray seal detections. Sea turtle closest approach data is not generally considered to be relevant as sea turtles cannot sustain swimming speeds equivalent to a vessel's survey speed.

Table 20: Average closest observed approach of protected species to regulated sources while active and inactive

Species Detected	Regulated Source Active		Regulated Source Inactive	
	Number of detections	Mean closest observed approach to source (meters)	Number of detections	Mean closest observed approach to source (meters)
Bottlenose dolphin	11	330.36	1	130
Common dolphin	91	153.78	36	91.58
Unidentified dolphin	3	820.33	7	363
All dolphin species	**105**	**434.82**	**44**	**194.86**
Fin whale	2	600	3	531.67
Humpback whale	6	629.71	6	873.33
Minke whale	5	288	2	152.5
Unidentified whale	6	481.67	3	1085
All whale species	**19**	**499.85**	**14**	**660.63**
Gray seal	1	390	5	123
Unidentified seal	0	0	1	80
All pinniped species	**1**	**390**	**6**	**101.5**
Kemp's Ridley sea turtle	0	0	1	10
Leatherback sea turtle	7	112.14	1	70
Loggerhead sea turtle	2	60	0	0
All turtle Species	**9**	**57.38**	**2**	**40**

6.4.2 Behavior Summary

A total of ten different behavior states were used to describe the behavior observed at the initial detection of all 146 dolphin visual sighting events. The initial behavior state is provided in Table 21. The sample size for the unidentified dolphins was too small compared to the other observed species to make any meaningful conclusions. But for bottlenose dolphins and common dolphins, where sample sizes were larger, swimming at the surface was reported significantly more often than the other behaviors (n=37).

Fast travel was reported next most frequently in common dolphin sightings (n=27). Diving (n=1) and bow-riding (n=3) were reported most infrequently of the detection events.

Table 21: Behavior state at initial detection for dolphin species

Species	Acrobatic behavior/ Jump/ Spin	Blow	Bow-Ride	Diving	Fast Travel	Feeding	Porpoise	Surfacing	Swim at Surface	Swim Below Surface
Bottlenose dolphin	2	0	0	0	1	0	1	4	4	0
Common dolphin	17	5	3	1	23	15	19	3	33	6
Unidentified dolphin	3	0	0	0	2	0	0	3	0	0

When all delphinid species are grouped for analysis of the initial observed behavior state, some categories of travel (fast travel and swimming/swimming below the surface) represented the majority of the behaviors observed (48% of events; n= 27 fast travel, n= 42 swim / swim below surface) (Figure 7).

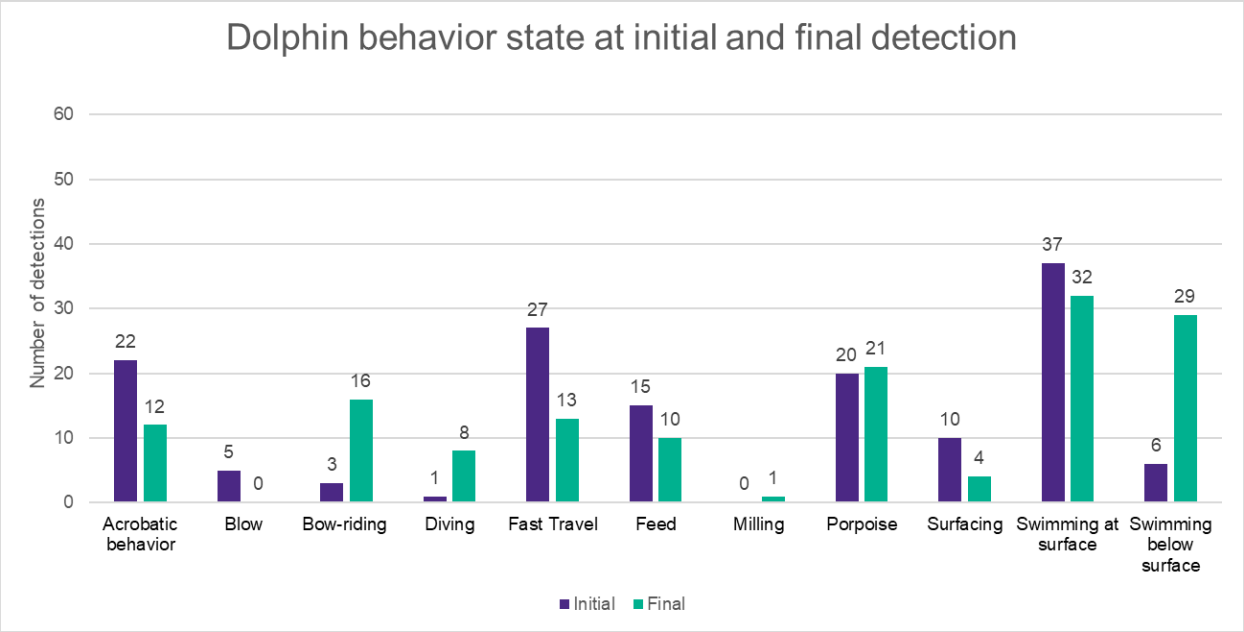

Figure 7: Behavior state at initial and final detection for all combined delphinid detections

Pace of travel at initial detection was more often described as moderate and vigorous than sedate (Figure 8). There was no significant difference in the pace observed at initial and final detection of dolphin pods.

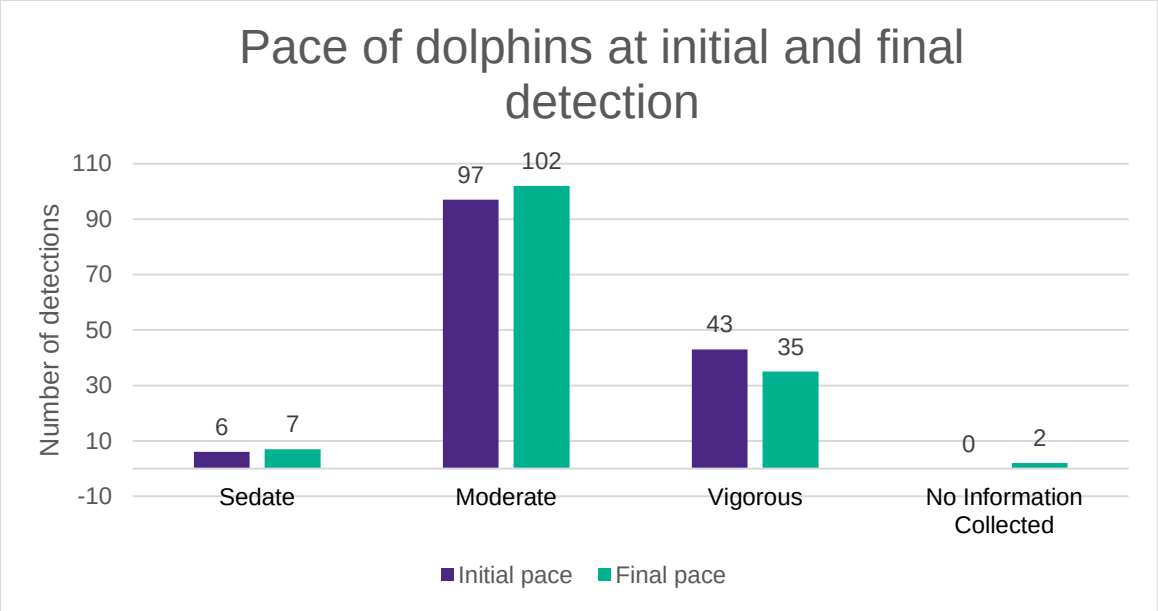

Figure 8: Pace at initial and final detection for all combined delphinid detections

When sufficient data was available, detection events were classified as showing a behavior change or no indication of behavior change. Where a behavior change was observed or documented, the type of change was described. Behavior state, pace and direction of travel were evaluated at initial detection and subsequent observations during the ongoing detection event in order to classify an event as exhibiting a behavior change.

Of the 146 delphinid detection events where sufficient data was provided, no change in behavior was observed in 60 of the events (41% of detection events where sufficient data was provided to make this determination) (Table 22).

The most reported behavior change was a change in the direction of travel, and it was observed more often during detections occurring while the source was active (n= 48) than while the source was inactive (n=19). However, it should be noted that there were significantly more detections made while the source was active for all dolphin species.

Table 22: Change in behavior state in delphinid detections while HRG source is active and inactive

Change in Behavior State	All Detection Events		Source Active		Source Inactive	
	# of Detections	% of Detections	# of Detections	% of Detections	# of Detections	% of Detections
No change	60	41	43	41	17	43
Direction change	65	45	48	45	19	48
Pace change	6	4	5	5	1	3
Direction and Pace change	15	10	10	9	3	8
Total number of detections	146		106		40	

Six different behavior states were used to describe the behavior observed at the initial detection of 34 whale detections. Blowing was the most frequently observed behavior (n=21) (Table 23).

Table 23: Behavior state at initial detection for whale species

Species	Blow	Breach	Diving	Surfacing	Swimming at Surface	Swimming Below Surface
Fin whale	5	0	0	0	0	0
Humpback whale	8	2	0	1	0	1
Minke whale	0	0	0	4	3	0
Unidentified whale	7	0	1	1	0	0

All whale species are grouped for analysis of the initial and final observed behavior state. Blowing was the most frequently observed behavior state at initial detection (n=21) whereas diving with or without fluking was the most frequently observed final behavior state (n=18) (Figure 9). Surfacing (n=6) and swimming at the surface (n=3) were the next two most observed initial behaviors.

