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VINEYARD NORTHEAST HRG SURVEY 2025 PROTECTED SPECIES OBSERVER FINAL REPORT

Prepared for: Vineyard Northeast, LLC

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VINEYARD NORTHEAST HRG SURVEY 2025 PROTECTED SPECIES OBSERVER FINAL REPORT

Final

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This deliverable was prepared in accordance with generally accepted professional practices that are typically utilized for scientific work products. The work was performed within the limitations and assumptions of our approved scope of work, and the descriptive documentation associated with this deliverable. Unless explicitly included in our approved scope of work, information provided in this deliverable has not been prepared to meet industry standards for engineering and should not be used for construction.

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Acronyms and Abbreviations

BOEM – Bureau of Ocean Energy Management

BMP – Best Management Practices

CPA – Closest Point of Approach

CT – Connecticut

CZ – Clearance Zone

DMA – Dynamic Management Area

DSLR – Digital Single Lens Reflex

EMP – Environmental Management Plan

EOL – End of Line

GSS – Geo SubSea, LLC

HRG – High Resolution Geophysical

IHA – Incidental Harassment Authorization

kHz – Kilohertz

km – Kilometers

kt – Knots

m – Meters

NARW – North Atlantic right whale

NMFS – National Marine Fisheries Service

OECC – Offshore Export Cable Corridor

OCS-A – Outer Continental Shelf-Atlantic

PDC – Project Design Criteria

PSO – Protected Species Observers

PSMMP – Protected Species Monitoring and Mitigation Plan

R/V – Research Vessel

SMA – Seasonal Management Area

SOL – Start of Line

SZ – Shutdown Zone

VNE – Vineyard Northeast, LLC

VSA – Vessel Strike Avoidance

1 EXECUTIVE SUMMARY

This Final Protected Species Report documents monitoring and mitigation conducted by Protected Species Observers provided by Tetra Tech RPS Energy during high resolution survey performed in Connecticut State waters by Geodynamics on behalf of Vineyard Northeast, LLC from 04 February to 15 February 2025. Protected species monitoring and mitigation was conducted in accordance with applicable protected species requirements. Mitigation protocols for this survey included the establishment of separation distances, mitigation zones, and Level B harassment zones for protected species, visual monitoring, sound source mitigation and vessel strike avoidance measures while the vessels were underway.

Visual observations were conducted by PSOs for a total of 66 hours and 21 minutes.

There were no visual detections of marine mammals or other protected species during the survey, and no dead or injured animals were observed. No mitigation actions were implemented for the sound sources and no VSA maneuvers were initiated during the survey.

2 INTRODUCTION

This is the Final Protected Species Report for the Vineyard Northeast, LLC (VNE) High Resolution Geophysical (HRG) Survey, hereafter referred as the Survey. VNE contracted Geodynamics to conduct an HRG survey of a potential OECC in Connecticut (CT) state waters, utilizing the R/V *Bogue,* between 05 February and 15 February 2025.

VNE contracted Protected Species Observers (PSOs) through a third-party provider, Tetra Tech RPS Energy, to conduct monitoring and mitigation for protected species, including marine mammals and sea turtles, during the Survey. This report covers the protected species monitoring and mitigation undertaken by PSOs deployed to the HRG survey vessel operating during the Survey.

2.1 Protected Species Requirements

Protected species monitoring was conducted in accordance with the following requirements (referred to hereafter as the Protected Species Requirements):

- VNE's Incidental Harassment Authorization (IHA) issued by the National Marine Fisheries Service (NMFS) on 27 July 2024
- Project Design Criteria (PDC) and Best Management Practices (BMPs) for Protected Species Associated with Offshore Wind Data Collection (last updated September 30, 2021) issued in consultation with NMFS Programmatic Consultation dated June 29, 2021

The Protected Species Monitoring and Mitigation Plan (PSMMP) prepared by Tetra Tech RPS identifies the requirements that are applicable to the Survey and is included in Appendix C.

During the survey, VNE was responsible for contracting PSOs to conduct monitoring and mitigation for protected species, including marine mammals and sea turtles during their activities, where Tetra Tech RPS Energy was selected to perform this scope of work. Monitoring and mitigation procedures implemented during the Survey in accordance with these requirements are described in Section 4.1 of this report.

2.2 Reporting Requirements

This technical report summarizes the information required by the Protected Species Requirements as outlined in Table 1.

The Incidental Harassment Authorization (IHA) is located in Appendix A. The NMFS Programmatic Consultation (PDC & BMPs) is located in Appendix B. The Protected Species Monitoring and Mitigation Plan (PSMMP) is located in Appendix C.

Table 1: NMFS reporting requirements[1] and their location within this technical report

Required Content	Source Reference	Location Addressed in Technical Report
A monitoring report must be provided to NMFS within 90 days after completion of the survey or expiration of the IHA, whichever comes sooner. The report must describe all activities conducted and sightings of marine mammals, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all marine mammal sightings (dates, times, locations, activities, associated survey activities). The draft report must also include geo-referenced, time-stamped vessel tracklines for all time periods during which acoustic sources were operating.	IHA Section 6(a)	This Technical Report
A final monitoring report must be submitted to BOEM and NMFS (to renewable_reporting@boem.gov and nmfs.gar.incidental-take@noaa.gov) within 90 days after completion of survey activities. The report must fully document the methods and monitoring protocols, summarizes the survey activities and the data recorded during monitoring, estimates of the number of listed species that may have been taken during survey activities, describes, assesses and compares the effectiveness of monitoring and mitigation measures. PSO sightings and effort data and trackline data in Excel spreadsheet format must also be provided with the final monitoring report.	PDC 8 BMP 2	This Technical Report
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, Vineyard Northeast must immediately report the sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866- 755-6622).	IHA Section 6(d)	Section 6.4
If a North Atlantic right whale is observed at any time by a PSO or project personnel during surveys or vessel transit, sightings must be reported within two hours of occurrence when practicable and no later than 24 hours after occurrence. In the event of a sighting of a right whale that is dead, injured, or entangled, efforts must be made to make such reports as quickly as possible to the appropriate regional NOAA stranding hotline (from Maine-Virginia report sightings to 866-755-6622, and from North Carolina-Florida to 877-942-5343). Right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16 and through the WhaleAlert App (http://www.whalealert.org/).	PDC 8 BMP 3a	Section 6.4

[1] This Technical Report is intended to fulfill the Final Monitoring Report requirements stipulated in the IHA issued to VNE (27 July 2024) and NMFS PDC/BMPs (last updated 21 September 2021) as indicated in Table 1.