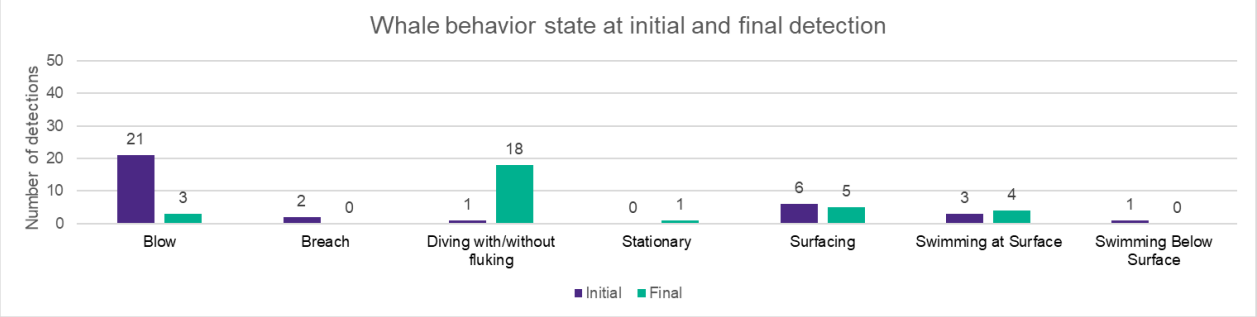

Figure 9: Behavior state at initial and final detection of the whale species

The pace of whales at initial and final detection was most frequently observed to be moderate pace (Figure 10).

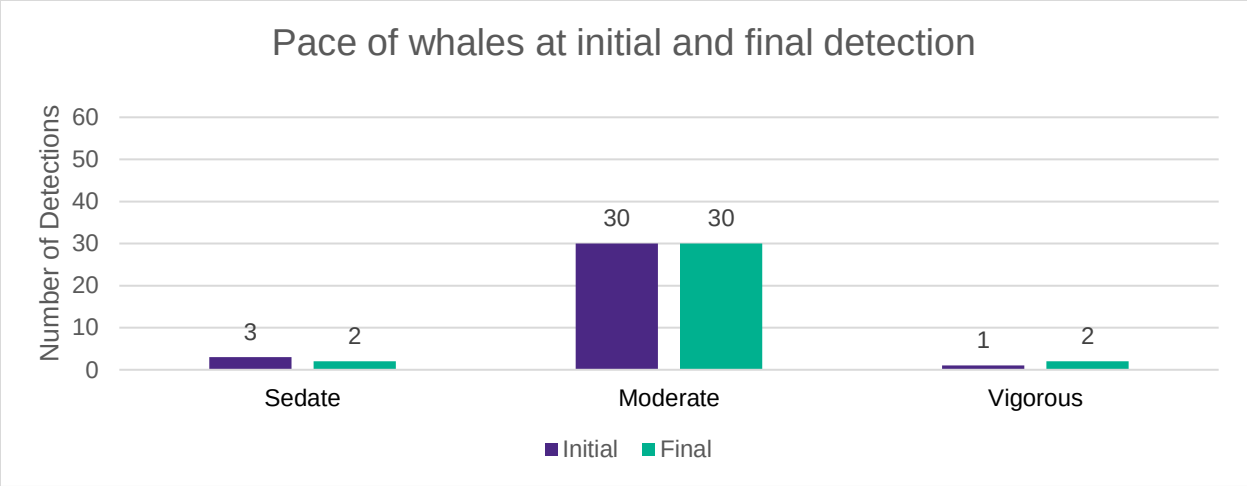

Figure 10: Pace at initial and final detection of the combined whale detection events

During most whale detection events, no change in behavior was observed. A change indirection of travel was the most frequent change observed and there was no difference in the frequency that it was observed in relation to source activity (Table 24). There were more detections made while the source was active (n=20).

Table 24: Change in Behavior state in whale detections while HRG source is active and inactive

Change in Behavior State	All Detection Events		Source Active		Source Inactive	
	No of Detections	% of Detections	No of Detections	% of Detections	No of Detections	% of Detections
No change	25	74	15	75	10	71
Direction change	7	21	3	15	4	29
Pace change	1	3	1	5	0	0
Pace and direction change	1	3	1	5	0	0
Total Number of Detections	34		20		14	

There were too few pinniped sighting events to conduct a behavior analysis.

There were too few sea turtle sighting events to conduct a behavior analysis.

6.4.3 Incidental Harassment Authorization (IHA) Level B Exposures

NMFS issued an IHA for the Mayflower HRG survey on 01 July 2021. A total of 3445 takes were authorized for 14 species/species groups under the NMFS IHA. Over the course of the survey, 420 marine mammals from six species/species groups were observed within 141 meters of the active LF sound sources (Table 25).

Table 25: IHA authorized Level B takes and total project takes

Species common name	IHA Authorized Level B Takes	Total Number of Animals Observed Inside the IHA-defined Level B Harassment Zone
North Atlantic right whale	9	0
Humpback whale	33	1
Fin whale	6	0
Sei whale	6	0
Minke whale	14	0
Sperm whale	6	0
Bottlenose dolphin	536	33
Common dolphin	1969	386
Atlantic white-sided dolphin	57	0
Risso's dolphin	18	0
Pilot whales	27	0
Harbor porpoise	46	0
Harbor seal and Gray seal	718	0
Unidentified dolphin	N/A	0
Unidentified whale	N/A	0

6.4.4 NARW sightings reporting

There were no observations of NARWs made during Mayflower 2021 survey activities. As a result, there were no observations to report.

6.4.5 Protected species incident reporting

There was one sighting of a marine mammal carcass during the Mayflower survey activity under the 2021 IHA. The observation was reported to the NMFS stranding hotline and consisted of a carcass that showed a high degree of decomposition and no indications that Mayflower survey activities had contributed to the death of the animal. The sighting is summarized below, and the reports is included in Appendix J.

On 24 July 2021, a PSO on watch on the *Westerly* observed a dead marine mammal on a sand bar at 450 m away from the vessel. The carcass appeared to have washed up on the sand bar and had been there for a few days. This incident was reported to the NMFS stranding hotline within 24 hours.

6.4.6 Summary of Dynamic Management Areas (DMAs)

There was one Dynamic Management Areas (DMAs) established in the region of the Mayflower Lease during the survey period.

Table 26: DMAs reported observations in the Mayflower lease area during survey operations

	Effective Start Date	Effective End Date	Reason for DMA	General Location	Restrictions
NARW Slow Zone	03 July 2021	18 July 2021	NARW sighting in the area	23 nm Southwest Martha's Vineyard, MA	None: Requested awareness notifications (speed restriction zone already in place)

6.5 Summary of Mitigation Measures Implemented

Mitigation was implemented as described over the course of the Mayflower geophysical survey to prevent adverse impacts to protected species from physical interactions with vessels and / or towed equipment (strike avoidance mitigation), or from exposure to potentially harmful levels and frequencies of sound.

During the survey operations, mitigation from regulated sound sources was implemented during 31 detections events: activation of regulated HRG sources was delayed on eight occasions and regulated HRG sources were shut down as a result of incursions into exclusion zones by protected species on 23 occasions.

Mitigation actions were implemented for dolphin detections more often than any other species group, both delays to initiating the source and shut downs of the active regulated sources (n=8 and n=13), followed by actions implemented for pinnipeds (n=6 shut downs), which were implemented next most frequently (Table 27). A lot of these measures were proactive to manage the amount of Level B takes incurred over the 2021 surveys under the 2020 and 2021 NMFS issued IHA.

Table 27: Summary of mitigation actions implemented during the Mayflower HRG survey

Mitigation Action	Dolphins		Whales		Sea turtles		Pinnipeds		All Species	
	No	Mitigation Downtime	No.	Mitigation Downtime	No.	Mitigation Downtime	No.	Mitigation Downtime	No.	Mitigation Downtime
Delay of Initiation of Operation	8	05:29	0	0:00	0	0:00	0	0:00	8	05:29
Shutdown of Operation	13	04:11	4	02:07	0	0:00	6	03:40	23	09:58
Total Mitigation	**21**	**09:40**	**4**	**02:07**	**0**	**0:00**	**6**	**03:40**	**31**	**15:27**

Strike avoidance maneuvering was conducted three times during Mayflower geophysical survey. The strike avoidance maneuvers consisted of a reduction in speed and altering course to maintain separation distances. Strike avoidance maneuvers were conducted twice for gray seals and once for humpback whales. Each strike avoidance maneuver undertaken is described in Table 28 as well as summarized below.

Gray seals

On 21 August 2021 at 14:10 UTC as the survey crew was recovering the HRG gear, a gray seal was detected 40 m off the port bow floating stationary. The seal dove and resurfaced 20 m off the starboard beam and dove again. As the vessel continued its course, the seal resurfaced 10 meters off the starboard bow and crossed ahead of the vessel and dove one last time, ending the detection. Since the sources were already inactive and in the process of recovery no mitigation actions were necessary.

On 30 August 2021 at 19:49 UTC, a dark colored animal with a broad head and snout was spotted swimming at the surface 50 m ahead of the vessel. The PSO on duty determined the animal to be a gray seal. The animal was swimming slowly at the surface. The vessel reduced its speed since it wasn't clear if the seal would move or not. Shortly after, the seal proceeded to dive out of sight, 40 m ahead of the vessel at 19:50 and was not seen again. The source was not deployed as the vessel was transiting.

Humpback whale

On 04 December 2021 at 15:15 UTC, a group of three humpback whales was spotted 1000 m off the port bow. The whales were seen surfacing, blowing, and diving with exposed flukes. The animals were traveling perpendicular to and away from the ship`s course at a moderate rate. To ensure the whales would be outside of any mitigation zone, an avoidance maneuver was implemented, and the vessel turned to starboard, altering its course. The group continued their path away from the vessel and dove out of sight 500 m off the port bow. The source was deployed and at full volume while not on a survey line. The group`s closest approach to the active source was 540 m so no mitigation actions were required.

Table 28: Summary of strike avoidance maneuvers undertaken

Vessel	Date	Detection number	Species	Number of animals	CPA Distance (M)	Strike avoidance maneuver
GO Pursuit	2021-08-21	256	Gray seal	1	30	Maintained Vessel Course
GO Liberty	2021-08-30	58	Gray seal	1	125	Vessel Speed Reduction
Fugro Brasilis	2021-12-04	6	Humpback whale	3	540	Altered Vessel Course

7 SUMMARY

7.1 Interpretation of the Results

All the marine mammal and sea turtle species detected during the Mayflower HRG Survey were species that occur commonly in the region and that are regularly observed by PSOs during HRG and other types of survey operations. Each species detected was observed within its predicted range with no species encounters occurring outside of that species normal range.

For all dolphin species, the mean distance at initial detection and at CPA was greater when the regulated sound sources were active but there was insufficient data present to determine whether there were behavior changes observed during most of the marine mammal encounters. No behaviors were documented that suggested adverse impacts had occurred to any protected species encountered as a result of the survey activities undertaken.

Behavior states like bow-riding and swimming toward the vessel that are less subjective and are easily determined in the field by PSOs were exhibited in the expected species like common dolphins and bottlenose dolphins. Whales were sighted exhibiting similarly expected behaviors like blowing and diving.

7.2 Effectiveness of Monitoring and Mitigation

To minimize the potential impacts to marine mammals and sea turtles, PSOs onboard all the survey vessels were prepared to implement mitigation measures whenever protected species were detected approaching, entering, or within the designated exclusion zones. Mitigation actions for regulated sound sources were implemented successfully during 31 detection events. PSOs searched the buffer zones prior to activation of regulated sound sources and survey crew confirmed that applicable zones were clear prior to activating the regulated sound sources, which was then done gradually in ramp-up form wherever possible.

Strike avoidance maneuvering was conducted three times to prevent potential physical interactions between the survey vessels and marine mammals. In each case the maneuvers were executed as necessary- PSOs detected the animals in sufficient time to alert the vessel of the need for maneuvering and maneuvering was carried out successfully to avoid physical impacts to the animals. The implemented actions were maintained vessel course, vessel speed reduction and altered vessel course to maintain separation distances.

If an injured or dead protected species was discovered during the survey program, the lead visual observer determined that the cause of death was unknown or unrelated to the activities of the vessel, and the incident was immediately reported. There were no sightings of injured or dead protected species, during the Mayflower geophysical surveys.

Visual observations yielded a total 200 protected species detections both inside and outside the Lease Area and included marine mammals and sea turtles. It is unlikely that protected species were not detected inside the buffer and exclusion zones since the radii were relatively small and PSOs were equipped with multiple options for monitoring. The environmental conditions present during visual monitoring were generally good for detecting protected species, especially inside the buffer and exclusion zones.

For the Mayflower HRG survey program, a total of 3445 takes were authorized for 13 species/species groups were authorized for takes in the IHA. During the survey program, a total of 420 individual protected species were observed within the predicted Level B harassment radius. This total represents 12% of the authorized Level B takes.

PSOs likely did not detect all animals present; however, it is highly unlikely that the actual number of animals present during survey operations reached anywhere near the fully authorized levels for all

species. The combination of conservative mitigation zones combined with conservative take estimation by NMFS (i.e., the precautionary approach), appears for most species to have resulted in an overestimation of take and of overall impact on marine species from the activity. The monitoring and mitigation measures required by the IHA, and Lease stipulations appear to have been an effective means to protect the marine species encountered during survey operations.

8 LITERATURE CITED

Bureau of Ocean Energy Management (BOEM) Lease OCS-A 0521

Mayflower Wind Addendum to the 2021 Geophysical & Geotechnical Survey Plan (April 8, 2021)

Mayflower Wind 2021 Geophysical & Geotechnical Survey Plan (December 15, 2020; Updated February 12, 2021)

National Marine Fisheries Service (NMFS) Incidental Harassment Authorization 2021 effective 01 July 2021 through 30 June 2022

United States Fish and Wildlife Service (USFWS). 2019. Marine Mammal Protection Act (MMPA). 16 U.S.C.

Appendix A: NMFS 2021 IHA

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

INCIDENTAL HARASSMENT AUTHORIZATION

Mayflower Wind Energy, LLC (Mayflower) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)) to incidentally harass marine mammals, under the following conditions.

1. This incidental harassment authorization (IHA) is effective from July 1, 2021 through June 30, 2022.

2. This IHA authorizes take incidental to marine site characterization surveys in coastal waters of Massachusetts, as specified in Mayflower's IHA application.

3. General Conditions

   (a) A copy of this IHA must be in the possession of Mayflower, the vessel operators, the lead protected species observers (PSO), and any other relevant designees of Mayflower operating under the authority of this IHA.

   (b) The species and/or stocks authorized for taking are listed in Table 1. Authorized take, by Level B harassment only, is limited to the species and numbers listed in Table 1.

   (c) The taking by injury, serious injury, or death of any of the species listed in Table 1 or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.

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

4. Mitigation Requirements

   (a) Mayflower must employ independent, qualified, NMFS-approved PSOs (see section 5 of this IHA) to conduct visual monitoring. When specified acoustic sources (impulsive: boomers and/or sparkers; non-impulsive: non-parametric sub-

bottom profilers) are operating, a minimum of one (1) PSO must be on duty during daylight hours and two (2) PSOs must be on duty during nighttime hours.

(i) Vessels conducting HRG survey activities in very-shallow waters using shallow-draft vessels must have one visual PSO onboard. The vessel captain (or crew member on watch) must conduct observations when the PSO is on required breaks. All vessel crew conducting PSO watches must receive training in monitoring and mitigation requirements and species identification necessary to reliably carry out the mitigation requirements

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

(c) Operational Exclusion Zones – PSOs must establish and monitor marine mammal Exclusion Zones. Distances to Exclusion Zones must be from any acoustic sources, not the distance from the vessel. Exclusion Zones must be as follows:

(i) 500-m Exclusion Zone for North Atlantic right whales for use of impulsive acoustic sources (e.g., boomers and/or sparkers) and non-impulsive, nonparametric sub-bottom profilers; and

(ii) 100-m Exclusion Zone for all other marine mammals for use of impulsive acoustic sources (e.g., boomers and/or sparkers), except for as noted in condition 4(g)(vii) of this IHA

(d) Harassment Zones – PSOs must establish and monitor a 141-m Level B harassment zone during use of acoustic sources used during the survey.

(e) Pre-clearance observation – PSOs must conduct 30 minutes of pre-start clearance observation prior to initiation of HRG survey operations (except as described under condition 4(g)(ix) of this IHA). If a marine mammal is observed entering or within the pre-start clearance zones (described below) during the pre-start clearance period, relevant acoustic sources must not be initiated until the marine mammal(s) is confirmed by visual observation to have exited the relevant zone, or, until an additional time period has elapsed with no further sighting of the animal (15 minutes for small odontocetes and seals and 30 minutes for all other species, see Table 1). The pre-start clearance requirement includes small delphinids that approach the vessel. HRG surveys must not be initiated if:

(i) a North Atlantic right whale is observed within a 500-m radius of impulsive acoustic sources (e.g., boomers and/or sparkers) and non-impulsive, nonparametric sub-bottom profilers during the pre-start clearance period; or

(ii) any other marine mammals are observed within a 100-m radius of impulsive acoustic sources (e.g., boomers and/or sparkers) and non-impulsive, nonparametric sub-bottom profilers during the pre-start clearance period.

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

(i) 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).

(g) Shutdown requirements

(i) If a marine mammal is observed within or entering the relevant Exclusion Zones as described under 4(c) of this IHA while acoustic sources are operational, the acoustic sources must be immediately shut down (except as described in condition 4(g)(vii) of this IHA).

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

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

(iv) The vessel operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source(s) to ensure that shutdown commands are conveyed swiftly, while allowing PSOs to maintain watch.

(v) Upon implementation of a shutdown, survey equipment may be reactivated when all marine mammals that triggered the shutdown have been confirmed by visual observation to have exited the relevant Exclusion Zone or an additional time period has elapsed with no further sighting of the animal that triggered the shutdown (15 minutes for small odontocetes [i.e., species comprising the family Phocoenidae and the species comprising the genera *Delphinus, Lagenorhynchus, Stenella* (*frontalis* only), or *Tursiops*], and seals; 30 minutes for all other marine mammals).

(vi) If acoustic sources are shut down for less than 30 minutes for reasons other than marine mammal mitigation (*e.g.*, due to mechanical or electronic failure) the acoustic sources may be re-activated as soon as is practicable at full operational level if PSOs have maintained constant visual observation during the shutdown and no visual detections of marine mammals occurred within the applicable Exclusion Zone during that time. For a shutdown of 30 minutes or longer, or if visual observation was not continued diligently during the pause, pre-start clearance observation is required, as described in condition 4(e) of this IHA, unless visual observation was continued diligently during the entire pause with no further detections of any marine mammals.

(vii) If delphinids from the genera *Delphinus*, *Lagenorhynchus*, *Stenella* (*frontalis* only), *Tursiops* or seals (Table 1) are visually detected approaching the vessel or towed acoustic sources, shutdown is not required. If there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived), PSOs must use best professional judgment in making the decision to call for a shutdown

(viii) Shutdown of acoustic sources is required upon observation of either a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met, entering or within the Level B harassment zone.

(ix) Shutdown, pre-start clearance, and ramp-up procedures are not required during HRG survey operations using only non-impulsive sources (e.g., USBL and parametric sub-bottom profilers) other than non-parametric sub-bottom profilers (e.g., CHIRPs). Pre-clearance and ramp-up, but not shutdown, are required when using non-impulsive, non-parametric sub-bottom profilers.

(h) Vessel Strike Avoidance – Vessel operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammals. Survey vessel crew members responsible for navigation duties will receive site-specific training on marine mammals sightings/reporting and vessel strike avoidance measures. Vessel strike avoidance measures must include the following, except under circumstances when 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:

(i) 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).

(ii) 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 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;

(iii) All 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;

(iv) 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;

(v) 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.

(vi) 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.

(vii) All vessels must maintain a minimum separation distance of 100 m from sperm whales and all other baleen whales.

(viii) 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).

(ix) 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.

(x) 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.

5. Monitoring Requirements – Mayflower is required to conduct marine mammal visual monitoring during HRG survey activity. Monitoring must be conducted in accordance with the following requirements:

(a) Visual monitoring must be performed by qualified, NMFS-approved PSOs. PSO resumes must be provided to NMFS for review and approval prior to the start of survey activities.