Required Content	Source Reference	Location Addressed in Technical Report
Sightings of any injured or dead marine mammal must be reported to NMFS, regardless of the cause of injury or death. In the event that personnel involved in the survey activities discover an injured or dead marine mammal, Vineyard Northeast must report the incident as soon as feasible to the NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*),and the NMFS Greater Atlantic Stranding Hotline (866-755-6622) as soon as feasible.	IHA Section 6(e)	Section 6.4
Sightings of any injured or dead listed species must be immediately reported, regardless of whether the injury or death is related to survey operations, to BOEM (renewable_reporting@boem.gov), NMFS (nmfs.gar.incidental-take@noaa.gov), and the appropriate regional NOAA stranding hotline (from Maine-Virginia report sightings to 866-755-6622, and from North Carolina-Florida to 877-942-5343 for marine mammals and 844-732-8785 for sea turtles).	PDC 8 BMP 5	Section 6.4
In the event of a ship strike of a marine mammal by any vessel involved in the survey activities, Vineyard Northeast must report the incident to the NMFS Office of Protected Resources (PR.ITP.MonitoringReports@noaa.gov) and the NMFS Greater Atlantic Stranding Hotline (866-755-6622) as soon as feasible but within 24 hours.	IHA Section 6(e)(ii))	Section 6.4
In the event of a vessel strike of a protected species by any survey vessel, the project proponent must immediately report the incident to BOEM (renewable_reporting@boem.gov) and NMFS (nmfs.gar.incidental-take@noaa.gov) and for marine mammals to the NOAA stranding hotline: from Maine-Virginia, report to 866-755-6622, and from North Carolina-Florida to 877-942-5343 and for sea turtles from Maine-Virginia, report to 866-755-6622, and from North Caroline-Florida to 844-732-8785.	PDC 8 BMP 4	Section 6.4

3 PROGRAM OVERVIEW

This Survey was conducted on behalf of VNE to provide geophysical data needed to evaluate an alternative offshore export cable corridor (OECC) in Connecticut State waters (Figure 1).

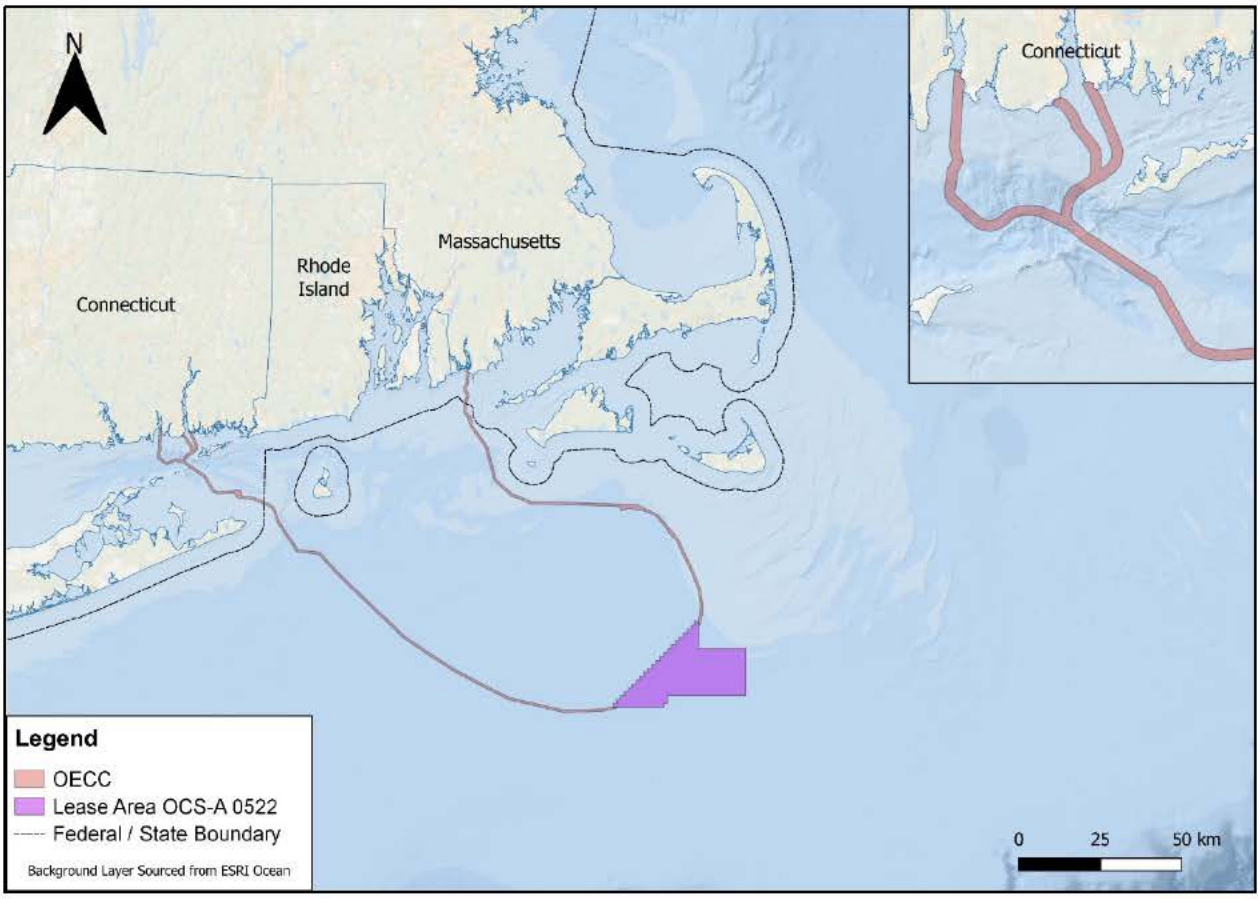

Figure 1: OCS-A 0522 Lease Area and associated OECC

The R/V *Bogue* first departed on 04 February 2025 for testing of non-mitigating HRG equipment. HRG data acquisition for the survey began on 05 February 2025. Over the course of the Survey, the vessel returned to port at Safe Harbor Mystic in Mystic, CT daily. The R/V *Bogue* completed survey operations on 15 February 2025 and transited to port at Safe Harbor Mystic in Mystic, CT for demobilization.