(b) In order to be considered qualified, PSOs must have successfully completed an acceptable PSO training course and/or have demonstrated experience in the role of independent PSO during an HRG survey. 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.

(c) PSOs must be employed by a third-party observer provider, must not have 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). At least one PSO aboard each acoustic source vessel must have a minimum of 90 days at-sea experience working as a PSO during a geophysical survey, with no more than 18 months elapsed since the conclusion of the at-sea experience. This lead PSO must coordinate duty schedules and roles for the PSO team and serve as primary point of contact for the vessel operator. (Note that the responsibility of coordinating duty schedules and roles may instead be assigned to a shore-based, third-party monitoring coordinator). To the maximum extent practicable, the lead PSO must devise the duty schedule such that experienced PSOs are on duty with those PSOs with appropriate training but who have not yet gained relevant experience.

(d) PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts.

(e) 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.

(f) In cases where multiple vessels are surveying concurrently, any observations of marine mammals must be communicated to PSOs on all active survey vessels.

(g) PSOs must be equipped with binoculars and have the ability to estimate distances to marine mammals located in proximity to the vessel and/or Exclusion Zones. Reticulated binoculars must be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine species.

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

(i) Mayflower must consult NMFS North Atlantic right whale reporting system and Whale Alert, as able, for the presence of NARWs 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 per the lease conditions.

(j) Visual PSOs must conduct observations in the following circumstances (in addition to those described in condition 4(b) of this IHA):

(i) During good conditions (e.g., daylight hours; Beaufort sea state 3 or less) and no acoustic sources are operating, for comparison of sighting rates and behavior with and without use of the specified acoustic sources and between acquisition periods (to the maximum extent practicable); and

(ii) During all daylight hours, when any acoustic sources are active (in addition to those specified in condition 4(a) of this IHA).

(k) Night-vision equipment (*i.e.*, night-vision goggles and/or infrared technology) must be available for use during nighttime monitoring.

(l) Any observations of marine mammals by crew members aboard any vessel associated with the survey must be relayed to the PSO team.

(m) In cases when pre-clearance has begun in conditions with good visibility, including via the use of night-vision equipment, and the lead PSO has determined that the pre-start clearance zones (as described in condition 4(e) of this IHA) are clear of marine mammals, survey operations may commence (i.e., no delay is required) despite brief periods of inclement weather and/or loss of daylight. In cases where Exclusion Zones (as described in condition 4(c) of this IHA) become obscured for brief periods due to inclement weather, survey operations may continue (i.e., no shutdown is required).

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

(i) PSO names and affiliations

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

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

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

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

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

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

(viii) Survey activity information, such as 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.)

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

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

(B) PSO who sighted the animal;

(C) Time of sighting;

(D) Vessel location at time of sighting;

(E) Water depth;

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

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

(H) Pace of the animal;

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

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

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

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

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

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

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

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

6. Reporting – Mayflower is required to report to NMFS in accordance with the following requirements:

(a) A final technical monitoring report must be provided to NMFS within 90 days after completion of survey activities or expiration of this IHA, whichever comes sooner. The report must fully document the methods and monitoring protocols, summarize the data recorded during monitoring, describe, assess, and compare the effectiveness of monitoring and mitigation measures. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS. PSO datasheets or raw sightings data must also be provided with the draft and final monitoring report.

(b) Reporting sightings of North Atlantic right whales:

(i) 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.

(c) Reporting injured or dead marine mammals:

(i) In the event that personnel involved in the survey activities covered by the authorization discover an injured or dead marine mammal, Mayflower must report to the NMFS New England/Mid-Atlantic Regional Stranding Coordinator by phone (866-755-6622) or by email (*nmfs.gar.stranding@noaa.gov*) as soon as feasible. The report must include the following information:

(A) Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

(B) Species identification (if known) or description of the animal(s) involved;

(C) Condition of the animal(s) (including carcass condition if the animal is dead);

(D) Observed behaviors of the animal(s), if alive;

(E) If available, photographs or video footage of the animal(s); and

(F) General circumstances under which the animal was discovered.

(ii) In the event of a vessel strike of a marine mammal by any vessel involved in the activities covered by the authorization, Mayflower must report the incident to the NMFS New England/Mid-Atlantic Regional Stranding Coordinator (866- 755-6622) and NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*) as soon as feasible. The report must include the following information:

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

(B) Species identification (if known) or description of the animal(s) involved;

(C) Vessel’s speed during and leading up to the incident;

(D) Vessel's course/heading and what operations were being conducted (if applicable);

(E) Status of all sound sources in use;

(F) 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;

(G) Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;

(H) Estimated size and length of animal that was struck;

(I) Description of the behavior of the marine mammal immediately preceding and following the strike;

(J) If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;

(K) 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

(L) To the extent practicable, photographs or video footage of the animal(s).

7. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein (including, but not limited to, failure to comply with monitoring or reporting requirements), or if NMFS determines: 1) the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals, or 2) the prescribed measures are likely not or are not effecting the least practicable adverse impact on the affected species or stocks and their habitat.

8. Renewals – On a case-by-case basis, NMFS may issue a one time, one-year Renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical, or nearly identical, activities are planned or (2) the specified activities would not be completed by the time this IHA expires and a Renewal would allow for completion of the activities, provided all of the following conditions are met:

(a) A request for renewal is received no later than 60 days prior to the needed Renewal IHA effective date (the Renewal IHA expiration date cannot extend beyond one year from expiration of this IHA).

(b) The request for renewal must include the following:

(i) An explanation that the activities to be conducted under the requested Renewal IHA are identical to the activities analyzed for this IHA, are a subset of the activities, or include changes so minor 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).

(ii) 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.

(c) 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 made in support of this IHA remain valid.

SOMMA.ANGELA.1365825358 Digitally signed by SOMMA.ANGELA.1365825358 Date: 2021.06.30 14:03:11 -04'00'

Catherine Marzin,
Acting Director, Office of Protected Resources
National Marine Fisheries Service

Date

Table 1. Number of Incidental Take of Marine Mammals Authorized

Common Name	Genus / Species	Marine Mammal Category as it Applies to Mitigation Requirements in the IHA	Authorized Takes by Level B Harassment
Fin whale	*Balaenoptera physalus*	Large whale	6
Sei whale	*Balaenoptera borealis*	Large whale	6
Minke whale	*Balaenoptera acutorostrata*	Large whale	14
Humpback whale	*Megaptera novaeangliae*	Large whale	33
North Atlantic right whale	*Eubalaena glacialis*	North Atlantic right whale	9
Sperm whale	*Physeter macrocephalus*	Large whale	6
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Small odontocete	57
Common bottlenose dolphin	*Tursiops truncatus*	Small odontocete	536
Pilot whales	*Globicephala spp*	Large odontocete	27
Risso's dolphin	*Grampus griseus*	Small odontocete	18
Common dolphin	*Delphinus delphis*	Small odontocete	1,969
Harbor porpoise	*Phocoena phocoena*	Small odontocete	46
Seals (harbor/gray)	*Phoca vitulina/Halichoerus grypus*	Seal	718

Appendix B: 2021 Survey Environmental Management Plan

MAYFLOWER WIND OCS-A 0521 FUGRO

Environmental Management Plan: Marine Mammals and Sea Turtles Monitoring, Mitigation, and Reporting

Geophysical Survey 2021

Version 6
July 7, 2021

rpsgroup.com

MAYFLOWER WIND OCS-A 0521 FUGRO

Environmental Management Plan: Marine Mammals and Sea Turtles Monitoring, Mitigation, and Reporting

With reference to BOEM Lease OCS-A 0521 and Incidental Harassment Authorization and BOEM NTL 2016 – G01, including Alternative Monitoring Plan.

Revision		
Date	**Version**	**Revision made**
25 Jan 2021	1	Draft issued to Fugro for review. Changes include updated IHA information, watch requirements and equipment matrix
04 Feb 2021	2	Draft issued for review. Changes include removal of PAM requirement, add List of acronyms and updated comments
09 Feb 2021	3	Draft issued for review. Changes include Reticle binocular clarification and updated comments
12 Feb 2021	4	Draft issued for review. Changes include updated corrections and comments
09 Apr 2021	5	Updated start of survey IHA information.
07 Jul 2021	6	Updated NMFS IHA; Updated SBP requirements. Updated BZ and EZ: Updated voluntary approach species

Approval for issue		
Stephanie Milne		7 July 2021

Contents

List of Acronyms

BOEM – Bureau of Ocean Energy Management

BZ – Buffer zone

DMA – Dynamic Management Area

DSLR – Digital Single Lens Reflex

EMP- Environmental Management Plan

EZ – Exclusion zone

ESA - Endangered Species Act

G&G – Geophysical and geotechnical

HRG- High resolution geophysical

IHA- Incidental Harassment Authorization

IR- Infrared

kHz- Kilohertz

km - Kilometer

LF – Low Frequency

MBES – Multibeam Echo Sounder

MMPA – Marine Mammal Protection Act

NARW – North Atlantic Right Whale

m - Meter

NMFS- National Marine Fisheries Service

NOAA- National Oceanographic and Atmospheric Administration

NVD- Night-vision device

OCS – Outer Continental Shelf

PSO – Protected Species Observer

SBP – Sub Bottom Profiler

SSS – Side Scan Sonar

USBL – Ultra Short Baseline

1 INTRODUCTION

National Oceanic and Atmospheric Administration (NOAA) and Bureau of Ocean Energy Management (BOEM) have advised that sound-producing survey equipment operating below 200 kilohertz (kHz) has the potential to cause acoustic harassment to marine species, in particular marine mammals. RPS has prepared this Environmental Management Plan (EMP) based on consultations between Mayflower, BOEM and National Marine Fisheries Service (NMFS) regarding how to mitigate the potential for take or to conduct activities in a manner that no take of marine species occurs.

1.1 Applicable Regulatory Documents and Permits

BOEM Lease OCS-A 0521 contains monitoring and mitigation requirements that apply to marine mammals, marine turtles, and other protected species.

The vessels conducting geophysical operations with equipment below 200 kHz will operate under Mayflower's OCS-A 0521 lease stipulations and modifications approved by BOEM. This document outlines the monitoring and mitigation procedures that will be applied during survey activities.

NMFS issued an Incidental Harassment Authorization (IHA) July 01, 2021. This IHA is valid through June 30, 2022.

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2 MARINE PROTECTED SPECIES

Marine protected species or protected species refers to any marine species for which dedicated monitoring and mitigation procedures will be implemented, including:

- All marine mammals (whales, dolphins, seals, porpoise)
- Sea turtles

3 PROTECTED SPECIES OBSERVERS AND PASSIVE ACOUSTIC MONITORING OPERATORS

3.1 Staffing Plan

A team of Protected Species Observers (PSOs) supplied by RPS will be on board survey vessels with equipment operating below 200 kHz to undertake monitoring watches, implement mitigation and conduct data collection and reporting in accordance with this EMP plan, the BOEM OCS-A 0521 lease conditions, and the Mayflower IHA.

3.2 Roles and Responsibilities

PSO

- Visually monitor, detect, and identify protected species and determine distance to source
- Record and report marine mammal sightings, survey activities and environmental conditions according to survey plan
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the survey plan
- Communicate with the crew to implement mitigation actions as required by environmental protocols
- Participate in daily operation meeting with crew when appropriate

3.3 PSO Requirements

All PSOs will have completed a PSO training program for G&G surveys. Evidence of the latest training will be provided to BOEM prior to commencement of PSO activities on the survey vessels. PSOs will have relevant observation experience in the Atlantic or Gulf of Mexico as required to be approved by NMFS as a PSO.

4 MONITORING EQUIPMENT

4.1 Visual Monitoring Equipment

4.1.1 Day-time monitoring equipment

During daylight work, the PSO on duty will monitor for marine protected species using the naked eye and hand-held reticle binoculars. Digital single-lens reflex (DSLR) camera equipment will be provided to record sightings and verify species identification that is required by the PSOs in notebooks and transferred to a digital form at the earliest break.

4.1.2 Night-time monitoring equipment

During night-time work, the PSOs on duty will monitor for marine protected species using Morovision PVS-7 Gen 3 PINNACLE night vision goggles (NVDs) with a thermal acquisition clip-on system or forward-looking infrared (IR) monocle, so PSOs can focus observations in any direction.

RPS has used this equipment on multiple OCS wind projects and has successfully collected data meeting required detection distances for various species groups. Using this equipment, sea turtles have been detected at distances of up to 150 meters and delphinids at distances up to 250 meters.

Note that night-time monitoring equipment will only be utilized on the vessels conducting 24-hour operations.

4.1.3 Distance estimation and calibration of visual monitoring equipment

Reticle binoculars have the capability to find the distance from the vessel to detected animals.

Reticle binoculars will be calibrated when possible throughout the duration of the survey using the vessel radar, by comparing estimated distances to known distances and will be conducted during varying sea states and both at night and during the day. Calibration requires a clear view of the horizon and cannot be calibrated if the vessel is surrounded by land or reduced visibility.

At night, if reticles cannot be used to localize a detection, distance to detected animals will be determined using range finder sticks or by comparing the location of the animal to known distances, such as the length of the vessel.

5 VISUAL MONITORING PROCEDURES

5.1 Visual Monitoring Watches

PSOs will conduct visual watches during operations, as described below.

24-Hour Operations Vessels:

- One PSO will be on watch at all times during transit, day, or night.
- One PSO will be on watch at all times during daylight source operations.
- Two PSOs will be on watch at all times during nighttime source operations.

Day-light only Operations Vessels (Nearshore):

- One PSO will be on watch at all times during transit to and from port.
- One PSO will be on watch at all times during daylight source operations.
- Trained vessel crewmember will conduct strike avoidance measures as required during transits.

Day-light only Operations Vessels (Ultra Shallow):

- One PSO will be provided to monitor during transit to and from port as well as during daylight source operations.
- A trained crew member will be on watch to supplement and accommodate the watch schedule requirements during transit to and from port as well as during daylight source operations.

The following guidelines will apply to these watch periods:

- Other than brief alerts to bridge personnel of maritime hazards and the collection of ancillary wildlife data, no additional duties may be assigned to the PSO during his/her visual observation watch
- No PSO will be allowed more than four consecutive hours on watch as a visual observer before being allocated a two-hour break from visual monitoring
- No PSO will be assigned a combined watch schedule of more than 12 hours in a 24-hour period

The PSOs will stand watch in a suitable location that will not interfere with the navigation or operation of the vessel and affords an optimal view of the sea surface. PSOs will maintain 360° coverage surrounding the EZs of the vessel.

If a protected species is observed, the PSO should first take care of any necessary mitigation actions, or if no mitigation actions are required, they will note and monitor the position (including latitude/longitude of the vessel and relative bearing and estimated range to the animal) until the animal dives or moves out of visual range of the observer.

5.2 Alternative Monitoring Plan

5.2.1 Monitoring During Day-time Reduced Visibility

If visibility is reduced (full exclusion zones are not visible) during daytime, night monitoring equipment (NVDs and thermal IR add on equipment clip on or monocle) will be available to use to augment monitoring. No additional PSOs will be deployed to augment monitoring

If visibility is completely obscured, operations will be suspended until visibility increases.

5.2.2 Monitoring During Night-time

Mayflower will be operating all geophysical equipment at night. During the night-time geophysical operations, PSOs will be supplemented with night vision technology (described above) to monitor the exclusion zones.

6 MITIGATION PROCEDURES: STRIKE AVOIDANCE

6.1 Vessel Speed Restriction

PSOs will monitor the following NMFS' NARW (North Atlantic Right Whale) reporting systems daily for the presence of NARWs and for the establishment of Dynamic Management Areas (DMAs):

- Whale Alert
- NOAA
  https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales
  https://www.fisheries.noaa.gov/resource/map/north-atlantic-right-whale-sightings

Vessel speed will be restricted to 10 knots or less inside any established DMA.

Vessels will be operated in accordance with the following Mayflower Wind Lease Requirements, including that vessels 19.8 meters (m) (65 feet [ft]) in length or greater that operate between November 1 through July 31, operate at speeds of 10 knots (11.5 mph) or less.

6.2 Separation Distances

6.2.1 North Atlantic Right Whale

All survey vessels will maintain a separation distance of 500 meters or greater from any sighted NARW.

- If underway, steer a course away from any sighted NARW at 10 knots until the separation distance is achieved.
- If sighted within 100 meters to underway vessel, reduce speed and shift the engine to neutral until the NARW has moved beyond 100 meters and out of path, then re-engage engines and steer away at 10 knots.

6.2.2 Non-delphinoid Cetaceans (Baleen whales, Beaked whales, Sperm whales)

All vessels will maintain a separation distance of 100 meters or greater from any sighted non-delphinoid (i.e., mysticetes and sperm whales) cetacean, OR large assemblages of delphinoid cetaceans

- If sighted within 100 meters to underway vessel, reduce speed and shift the engine to neutral until the animal has moved beyond 100 meters

6.2.3 Small Cetaceans (Dolphins and Porpoises), Seal, Sea Turtles, and Giant Manta Rays

All vessels will maintain a separation distance of 50 meters or greater from any sighted small cetaceans (dolphins and porpoise), pinniped, sea turtle, or giant manta ray

- Underway vessel will remain parallel to a sighted delphinoid cetacean's or pinnipeds course whenever possible, avoiding speed or direction changes until the animal has moved beyond 50 meters
- Reduce vessel speed to 10 knots or less when pods (including mother/calf pairs) or large assemblages are observed
- Do not make abrupt changes to vessel course or speed

7 MITIGATION PROCEDURES: SOUND EXPOSURE MITIGATION

7.1 Survey Equipment Subject to Monitoring and Mitigation Procedures

All of the survey equipment that produces sound below 200kHz is subject to the following monitoring and mitigation protocols with the exception of the USBL, which is considered a navigational device and not a survey sound source for the purpose of mitigation.

Equipment	Frequency Range	Subject to monitoring and mitigation requirements
Medium Penetrating Dual Seismic Sparker (Sparker)	1 Hz – 10 kHz	Yes
High Resolution Subbottom Profiler (SBP) – Parametric SBP	8 – 10 kHz	No
USBL	21 – 31 kHz	No
Side Scan Sonar (SSS)	300 / 600 kHz	No
Multibeam Echo Sounder (MBES)	200 – 400 kHz	No

7.2 Buffer Zones and Exclusion Zones for LF Sound Source Operations

Two types of zones will be established for this survey. Note that Buffer Zones and Exclusion Zones described below for the purposes of sound exposure mitigation are established around the survey equipment and not around the vessel itself.

7.2.1 Buffer Zones (BZ)

This is applicable during the clearance search periods conducted prior to initiating the Sparker from silence, where detections of a protected species inside the applicable BZ during the search will result in a delay.

- 500 meters: North-Atlantic right whales
- 100 meters: All other marine mammals with no exception to voluntarily approaching delphinids and sea turtles

7.2.2 Exclusion Zones (EZ)

Anytime a protected species is sighted within the applicable exclusion zone (EZ) the PSO will call for an immediate shutdown of the survey equipment. However, HRG survey equipment may continue to operate if delphinids or pinnipeds voluntarily approach the vessel (e.g. to bow ride) when the sound sources are at full operating power.

- 500 meters: North-Atlantic right whales (both Sparker and SBP shutdown)
- 100 meters: All other marine mammals with the exception of voluntarily approaching delphinids and pinnipeds as described in Section 7.7 (Sparker only shutdown)
- 100 meters: Sea turtles (both Sparker and SBP shutdown)

- **141 m:** Level B harassment zone for marine mammals*.
  ***Shutdowns are required at this distance for marine mammals where take has not been granted or where the authorized takes have been met.

7.3 Visual Search Periods

To activate any other equipment operating below 200kHz from silence, a minimum of a 30-minute search period must be conducted for marine mammals and a 60-minute search period must be conducted for sea turtles. This only applies to activation of the sparker. Fugro is operating a parametric SBP.