The vessel's location and dates of operation are summarized in Table 2. A high-level overview of survey events for the vessel is outlined in Table 3.

Table 2: Summary of vessel location and scope of work for the 2025 HRG survey

Vessel Name	Location	Dates on Project
R/V *Bogue*	Nearshore OECC route for OCS-A 0522	04 February 2025 – 15 February 2025

Table 3: Summary of key survey events during the 2025 HRG survey

Event	R/V *Bogue*
Kick-Off Meetings	02 February 2025
PSO Team Mobilizes	03 February 2025
Vessel Departs Dock. PSO Effort Begins.	04 February 2025
HRG Operations Begin	05 February 2025
HRG Operations Complete	15 February 2025
PSO Monitoring Complete. PSO Team Demobilizes.	15 February 2025

3.1 Vessel Summary

The Survey was undertaken by the R/V *Bogue* (Figure 2), a survey vessel owned and operated by Geodynamics**.** Specifications of the vessel are provided in Table 4.

Figure 2: R/V *Bogue*

Table 4: Vessel specifications

Vessel Parameters	
Vessel Name	R/V *Bogue*
Vessel Length	17.7 meters (m)
Vessel Width	6.1 m
Vessel Speed	10 knots (kt) (Transit)
Vessel Configuration and Description	Multi-role survey vessel for coastal survey areas

3.2 Summary of Geophysical Survey Equipment Used

As specified by the Protected Species Requirements, the operation of certain HRG equipment is subject to protected species monitoring, mitigation and reporting (referred to herein as "regulated sound sources"). Other equipment that either did not produce sound or produced sound outside of the hearing range of protected species were also operated by the survey vessel but is not subject to the Protected Species Requirements and is not considered further in this technical report. The regulated sound sources operated during the survey are summarized in Table 5.

Table 5: HRG operations conducted during the Survey

R/V Bogue		
Operations	**Equipment Specifications**	**Description of Operations**
HRG Data Acquisition	Dura-Spark Sparker, 400 S-UHRS	Towing HRG equipment for data acquisition

4 MONITORING AND MITIGATION PROGRAM

This section describes the protected species monitoring and mitigation measures established to meet the Protected Species Requirements. Mitigation measures were intended 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:

- Visual daytime-only observations were conducted from dock to dock during all vessel activities, to provide real-time sighting data, allowing for the implementation of sound source or VSA mitigation measures as necessary.
- Species-specific separation distances were established around the vessel where vessel strike avoidance maneuvers were implemented, as safety permits, when protected species were observed inside the specific separation distances.
- Species-specific clearance zones (CZs) and shutdown zones (SZs) were established around the regulated sound sources, where delays to initiation and shutdowns of active sources were implemented when protected species were detected inside their respective CZ or SZ.

Trained and experienced PSOs were onboard the survey vessel during survey activities to conduct monitoring for protected species, record and report detections, and request mitigation actions in accordance with the established protected species requirements and monitoring plan.

All certified PSOs who were deployed on the R/V *Bogue* during the Survey are listed in Appendix D.

4.1 Visual Monitoring: Protocols and Methods

A team of two PSOs was deployed on the R/V *Bogue* to meet the monitoring requirements as outlined in Protected Species Requirements. PSOs monitored during daylight hours, from dock to dock, and implemented sound source mitigation and VSA measures, as necessary. PSOs onboard rotated monitoring shifts such that no PSO worked more than four consecutive visual monitoring hours before being allocated a two-hour break.

Visual monitoring locations on the vessel were selected in consideration of the following factors:

1. To afford PSOs a 360-degree viewpoint around the vessel and acoustic sources, such that the CZs and SZs around the sound sources and the strike avoidance separation distances could be simultaneously monitored,
2. Provide the highest vantage point possible to allow for monitoring out to the greatest distances ahead and around the vessel,
3. Provide shelter from inclement weather, as needed,
4. Provide real-time communication with vessel and regulated sound source 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 CZs and SZs and ahead of the vessel. PSOs conducted regular sweeps of the surrounding areas using magnification devices as described below. PSOs monitored for cues that might indicate the presence of protected species including but not limited to splashing, sea surface footprints, blows, and presence of other marine species (diving seabirds, fish feeding activity).

Table 6: Visual monitoring methodology

	R/V Bogue
Total Number of PSOs	2
Number of PSOs on Watch - Day	1
Visual Monitoring Equipment - Day	Reticle binoculars 10x50 & 7x50 magnification
Range Estimation	Calibrated reticle binoculars
Primary Monitoring Location- Visual	Bridge

Displays inside the bridge showed current information about the vessel necessary for the PSO reports. This information consisted of the vessel's position, speed, heading, water depth, wind direction, wind speed, and survey status. Sea conditions, Beaufort scale, cloud cover, and glare were all determined based on the PSO's knowledge and experience with collecting environmental condition data. Effort data was recorded every hour on the hour and when there was a change in one or more of the variables.

4.1.1 Daylight Visual

The PSOs on board were equipped with 10x50 and 7x50 reticle binoculars as well as digital single-lens reflex (DSLR) cameras with 200 mm and 500 mm 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 objects of known distance, as well as with reticle binoculars.

4.2 Monitoring: Data Collection

During or immediately after each sighting event, the PSOs would record the detection details in a standardized detection datasheet provided to them by VNE. Excel data forms included tabs for Project Information, PSO Effort, Operations, Sightings, and Port Calls.

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

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

4.2.1 Data Collection Requirements & Methods

Data was collected to meet the Protected Species Requirements as summarized 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.

4.2.2 Data Collection North Atlantic Right Whale External Sighting Monitoring Protocol

The PSO team monitored the NMFS North Atlantic right whale reporting systems daily (e.g., Sighting Advisory System, WhaleAlert and WhaleMap) for the presence of North Atlantic right whales (NARW) during HRG survey operations for any established Dynamic Management Areas (DMA) and relevant Seasonal Management Areas (SMA) in their permitted survey area and surrounding areas regularly.

Tetra Tech RPS Energy project managers were signed up to receive automatic notifications of DMAs and NARW sightings throughout survey operations. Any notifications were in turn relayed to the deployed PSO teams.