During the daytime and nighttime, the search must be conducted visually by the PSO on watch.

Note that visual observations for all marine protected species will extend to the furthest observable distances even though the above EZs around the sound sources will apply.

7.4 Delays to Initiation of the <200kHz Sound Sources

If any marine mammal or sea turtle was detected visually inside its respective BZ during the 30-minute and 60-minute respective search periods, initiation of the sound sources operating below 200kHz must be delayed until:

- **All** marine protected species that were observed inside the relevant BZ have been confirmed by the visual observer to have been exiting the relevant BZ
  OR
- when a marine protected species was not observed exiting the BZ, an additional time period has elapsed with no further sightings of the animal within the relevant BZ:
  - **15 minutes** for odontocetes and seals
  - **30 minutes** for all other marine mammals
  - **60 minutes** for sea turtles

Both the 30-minute and 60-minute pre-clearance search periods and the mandatory delay for animals not seen exiting the exclusion zone must be completed before source initiation.

During the day, if at any point during the 30- and 60-minute search periods, the full BZs were not completely visible, then:

1. Initiation of the source must be delayed until the full BZ has been visible for the full 30- (marine mammals) and 60-minute (sea turtles) clearance searches.

To summarize, in order to activate the sub-200 kHz source(s) on a vessel, the BZs around the vessel's source must have remained completely visible and clear of marine mammals and sea turtles for the durations described above.

7.5 Ramp Up (Soft Start) Procedure

Ramp-up or soft-start procedures will be conducted, where feasible, by initiating the smaller equipment sound sources first followed by the equipment producing larger sound levels.

7.6 Short Breaks in HRG Source Operations

In recognition of occasional short periods of silence for a variety of reasons other than for mitigation, the <200kHz sound sources may be silenced for periods of time not exceeding 30 minutes in duration and may be restarted for operations if:

1. Visual monitoring by PSO is continued diligently through the silent period (during visual surveys, the EZ must remain visible throughout the silent period)
   AND
2. No marine protected species are observed in the EZ.

7.7 Shut Down Procedures

If any marine protected species is sighted at or within its EZ, an immediate shutdown of the survey equipment operating below 200kHz is required.

- If a North Atlantic Right Whale is observed in its 500 m EZ, a shutdown of both the SBP and Sparker is required.
- If a any species of sea turtle is observed in its 100 m EZ, a shutdown of both the SBP and Sparker is required.
- Any other marine mammal with the exception of voluntarily approaching delphinids and pinnipeds in their 100 m EZ, a shutdown of just the Sparker is required.

An exception will apply to shutdown procedures for some delphinid species and some pinniped species that are observed voluntarily approaching the vessel where the following requirements apply:

- The exception applies only to delphinids in the genera Delphinus, Lagenorhynchus, *Stenela (frontalis* only) or Tursiops
- The exception applies only to gray seals or harbor seals
- If there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the genera for which shutdown is waived), PSOs must use best professional judgment in making the decision to call for a shutdown.
- If delphinids from the shut-down exempt genera are observed within or entering the EZ but do not voluntarily approach the vessel or towed survey equipment, shutdown is required
- The determination of whether the animal has "voluntarily" approached will be made by the PSO on watch.
- Shutdowns are required for marine mammals where take has not been granted or where the authorized takes have been met even if those species fall into the exemption genera

7.7.1 Resuming Sound Source Operations Following a Shut down

The vessel operator must comply immediately with any shut-down request made by a PSO. Any discussion can occur only after the shutdown has been implemented.

Subsequent restart of the survey equipment may only occur following clearance of the EZ of all marine protected species under the following conditions:

- When all marine protected species have been confirmed by the visual observer to have been seen exiting the relevant EZ

  OR

- When an animal was not observed exiting the EZ, and additional time period has elapsed with no further sightings of the animal within the relevant EZ:
  - **15 minutes** for odontocetes and seals
  - **30 minutes** for all other marine mammals
  - **60 minutes** for sea turtles

8 REPORTING

8.1 Data Forms

PSOs will utilize standardized data forms that have been provided to, and approved by, BOEM and NMFS. These forms will contain, at minimum, all of the data elements listed below, and data will be recorded in the field daily.

- Vessel name;
- Observers' names and affiliations;
- Date and location of survey operations;
- Time and latitude/longitude when daily visual survey began;
- Time and latitude/longitude when daily visual survey ended;
- Average environmental conditions during visual surveys, including
  - Wind speed and direction;
  - Sea state (glassy, slight, choppy, rough, or Beaufort scale, tidal state);
  - Swell (low, medium, high, or swell height in meters); and
  - Weather conditions (i.e., percent cloud cover, visibility, percent glare); and
  - Overall visibility (poor, moderate, good);
- Species (or identification to lowest possible taxonomic level, sex, age, classification [if known], numbers);
- Certainty of identification (sure, most likely, best guess);
- Total number of animals;
- Number of juveniles;
- Time and location (i.e., distance from sound source) of observation;
- Description (as many distinguishing features as possible of each individual seen, including length, shape, color and pattern, scars or marks, shape and size of dorsal fin, shape of head, and blow characteristics);
- Direction of animal's travel – related to the vessel (drawing preferably);

- Reaction of the animal(s) to relevant sound source (if any) and behavior - as explicit and detailed as possible; note any observed changes in behavior (e.g., avoidance, approach) including bearing and direction of travel; and
- Activity of vessel when sighting occurred.

8.2 Reporting Observed Impacts to Protected Species

It will be the responsibility of the Lead PSO / Environmental Team Lead on duty to report any impacts to an ESA (Endangered Species Act) species to NMFS, BOEM and the RPS Project Manager as soon as practicably possible but no more than 48 hours of any observations concerning impacts to ESA listed species and no more than 24 hours of the take of any ESA listed species.

The RPS Project Manager will send reports to:

On-board:
- Fugro Onboard Party Chief
- Client Representative

On-shore:
- Fugro Project Manager
- Mayflower Offshore Permitting Manager
- Mayflower Geophysical Project Manager

8.3 Injured or Dead Protected Species Reporting

1. The PSO on watch will report the sightings of a dead and/or injured marine species to the Lead PSO / Environmental Team Lead, RPS project manager, on board client representative and Fugro Party Chief.
2. The Lead PSO / Environmental Team Lead will report any observed injury or mortality in accordance with NMFS standard reporting guidelines, as well as to the stranding hotline for BOEM and NMFS coordination of proper response. The RPS office will also assist as necessary to contact the stranding hotline. This will occur as soon as practicably possible but no more than 24 hours of the detection
3. A report will be sent to RPS on the first break following the observation.
4. The RPS office will submit the report, which will include details of the BOEM and NMFS notifications, to the following distribution list within 12 hours of the detection:

   On-board:
   - Fugro Onboard Party Chief
   - Client Representative

   On-shore:
   - Fugro Project Manager
   - Mayflower Offshore Permitting Manager
   - Mayflower Project Manager

It will be the responsibility of the designated Mayflower representative to provide the report to NOAA and BOEM.

Unless otherwise directed by BOEM, NOAA Fisheries, or NOAA, the dead or injured marine mammal or sea turtle SHOULD NOT be touched! Dead and injured marine mammals and sea turtles are still protected by the ESA and the MMPA (Marine Mammal Protection Act) and touching the animals in any manner is considered harassment and is punishable by law.

8.4 Daily Progress Report

A daily report will be completed and submitted to the Fugro Party chief, onboard client representative, RPS project manager, Mayflower Geophysical Project Manager and Mayflower Offshore Permitting Manager. This will include an operational and detection summary. If there were no detections that day, the Lead PSO will email the distribution list noting that there were no detections on that day.

8.5 Final Report

The PSO team will develop a final report summarizing the HRG survey activities and all

PSO observations. The RPS Project Manager will provide the finalized report to the Fugro Project Manager, Mayflower Geophysical Project Manager, and the Mayflower Offshore Permitting Manager within 30 days of project completion for review.

The Mayflower Offshore Permitting Manager will submit the final report to BOEM and to NMFS.

Appendix C: Survey Vessel Photos

Figure 1: ***GO Liberty***

Figure 2: ***Westerly***

Figure 3: ***GO Pursuit***

Figure 4: ***Fugro Brasilis***

Appendix D: Protected Species Observers

GO Liberty
Francis Smith
Jordan Boliver
Fernando Jaimes
Stefan Ramudit

Westerly
Diana Maldonado
Laura Bluth
Marah Garcia

GO Pursuit
Malcolm Cowan
Heber Huizar
Fernando Jaimes
Sara Amozurrutia
Vanessa Blair-Glantz
Henry Lewis
Michael Morse
Arek Barkaszi
Cameron Snell
Robert Austin McGowan
Sam Scherck
Alexander Vest
Jason Herr
Romario Mike

Fugro Brasilis
Victoria Garcia
John Fisher
Heather Brock
Elsy Olivares

Appendix E: Reticle Binocular Calibration Table

Vessel	Date	Observer Name	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)	Wind Force (knots)	Swell (m)
GO Liberty	2021-07-10	Francis Smith	575	500	2	11	<2
GO Liberty	2021-07-16	Francis Smith	500	450	2	11	<2
GO Liberty	2021-07-22	Francis Smith	406	470	3	17	<2
GO Liberty	2021-07-27	Francis Smith	630	661	2	6	<2
GO Liberty	2021-08-07	Francis Smith	450	402	2	11	<2
GO Liberty	2021-08-12	Francis Smith	337	377	3	15	<2
GO Liberty	2021-08-21	Francis Smith	406	402	2	11	<2
GO Liberty	2021-8-28	Francis Smith	700	644	3	15	<2
GO Liberty	2021-09-04	Francis Smith	609	545	3	9	<2
GO Pursuit	2021-07-22	Heber Huizar	1870	1207	2	1	<2
GO Pursuit	2021-08-26	Sam Scherck	425	400	2	14	2
GO Pursuit	2021-09-04	Sam Scherck	800	775	2	12	1
GO Pursuit	2021-12-03	Alex Vest	800	852	2	14	<2

Vessel	Date	Observer Name	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)	Wind Force (knots)	Swell (m)
GO Pursuit	2021-12-06	Alex Vest	1200	1207	4	27	<2
GO Pursuit	2021-12-13	Sara Amozurrutia	1524	1371	3	20	<2
Westerly	07-July-21	Diana Maldonado	1565	1505	2	9	<2
Westerly	2021-07-12	Diana Maldonado	495	510	2	6	<2
Westerly	2021-07-19	Diana Maldonado	183	200	3	11	<2
Westerly	2021-07-26	Diana Maldonado	1803	1891	3	9	<2
Westerly	2021-08-02	Diana Maldonado	790	815	1	4	<2
Westerly	2021-08-09	Diana Maldonado	650	675	2	5	<2
Westerly	2021-08-16	Diana Maldonado	500	512	2	3	<2
Westerly	2021-08-24	Diana Maldonado	357	379	3	6	<2
Westerly	2021-08-30	Diana Maldonado	860	878	2	6	<2
Westerly	2021-09-10	Marah Garcia Vital	578	520	2	8	<2
Brasilis	2021-12-01	Victoria Garcia	2386	1944	5	20	2

Vessel	Date	Observer Name	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)	Wind Force (knots)	Swell (m)
Brasilis	2021-12-05	Victoria Garcia	477	370	2	3	<2
Brasilis	2021-12-07	John Fisher	326	356	2	17	<2

Appendix F: Night Monitoring Equipment Specifications

Night Monitoring Equipment Specifications

Night monitoring watches will be conducted with night vision goggles with head mounts and thermal clip-ons. Regular night vision binoculars work by enhancing the disponible light to allow a brighter image with the use of phosphor screen. The PVS-7D night vision goggles (Figure 1) withstand water immersion and runs on two AA batteries for more than 40 hours. Also provided were three pairs of batteries and a batteries charger with the equipment.

Figure 1: Night vision goggles with thermal clip.

The thermal clip on the night vision binocular enabled the capture of infrared light, which provided thermal imaging. The handheld forward-looking infrared (FLIR) system may also be provided (Figure 2). This allows a bit more flexibility with the IR detached from the headpiece.

Figure 2: Handheld thermal FLIR

Night Monitoring Equipment Specifications

Night Vision Goggle Technical Specifications

- Generation: 3 U.S.
- Resolution: 64 lp/mm (Min)
- Film: Thin-filmed
- Magnification: 1x
- Field of View: 40º
- Objective Lens: 25mm f/1.2
- Eyepiece Lens EFL: 26 mm
- Diopter Adjustment: +2 to -6
- Interpupillary Adjustment: 55 to 71 mm
- Range of Focus: 20cm to infinity
- Battery Type: Two (2) AA batteries
- Weight w/batteries: 24 oz / 680 grams
- Dimensions: 6 3/8”(L) x 6”(W) x 3”(H)
- Operating Temperature: -51°C to +52° C
- Weather Resistant: Yes
- IR Illuminator: Yes (built in)

Thermal Acquisition Clip-On Technical Specifications

- Field of View: 20° circular (centered)
- Magnification: 1X, optical unity
- Sensor: 320 x 240 Vox uncooled LWIR microbolometer
- Display Brightness: Adjustable
- Polarity: White hot/black hot
- Calibration: Manual
- Range: Detection – 300m, Recognition – 260m
- Compatibility: PVS-7
- Interface: Standard quick connect
- Battery Type: CR123, 3V lithium
- Battery Life: >3.0 hours (23°C), 2.5 hours (0°C)
- Dimensions: 38 x 64 x 89 mm (W x H x L)
- Weight: 166g with battery

Forward–looking Infrared (FLIR) Monocular Technical Specifications

- Dimensions: 5.5”(L) x 2.7”(W) x 1.9”(H)
- Weight: 0.46 pounds
- Detector Type: 320 x 256 V0x Microbolometer
- FOV: 24° x 19° (NTSC)
- Refresh Rate: 60 Hz
- Video Output: Digital Video
- Optical Magnification: 1x
- Display: Quad-VGA (1280 x 960) FLCOS
- Battery Type: One CR123A 3V Lithium Battery
- USB Power: 5 VDC

Appendix G: Mitigation Flow Chart

Exclusion Zones and Clearance Times for HRG Surveys

Exclusion Zones

NO TAKE PERMITTED

SHUT DOWN SURVEY EQUIPMENT IMMEDIATELY IF A MARINE MAMMAL OR SEA TURTLE IS SEEN ENTERING THE EZ

North Atlantic right whales
- 500 m EZ

Sea turtles
- 200 m EZ

Fin whales
Sperm whales
Blue whales
Humpback whales
Minke whales
Sei whales
- 100 m EZ

All other cetaceans
Seals
- 86 m EZ

Ramp up Procedures and Initial Clearance Times

60 minutes — Ramp up only after EZ is clear for 60 minutes (all species). Clock starts for sea turtles when they are seen leaving the EZ.

Incursion Clearance Times

BOEM Waiver Approved?

Yes

Re-start and ramp up only after EZs are clear for:

- **15 minutes** — Dolphins, Harbor porpoise, Seals — For delphinoid cetaceans or pinnipeds, restart and ramp up only after 1) EZ is clear of delphinoid cetaceans and pinnipeds OR 2) PSO determines after 10 minutes that delphinoid cetaceans and pinnipeds are voluntarily approaching to bow-ride or chase equipment.
- **30 minutes** — North Atlantic Right whales, Humpback whales, Fin whales, Minke whales, Sperm whales (and all other cetaceans)
- **60 minutes** — Sea turtles — If a shutdown occurs for a sea turtle, and that sea turtle is seen exiting the exclusion zone, ramping up may take place once the EZ is clear.

No

- **60 minutes** — All Species

If the HRG sound source shuts down for > 20 minutes, the EZ must be clear of all marine mammals and sea turtles for at least 60 minutes before equipment is ramped up. If the HRG sound source shuts down for < 20 minutes, equipment may be ramped up as soon as practicable as long as PSOs observe the EZ and it remains clear of marine mammals and sea turtles.

If PSOs do not visually observe the exclusion zone during a shutdown of < 20 minutes, the exclusion zone must be clear of all marine mammals and sea turtles for at least 60 minutes before equipment is ramped up.

When technically feasible, ramp up HRG equipment at start or re-start of survey, begin with smallest and lowest power and increase so that source level rises in steps not exceeding 6 dB per 5-minute period.

Appendix H: Excel Data Sheets of Monitoring Effort, Source Operations and Detections of Protected Species During the Survey

Appendix I: Photographs of Identified Protected Species Visually Detected During the Survey

Figure 1: GO Liberty - Visual Detection 27 - Fin whale - 18 July 2021

Figure 2: GO Liberty - Visual Detection 27 - Fin whale - 18 July 2021

Figure 3: GO Liberty - Visual Detection 29 - Humpback whale - 18 July 2021

Figure 4: GO Liberty - Visual Detection 29 - Humpback whale - 18 July 2021

Figure 5: GO Liberty - Visual Detection 39 - Common dolphin - 22 July 2021

Figure 6: GO Liberty - Visual Detection 40 - Common dolphins - 22 July 2021

Figure 7: GO Liberty - Visual Detection 42 - Bottlenose dolphins - 29 July 2021

Figure 8: GO Liberty - Visual Detection 43 - Bottlenose dolphins - 02 August 2021

Figure 9: GO Liberty - Visual Detection 46 - Common dolphins - 19 August 2021

Figure 10: GO Liberty - Visual Detection 54 - Minke whale - 25 August 2021

Figure 11: GO Liberty - Visual Detection 63 - Bottlenose dolphins - 03 September 2021

Figure 12: GO Pursuit - Visual Detection 130 - Common dolphins - 11 July 2021

Figure 13: GO Pursuit - Visual Detection 133 - Common dolphins - 14 July 2021

Figure 14: GO Pursuit - Visual Detection 138 - Common dolphins - 19 July 2021

Figure 15: GO Pursuit - Visual Detection 139 - Bottlenose dolphins - 22 July 2021

Figure 16: GO Pursuit - Visual Detection 144 - Common dolphins - 23 July 2021

Figure 17: GO Pursuit - Visual Detection 144 - Common dolphins - 23 July 2021

Figure 18: GO Pursuit - Visual Detection 153 - Common dolphin - 27 July 2021

Figure 19: GO Pursuit - Visual Detection 159 - Loggerhead sea turtle - 28 July 2021