4.3 Mitigation Methodology

The PSO monitoring and mitigation program implemented on the Survey was established to meet the requirements of the protected species requirements and to minimize potential impacts of the survey activities on protected species.

These mitigation measures include implementing mitigation zones (CZs and SZs), visual monitoring by approved PSOs, search periods of CZs prior to the commencement of HRG operations, ramp up of survey equipment, delays to initiation and shutdown of HRG operations for protected species detections, and vessel strike avoidance procedures as necessary. Specific source mitigation and vessel strike avoidance procedures can be found in the PSMMP (Appendix C).

4.4 Reporting

As specified in the PSMMP and as required by the Protected Species Requirements, this final survey report is prepared detailing PSO effort and detection of protected species, as well as any observations of dead/injured protected species made during survey operations.

4.4.1 Injured or Dead Protected Species

Any injured or dead marine mammal, sea turtle, and/or sturgeons, including ship strikes, observed either by a PSO on watch or by a crew member is required to be reported to BOEM and NMFS.

Complete injured/dead reporting protocols are available within the PSMMP included in Appendix C.

There were no detections of injured or dead protected species observed during the campaign, as described in Section 6.4.

4.4.2 NARW Sightings

Reporting of NARW sightings to external monitoring resources was to be conducted as required in the Protected Species Requirements. An overview of the reporting protocol is provided below.

1. The Lead PSO will immediately inform the Tetra Tech RPS Energy Project Manager and GSS Environmental Project Manager via WhatsApp communication group of any NARW sighting(s).
    - The vessel's Captain would report the sighting to the United States Coast Guard on channel 16.
2. GSS Environmental Project Manager would facilitate all Agency reporting on behalf of VNE.
3. PSOs would then prepare a sighting report including a description of the detection event noting date, time, distance to vessel, vessel, and HRG equipment activity, observed behaviors and any photographs or screenshots taken during the sighting.

There were no NARW sightings during the campaign, as described in Section 6.4.

4.4.3 Final Report

Tetra Tech RPS Energy has prepared this Technical Report to meet the Protected Species Requirements outlined in Table 1 of this report. Each of the required elements of 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 equipment's operational status each day that they were deployed on the vessel.

The vessel recorded the start of line (SOL) times and the end of line (EOL) times for the mitigating equipment during acquisition. The vessel also recorded the status of the equipment while acquisition occurred by noting full power or shutdowns due to mitigation actions.

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.

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 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
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

Beaufort number	Description	Wave height	Sea conditions
			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 m) were recorded in standardized categories (< 2 m, 2-4 m, and > 4 m).

PSOs categorized visibility during monitoring effort in kilometers (km) and/or m where values were selected from categories.

5.3 Visual Sightings of Protected Species

PSOs were to use standardized reporting forms provided by Tetra Tech RPS Energy to record all detections of marine mammals and sea turtles made during survey operations. These records were to be 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 to be assigned chronologically for all protected species observed on a vessel throughout that vessel's survey activity. A new detection number would be 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.

Protected species movement relative to the vessel, pace, and initial and subsequent behavior states were to be 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 were to record closest point of approach (CPA) to the vessel and the source, and the regulated source status at the time of CPA.

5.3.2 Detection rate

Detection rate was to be calculated using the number of protected species events per hour of monitoring effort.

5.3.3 Behavior state

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.

5.3.4 Level B Take / Exposure Estimation

Under the Marine Mammal Protection Act (MMPA) 16 United Stated Code (USC) 1362, 'take' is identified as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill."

The MMPA further defined that 'harassment' refers to acts that have the potential to injure or disturb a marine mammal or marine mammal stick in the wild. Disturbing can be caused by disrupting behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

NMFS considers exposure of marine mammals to received sound levels of 160 dB (rms) to be potentially disturbing and therefore classifies the exposure as a Level B take.

5.4 Mitigation Measures Implemented

Mitigation measures were to be implemented on the vessel as previously described. The onboard PSO team communicated requested mitigation in real time to survey operators that controlled the operation of the regulated sound sources or to the vessel crew operating the vessel, depending on the type of action required. Communications were conducted in person.

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

For each mitigation action, the mitigation downtime associated with that action would be 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 would not include any additional downtime that a survey operator needed to resume acquisition: additional vessel maneuvering time, time to deploy or calibrate equipment etc.

5.5 Data Quality Control

The Tetra Tech RPS Energy and GSS data analysts reviewed all the PSO data sets received and conducted data quality control (QC) as described in Table 8.

Table 8: Quality control editing performed by Tetra Tech RPS Energy and GSS on PSO datasets by data field

Data Type	Data Field	Corrections Made
Monitoring Effort	Position	• Corrected coordinates that plotted out of place by using vessel track line positions of corresponding times.
	Start of Watch/End of Watch	• Corrected errors that didn't align with corresponding Source Operations data.
Source Operations	Time Pre-Clearance Visual Monitoring Ended	• Corrected a time to "Time Power-up / Ramp-up Began" field

6 RESULTS

This section of the report details regulated sound source operations, protected species monitoring effort, environmental conditions during monitoring effort and distribution.

The monitoring effort and source operations for the R/V *Bogue* are provided as an excel dataset in Appendix E. As there were no sightings of protected species during the survey, an example of the protected species detection data form provided to PSOs is also in Appendix E.

6.1 Operation Activity

Survey operations began with the vessel conducting source testing before proceeding to acquisition, according to the survey plan. Survey operations were briefly suspended when necessary for weather, crew changes and equipment maintenance.

The dates of operation, total days of survey activity and hours of regulated source operations by the survey vessel are provided in Table 9.

Table 9: Summary of regulated sound source operations.

Vessel	Dates of Operation	Total Survey Days	Total Hours of Regulated Source Operations (HH:MM)
R/V *Bogue*	02 February 2025 – 15 February 2025	6	43:01

6.2 Monitoring Effort

Visual monitoring was conducted for 43 hours and 01 minute during source activity, 23 hours and 20 minutes without source activity, for an overall total of 66 hours and 21 minutes.

Visual monitoring effort during the Survey is summarized in Table 10, shown by activity of the regulated source.

Table 10: Summary of visual monitoring effort by regulated source activity status

Monitoring Effort	HH:MM
Source Active	43:01
Source Inactive	23:20
Total	**66:21**

6.3 Environmental Conditions

Environmental conditions can have an impact on 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

Visibility conditions were favorable for protected species detection, extending to greater than 5 km for 91.41% of the overall visual monitoring effort for the Survey (Table 11). Visibility of 2 to 5 km was recorded during 2.76% of the Survey, 0.5 to 1 km during 3.09%, and 0.3 to 0.5 km was recorded during less than 1% of the Survey. The reduced visibility periods included fog, rain, and showers.

Table 11: Summary of visibility during visual monitoring effort

Visibility	Duration (HH:MM)	% of Overall Monitoring Effort
Greater than 5 km	60:39	91.41
2 to 5 km	1:50	2.76
1 to 2 km	2:03	3.09
0.5 to 1 km	1:16	1.91
0.3 to 0.5 km	00:33	<1

Beaufort Sea State

Monitoring effort was conducted in Beaufort Sea states ranging from Level 1 through Level 5. Visual observations at Level 3 Beaufort Sea state or below were considered favorable conditions for protected species detection and accounted for 69.15% of the total visual monitoring effort (Table 12).

Table 12: Summary of Beaufort Sea state during visual monitoring effort

Beaufort Sea State	Duration (HH:MM)	% of Overall Monitoring Effort
B1	4:09	6.25
B2	19:42	29.69
B3	22:02	33.20
B1 through B3	**45:53**	**69.15**
B4	16:52	25.43
B5	3:36	5.43
B4 and above	**20:28**	**30.85**

Swell

Swell heights during visual observations were considered low, with swells of less than two meters recorded for 100% of visual monitoring effort (Table 13).

Table 13: Summary of swell height during visual monitoring effort

Swell Height	Duration (HH:MM)	% of Overall Monitoring Effort
Less than 2 m	66:21	100

6.4 Visual Sightings

There were no protected species detection events during the Survey, this includes North Atlantic right whales as well as injured or dead protected species.

6.5 Summary

Mitigation was implemented as described over the course of the Survey to prevent, avoid, and minimize potential impacts to protected species from physical interactions with vessels and / or towed equipment (VSA mitigation), or from exposure to potentially harmful levels and frequencies of sound.

As there were no protected species detections made during the Survey, source mitigation and VSA maneuvers were not requested.

6.5.1 Effectiveness of all monitoring tasks

In order to minimize the potential impacts to marine mammals and sea turtles, PSOs onboard were prepared to implement sound source mitigation and VSA measures whenever protected species were detected approaching, entering, or within the designated exclusion zones and separation distances. PSOs searched the monitoring and clearance zones prior to activation of regulated sound sources and confirmed with survey crew that clearance zones were clear prior to activating the regulated sound sources, which was then done gradually in ramp-up form whenever possible.

If an injured or dead protected species was discovered during the survey program, the incident was to be immediately reported. There were no sightings of an injured or dead protected species.

Visual observations yielded no protected species detections. PSOs likely did not detect all animals present. However, it is unlikely that protected species were missed inside the exclusion zones, while HRG operations were active, due to the small size of these zones. The environmental conditions present during visual monitoring were generally good for detecting protected species, especially within the exclusion zones.

The required monitoring and mitigation measures implemented, such as pre-clearance observation, ramp-up of the regulated source, and separation distances, appear to have been effective means to prevent potential impacts to protected species.

7 REFERENCED DOCUMENTS

Incidental Harassment Authorizations (IHAs) issued to Vineyard Northeast, LLC by the National Oceanic and Atmospheric Administration (NOAA) Fisheries' Office of Protected Resources (July 27, 2024)

Project Design Criteria (PDC) and Best Management Practices (BMPs) for Threatened and Endangered Species for Site Characterization and Site Assessment Activities to Support Offshore Wind Projects (last updated September 30, 2021), located in Appendix B of NMFS's Programmatic Consultation (dated June 29, 2021).

Appendix A: Incidental Harassment Authorization

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

Vineyard Northeast, LLC (Vineyard Northeast) and their designees are 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 valid for one year from July 27, 2024 through July 26, 2025.

2. This IHA authorizes take incidental to marine site characterization surveys in the Outer Continental Shelf Lease Area OCS-A 0522 and OCS-A 0544 and potential offshore export cable corridor (OECC) routes to landfall locations from Massachusetts to New Jersey.

3. General Conditions

   (a) A copy of this IHA must be in the possession of Vineyard Northeast, the vessel operators, the lead protected species observers (PSO), and any other relevant designees of Vineyard Northeast while conducting activities subject to this IHA.

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

   (c) The taking by injury, serious injury, or death of any of the species/stocks listed in Table 1 or any taking of any species/stock of marine mammal not listed in Table 1 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) Vineyard Northeast must instruct relevant vessel personnel with regard to the authority of the protected species monitoring team, and must ensure that relevant vessel personnel and the protected species monitoring team participate in a joint onboard briefing (hereafter PSO briefing), led by the vessel operator and lead PSO, prior to beginning survey activities to ensure that responsibilities, communication procedures, monitoring protocols, safety and operational procedures, and IHA requirements are clearly understood. This PSO briefing must be repeated when relevant new personnel (*e.g.*, PSOs, acoustic source operator) join the survey operations before work commences.

   (e) The acoustic source must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the acoustic source must be avoided.

(f) Vineyard Northeast must abide by the relevant Project Design Criteria (PDC 4, 5 and 7) of the programmatic consultation completed by NMFS' Greater Atlantic Regional Fisheries Office on June 29, 2021 (revised September 2021), pursuant to section 7 of the Endangered Species Act (ESA). To the extent that any relevant Best Management Practices (BMPs) described in these PDCs are more stringent than the requirements herein, those BMPs supersede these requirements.

4. Mitigation Requirements

(a) Vineyard Northeast must employ qualified, NMFS-approved visual PSOs (see Section 5 of this IHA). When specified acoustic sources (impulsive: sparkers and boomers; non-impulsive: non-parametric sub-bottom profilers) are operating, a minimum of one PSO must be on duty, per source vessel, during daylight hours (civil sunrise to civil sunset) and two PSOs must be on duty, per source vessel, during nighttime hours.

(b) Visual monitoring must begin no less than 30 minutes prior to initiation of specified acoustic sources (see condition 4(a) of this IHA) and must continue until 30 minutes after use of specified acoustic sources ceases.