Figure 20: GO Pursuit - Visual Detection 164 - Common dolphin - 28 July 2021

Figure 21: GO Pursuit - Visual Detection 165 - Common dolphin - 28 July 2021

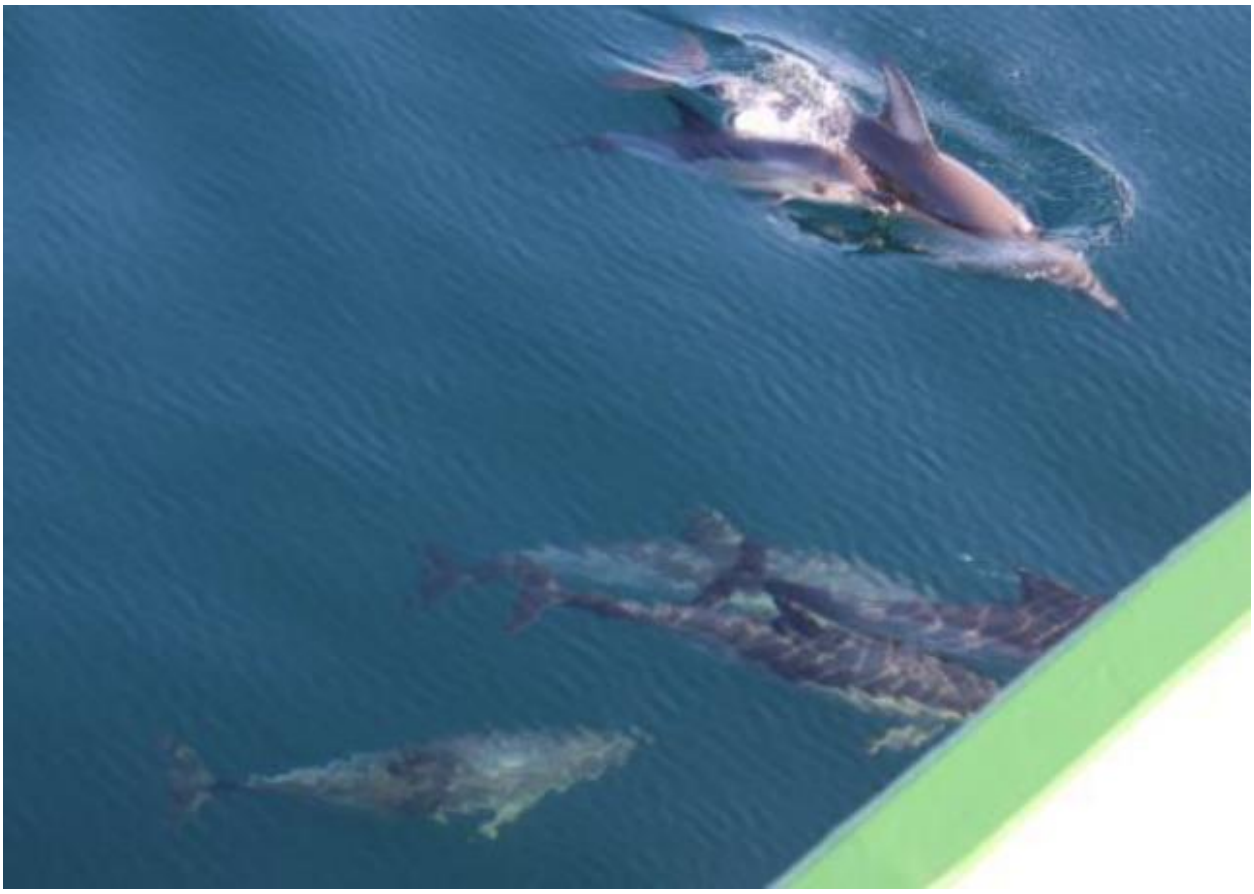

Figure 22: GO Pursuit - Visual Detection 174 - Common dolphin - 29 July 2021

Figure 23: GO Pursuit - Visual Detection 176 - Fin whale - 29 July 2021

Figure 24: GO Pursuit - Visual Detection 177 - Common dolphin - 29 July 2021

Figure 25: GO Pursuit - Visual Detection 180 - Common dolphin - 29 July 2021

Figure 26: GO Pursuit - Visual Detection 185 - Common dolphin - 30 July 2021

Figure 27: GO Pursuit - Visual Detection 188 - Common dolphin - 31 July 2021

Figure 28: GO Pursuit - Visual Detection 193 - Common dolphin - 01 August 2021

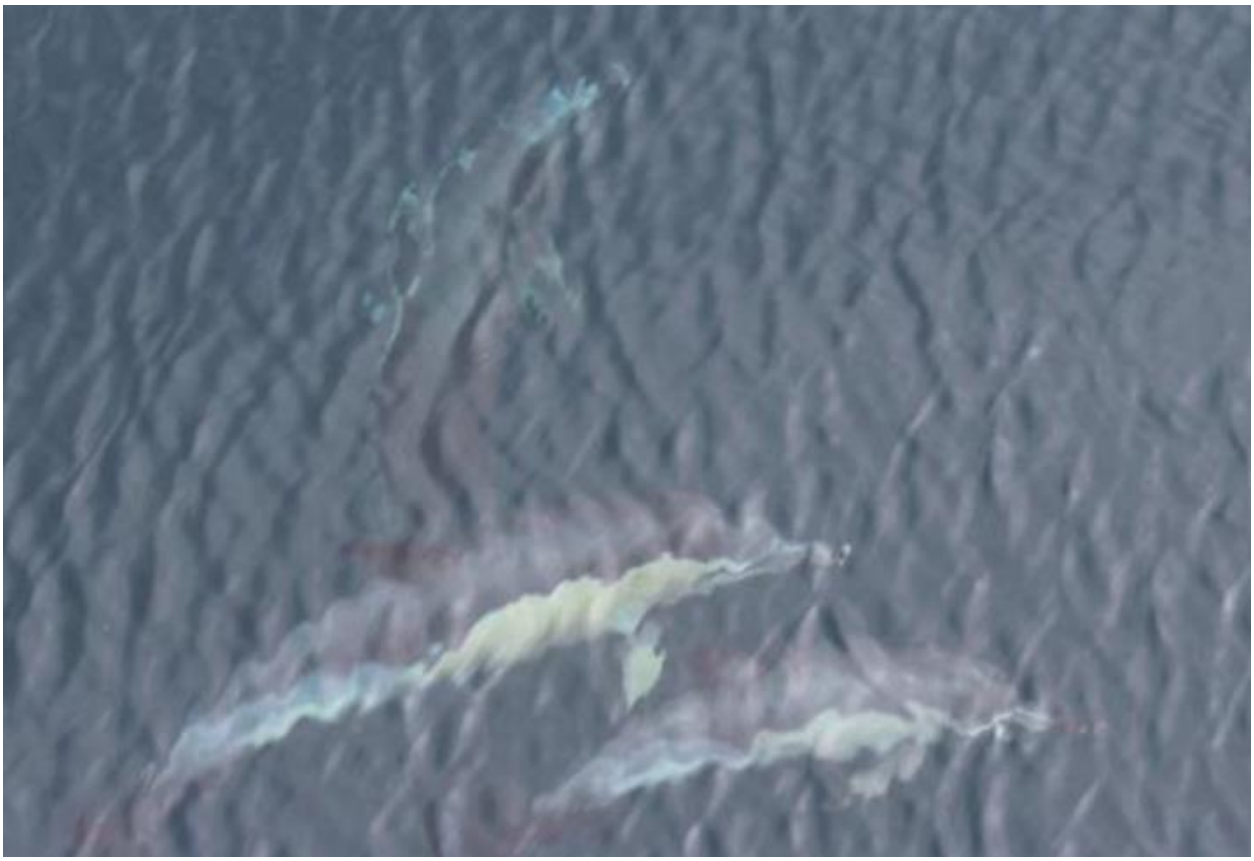

Figure 29: GO Pursuit - Visual Detection 202 - Common dolphin - 03 August 2021

Figure 30: GO Pursuit - Visual Detection 203 - Humpback whale - 03 August 2021

Figure 31: GO Pursuit - Visual Detection 215 - Fin whale - 10 August 2021

Figure 32: GO Pursuit - Visual Detection 216 - Common dolphin - 10 August 2021

Figure 33: GO Pursuit - Visual Detection 222 - Leatherback sea turtle - 13 August 2021

Figure 34: GO Pursuit - Visual Detection 225 - Leatherback sea turtle - 14 August 2021

Figure 35: GO Pursuit - Visual Detection 228 - Minke whale - 15 August 2021

Figure 36: GO Pursuit - Visual Detection 240 - Humpback whale - 17 August 2021

Figure 37: GO Pursuit - Visual Detection 247 - Leatherback sea turtle - 18 August 2021

Figure 38: GO Pursuit - Visual Detection 248 - Leatherback sea turtle - 18 August 2021

Figure 39: GO Pursuit - Visual Detection 252 - Common dolphin - 20 August 2021

Figure 40: GO Pursuit - Visual Detection 256 - Grey seal - 21 August 2021

Figure 41: GO Pursuit - Visual Detection 257 - Kemp's Ridley sea turtle - 21 August 2021

Figure 42: GO Pursuit - Visual Detection 265 - Common dolphins - 02 September 2021

Figure 43: GO Pursuit - Visual Detection 268 - Common dolphins - 04 September 2021

Figure 44: GO Pursuit - Visual Detection 269 - Common dolphins - 06 September 2021

Figure 45: Westerly - Visual Detection 13 – Gray seals – 10 July 2021

Appendix J: Dead or Injured Protected Species Observed during the Survey

Mayflower Wind Energy, Mayflower Wind Energy LLC
Fugro, *RV Westerly*

OCS-A 0521
Incident Report: Unidentified marine mammal mortality
24 July 2021

Observer's full name: Diana Angelica Maldonado Cecena

Reporter's full name: Diana Angelica Maldonado Cecena

Species Identification: Unidentified marine mammal

Name and type of platform: Not apply

Position of vessel at time of sighting: 41.32339°N, 070.43261°W

Date animal observed: 24 July 2021

Time animal observed: 16:11 UTC

Date animal collected: Not apply

Time animal collected: Not apply

Environmental conditions at time of observation: Beaufort scale 2, Wind 7 knots SE.

Water temperature (°C) and depth (m/ft) at site: 23°C, 5 meters depth

Description of sighting event:

An unidentified marine mammal was observed dead in a sand bar in decompose state. Due to the distance from the vessel, there are no visible signs of the cause of death that could be seen from the photo or zoom lens. The animal was observed about 450 meters distance from the vessel. It appeared to have been washed up on the sand bar for a few days. There are signs of scavengers in the photo.

Figure 1: Dead unidentified marine mammal

Figure 2: Dead unidentified marine mammal, original photo taken from the boat without zoom.

Photograph/Video taken: Yes

If Yes, was the data provided to NMFS? No.

Date and Time reported to NMFS Stranding Hotline: 24 July 2021 at 21:40 UTC by Diana Maldonado

Date and Time reported to Office of Protected Resources: 24 July 2021, 1815 (CST) by RPS Project Manager (Katherine Gideon)

Marine Mammal Information: (please designate cm/m or inches)

Species: Unidentified marine mammal
Length: 8 meters
Weight (kg or lbs): Unknown
Sex: Unknown
Confidence of Species Identification: Not apply
Description of Identification Characteristics:
Genetic samples collected: No
Genetics samples transmitted to: No
Fate of Marine Mammal: Dead
Description of Injuries Observed: Decomposition state
Other Remarks/Drawings: No