(c) PSOs must establish and monitor applicable Shutdown Zones (see Table 3). These zones must be based upon the radial distance from the acoustic source (rather than being based around the vessel itself).

(d) Pre-start clearance and ramp-up – PSOs must establish and monitor applicable pre-start clearance zones (see Table 3) A ramp-up procedure, involving a gradual increase in source level output, is required at all times as part of the activation of the acoustic source, when technically feasible. Operators must ramp up sources to half power for 5 minutes and then proceed to full power. A 30-minute pre-start clearance observation period must occur prior to the start of ramp-up (or initiation of source use if ramp-up is not technically feasible). All operators must adhere to the following pre-start clearance and ramp-up requirements:

(i) The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time must not be less than 60 minutes prior to the planned ramp-up to allow the PSOs time to monitor the Shutdown Zones for 30 minutes prior to the initiation of ramp-up (pre-start clearance). During this 30-minute pre-start clearance period, the entire applicable Shutdown Zone must be visible, except as indicated in (viii) below.

(ii) Ramp-ups must be scheduled so as to minimize the time the source is activated.

(iii) A PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must

receive confirmation from the PSO that the Shutdown Zone is clear prior to proceeding.

(iv) Any PSO on duty has the authority to delay the start of survey operations if a marine mammal is detected within the applicable pre-start clearance zone.

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

(vi) Ramp-up must not be initiated if any marine mammal is within the applicable Shutdown Zone. If a marine mammal is observed within the applicable Shutdown Zone during the 30-minute pre-start clearance period, ramp-up must not begin until the animal(s) has been observed exiting the zones or until an additional period has elapsed with no further sightings (15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

(vii) PSOs must monitor the Shutdown Zone 30 minutes before and during ramp-up, and ramp-up must cease and the source must be shut down upon observation of a marine mammal within the applicable Shutdown Zone.

(viii) Ramp-up may occur at times of poor visibility, including nighttime, if appropriate visual monitoring has occurred with no detections of marine mammals in the 30 minutes prior to beginning ramp-up. Acoustic source activation may only occur at night where operational planning cannot reasonably avoid nighttime activation.

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

(e) Shutdown requirements

(i) Any PSO on duty has the authority to call for shut down of the acoustic source if a marine mammal is detected within the applicable Shutdown Zone.

(ii) The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to

ensure that shutdown commands are conveyed and implemented swiftly while allowing PSOs to maintain watch.

(iii) When the acoustic source is active and a marine mammal appears within or enters the applicable Shutdown Zone, the acoustic source must be shut down (Table 3). When shutdown is instructed by a PSO, the acoustic source must be immediately deactivated and any dispute resolved only following deactivation.

(iv) The shutdown requirement is waived for small delphinids[1] and pinnipeds, as provided in paragraphs (A) and (B) below.

(A) If a delphinid (individual belonging to the genera of the Family *Delphinidae*) or pinniped included in Table 1 is visually detected within the Shutdown Zone, no shutdown is required.

(B) If there is uncertainty regarding identification of a marine mammal species (*i.e.*, whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger Shutdown Zone), PSOs must use best professional judgment in making the decision to call for a shutdown.

(v) Upon implementation of shutdown, the source may be reactivated after the marine mammal has been observed exiting the applicable Shutdown Zone or following a clearance period (15 minutes for harbor porpoises and 30 minutes for all other species; Table 3) with no further detection of the marine mammal.

(vi) 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 (Table 2).

(f) Vessel Strike Avoidance – Vessel operators must comply with the below measures except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question. These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply.

(i) 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 mammal. A

[1] Small delphinids include members of the following genera: *Delphinus*, *Lagenorhynchus*, *Stenella*, or *Tursiops.*

single marine mammal at the surface may indicate the presence of additional submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel (species-specific distances detailed below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (*i.e.*, PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to 1) distinguish a marine mammal from other phenomena and 2) broadly to identify a marine mammal as a right whale, other whale (defined in this context as sperm whales or baleen whales other than right whales), or other marine mammals.

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

(iii) Vessel speeds must be reduced to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel.

(iv) All vessels must maintain a minimum separation distance of 500-m from right whales and other ESA-listed species. If an ESA-listed species is sighted within the relevant separation distance, the vessel must steer a course away at 10-knots or less until the 500-m separation distance has been established (Table 3). If a whale is observed but cannot be confirmed as a species that is not ESA-listed, the vessel operator must assume that it is an ESA-listed species and take appropriate action.

(v) All vessels must maintain a minimum separation distance of 100-m from non-ESA-listed whales (Table 3).

(vi) 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; Table 3).

(vii) When a marine mammal is sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distance (*e.g.*, attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the

area, reduce speed and shift the engine to neutral). This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

5. Monitoring Requirements

(a) Vineyard Northeast must use independent, dedicated, trained PSOs, meaning that the PSOs must be employed by a third-party observer provider, must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammal and mitigation requirements (including brief alerts regarding maritime hazards), and must have successfully completed an approved PSO training course for geophysical surveys. Except as provided under condition 4(f)(i) above and paragraph (b) below, 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) On a case-by-case basis, non-independent observers (*e.g.*, crew members) may be approved by NMFS to act as PSOs for limited, specific duties (*i.e.*, conduct visual monitoring while the independent NMFS-approved PSO takes the required 2-hour break between 4-hour shifts) on smaller vessels with limited occupancy. Non-independent observers may be approved only for surveys operating in nearshore waters and only for daylight operations. In order to be approved to act as PSOs, non-independent observers must have no duties other than marine mammal monitoring while on watch, and must be trained on protected species detection and identification, vessel strike minimization procedures, and reporting requirements in this IHA. If a whale is observed but cannot be confirmed as a species other than a right whale, the non-independent observer must assume that it is a right whale and take appropriate action (*i.e.*, call for a delay or shutdown).

(c) PSO names must be provided to NMFS by Vineyard Northeast for review and confirmation of their approval for specific roles prior to commencement of the survey[2]. For prospective PSOs not previously approved, or for PSOs whose approval is not current, NMFS must review and approve PSO qualifications. Resumes must include information related to relevant education, experience, and training, including dates, duration, location, and description of prior PSO experience. Resumes must be accompanied by relevant documentation of successful completion of necessary training.

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

[2] PSO-related inquiries should be directed to *nmfs.psoreview@noaa.gov*.

conclusion of the most recent relevant experience not more than 18 months previous.

(e) At least one of the visual PSOs aboard the vessel must be unconditionally-approved. One unconditionally-approved visual PSO must be designated as the lead for the entire PSO team. This lead should typically be the PSO with the most experience, would coordinate duty schedules and roles for the PSO team[3], and serve as the primary point of contact for the vessel operator. To the maximum extent practicable, the duty schedule must be planned such that unconditionally-approved PSOs are on duty with conditionally-approved PSOs.

(f) PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver must be submitted to NMFS and must include written justification. Alternate experience that may be considered includes, but is not limited to, (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; and (3) previous work experience as a PSO (PSO must be in good standing and demonstrate good performance of PSO duties).

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

(h) PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and must conduct visual observations using binoculars or night-vision equipment and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.

(i) 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.

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

(k) Vineyard Northeast must work with the selected third-party PSO provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals, and to ensure that PSOs are capable of

[3] Responsibility for coordination of duty schedules and roles may be delegated, such as to a shore-based monitoring coordinator employed by the third-party observer provider.

calibrating equipment as necessary for accurate distance estimates and species identification. Such equipment, at a minimum, must include:

(i) At least one thermal (infrared) imaging device suited for the marine environment;

(ii) Reticle binoculars (*e.g.,* 7x50) of appropriate quality (at least one per PSO, plus backups);

(iii) Global Positioning Units (GPS) (at least one plus backups);

(iv) Digital cameras with a telephoto lens that is at least 300 mm or equivalent on a full-frame single lens reflex (SLR) (at least one plus backups). The camera or lens must also have an image stabilization system;

(v) Equipment necessary for accurate measurement of distances to marine mammals;

(vi) Compasses (at least one plus backups);

(vii) Means of communication among vessel crew and PSOs; and

(viii) Any other tools deemed necessary to adequately and effectively perform PSO tasks.

(l) Equipment specified in (i) through (viii) above may be provided by an individual PSO, the third-party PSO provider, or the operator, but Vineyard Northeast is responsible for ensuring PSOs have the proper equipment required to perform the duties specified within this IHA.

(m) During good conditions (*e.g.*, daylight hours; Beaufort sea state 3 or less), PSOs must conduct observations when the specified acoustic sources (see condition 4(a) of this IHA) are not 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.

(n) Vineyard Northeast must consult the NMFS North Atlantic right whale reporting system and Whale Alert, daily and as able, for the presence of North Atlantic right whales before and 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 must abide by speed restrictions in the DMA.

6. Reporting Requirements

(a) Vineyard Northeast must submit a draft comprehensive report on all activities and monitoring results within 90 days of the completion of the survey or expiration of the IHA, whichever comes sooner. The report must describe all activities conducted and sightings of marine mammals, must provide full documentation of

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

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

(i) Vessel names (source vessel and other vessels associated with survey), vessel size and type, maximum speed capability of vessel;

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

(iii) The lease number;

(iv) PSO names and affiliations;

(v) Date and participants of PSO briefings;

(vi) Visual monitoring equipment used;

(vii) PSO location on vessel and height of observation location above water surface;

(viii) Dates and times (Greenwich Mean Time) of survey on/off effort and times corresponding with PSO on/off effort;

(ix) Vessel location (decimal degrees) when survey effort begins and ends and vessel location at beginning and end of visual PSO duty shifts;

(x) Vessel location at 30-second intervals if obtainable from data collection software, otherwise at practical regular interval;

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

(xii) Water depth (if obtainable from data collection software);

(xiii) Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including BSS and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon;

(xiv) Factors that may contribute to impaired observations during each PSO shift change or as needed as environmental conditions change (*e.g.*, vessel traffic, equipment malfunctions); and

(xv) Survey activity information (and changes thereof), such as acoustic source power output while in operation, tow depth of an acoustic source, and any other notes of significance (*i.e.*, pre-start clearance, ramp-up, shutdown, end of operations, etc.).

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

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

2. Vessel/survey activity at time of sighting (*e.g.*, deploying, recovering, testing, shooting, data acquisition, other);

3. PSO name who sighted the animal;

4. Time of sighting (local time military format);

5. Initial detection method;

6. Sightings cue;

7. Vessel location at time of sighting (decimal degrees);

8. Direction of vessel's travel (compass direction);

9. Speed of the vessel(s) from which the observation was made;

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

11. Species reliability (an indicator of confidence in identification);

12. Estimated distance to the animal and method of estimating distance;

13. Estimated number of animals (high/low/best);

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

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

16. Detailed behavior observations (*e.g.*, number of blows/breaths, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior before and after point of closest approach);

17. Mitigation actions; description of any actions implemented in response to the sighting (*e.g.*, delays, shutdowns, ramp-up, speed or course alteration, etc.) and time and location of the action;

18. Equipment operating during sighting;

19. Animal's closest point of approach and/or closest distance from the center point of the acoustic source; and

20. Description of any actions implemented in response to the sighting (*e.g.*, delays, shutdown, ramp-up) and time and location of the action.

(d) 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, Vineyard Northeast must immediately report the sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866-755-6622).

(ii) North Atlantic right whale sightings in any location may also be reported to the U.S. Coast Guard via Channel 16.

(e) Reporting injured or dead marine mammals:

(i) Sightings of any injured or dead marine mammal must be reported to NMFS, regardless of the cause of injury or death. In the event that personnel involved in the survey activities discover an injured or dead marine mammal, Vineyard Northeast must report the incident as soon as feasible to the NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*),and the NMFS Greater Atlantic Stranding Hotline (866-755-6622) as soon as feasible. The incident must also be reported to the NMFS Greater Atlantic Regional Fisheries Office (*nmfs.gar.incidental-take@noaa.gov*). The report must include the following information:

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

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

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

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

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

6. General circumstances under which the animal was discovered.

(ii) In the event of a ship strike of a marine mammal by any vessel involved in the survey activities, Vineyard Northeast must report the incident to the NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*) and the NMFS Greater Atlantic Stranding Hotline (866-755-6622) as soon as feasible but within 24 hours. The incident must also be reported to the GARFO (*nmfs.gar.incidental-take@noaa.gov*). The report must include the following information:

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

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

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

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

5. Status of all sound sources in use;

6. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;

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

8. Estimated size and length of animal that was struck;

9. Description of the behavior of the marine mammal immediately preceding and/or following the strike;

10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;

11. Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and

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

7. This Authorization may be modified, suspended or revoked 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 stocks 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.

7/24/2024

Kimberly Damon-Randall,
Director, Office of Protected Resources,
National Marine Fisheries Service.

Date

Table 1— Authorized Take by Level B Harassment

Taxonomic group	Common name	Scientific name	Stock	ESA-listed?	Marine mammal category as it applies to mitigation requirements in the IHA	Authorized take by Level B harassment
Cetacean (Mysticete)	North Atlantic right whale	*Eubalaena glacialis*	Western Atlantic Stock	Yes	North Atlantic right whale	12
	Blue whale	*Balaenoptera musculus*	Western Atlantic Stock	Yes	Large whale	1
	Fin whale	*Balaenoptera physalus*	Western North Atlantic Stock	Yes	Large whale	20
	Sei whale	*Balaenoptera borealis*	Nova Scotia Stock	Yes	Large whale	5
	Minke whale	*Balaenoptera acutorostrata*	Canadian East Coastal Stock	No	Large whale	45
	Humpback whale	*Megaptera novaeangliae*	West Indies DPS	No	Large whale	12
Cetacean (Odontocete)	Sperm whale	*Physeter macrocephalus*	North Atlantic Stock	Yes	Large whale	2
	Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Western North Atlantic Stock	No	Small odontocete	126
	Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic Stock	No	Small odontocete	29
	Common bottlenose dolphin	*Tursiops truncatus*	Western North Atlantic Offshore Stock	No	Small odontocete	165
			Western North Atlantic Northern Migratory Coastal Stock			44
	Common dolphin (short-beaked)	*Delphinus delphis*	Western North Atlantic Stock	No	Small odontocete	7,296
	White-beaked dolphin	*Lagernorhynchus albirostris*	Western North Atlantic Stock	No	Small odontocete	30
	Risso's dolphin	*Grampus griseus*	Western North Atlantic Stock	No	Large odontocete	9
	Long-finned pilot whale	*Globicephala melas*	Western North Atlantic Stock	No	Large odontocete	17

	Killer whale	*Orcinus orca*	Western North Atlantic Stock	No	Large odontocete	4
	False killer whale	*Pseudorca crassidens*	Western North Atlantic Stock	No	Large odontocete	5
	Harbor porpoise	*Phocoena phocoena*	Western North Atlantic Stock	No	Small odontocete	339
Pinniped (Phocid)	Gray seal	*Halichoerus grypus*	Western North Atlantic Stock	No	Seal	408
	Harbor seal	*Phoca vitulina*	Western North Atlantic Stock	No	Seal	917

Table 2—Level B Harassment Zones

Equipment	**Distance to Level B harassment threshold (m)**
ET 216 CHIRP	4
GeoMarine Geo Sparker	141
Applied Acoustics AA 251 Boomer	178

Table 3—Distances for Clearance, Vessel Separation, and Shutdown Zones

<table>
<tr><th>Species</th><th>ESA-listed?</th><th>Clearance zone (m)</th><th>Vessel separation zone (m)</th><th>Shutdown zone (m)</th></tr>
<tr><td>North Atlantic right whale</td><td rowspan="5">Yes</td><td rowspan="5">500</td><td rowspan="5">500</td><td>500</td></tr>
<tr><td>Blue whale</td><td rowspan="10">100</td></tr>
<tr><td>Fin whale</td></tr>
<tr><td>Sei whale</td></tr>
<tr><td>Sperm whale</td></tr>
<tr><td>Humpback whale</td><td rowspan="13">No</td><td rowspan="13">100</td><td>100</td></tr>
<tr><td>Minke whale</td></tr>
<tr><td>Long-finned pilot whale</td><td rowspan="11">50 (as feasible)</td></tr>
<tr><td>Risso’s dolphin</td></tr>
<tr><td>Harbor porpoise</td></tr>
<tr><td>Killer whale</td></tr>
<tr><td>False killer whale</td></tr>
<tr><td>Gray seal</td><td rowspan="4">Not required. See condition 4(e)(iv) in this IHA.</td></tr>
<tr><td>Harbor seal</td></tr>
<tr><td>Atlantic white-sided dolphin</td></tr>
<tr><td>Atlantic spotted dolphin</td></tr>
</table>

Common bottlenose dolphin (coastal and offshore stocks)				
Common dolphin				
White-beaked dolphin				

Appendix B: NMFS Programmatic Consultation (PDC/BMPs)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930

June 29, 2021

James F. Bennett
Program Manager, Office of Renewable Energy Programs
U.S. Department of the Interior
Bureau of Ocean Energy Management
45600 Woodland Road, VAM-OREP
Sterling, Virginia 20166

Dear Mr. Bennett:

We have completed consultation pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended, concerning the effects of certain site assessment and site characterization activities to be carried out to support the siting of offshore wind energy development projects off the U.S. Atlantic coast. The Bureau of Ocean Energy Management (BOEM) is the lead federal agency for this consultation. BOEM's request for consultation included a biological assessment (BA) that was finalized in February 2021 and was supplemented with modified Project Design Criteria (PDC) and supplemental information through June 11, 2021. The activities considered in this consultation may occur in the three Atlantic Renewable Energy Regions (North Atlantic Planning Area, Mid-Atlantic Planning Area, and South Atlantic Planning Area; see Figure 1 in Appendix A) and adjacent coastal waters over the next 10 years (i.e., June 2021 – June 2031). Other action agencies include the U.S. Army Corps of Engineers (USACE), the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the National Marine Fisheries Service's (NMFS) Office of Protected Resources (OPR).

ACTION AREA AND PROPOSED ACTIONS

As defined in 50 CFR 402.02, "programmatic consultation is a consultation addressing an agency's multiple actions on a program, region, or other basis. Programmatic consultations allow NMFS to consult on the effects of programmatic actions such as: (1) Multiple similar, frequently occurring, or routine actions expected to be implemented in particular geographic areas; and, (2) A proposed program, plan, policy, or regulation providing a framework for future proposed actions." This programmatic consultation considers category 1--multiple similar, frequently occurring, or routine actions expected to be implemented in particular geographic areas.

The survey activities considered in this consultation are geophysical and geotechnical surveys and the deployment, operation, and retrieval of environmental data collection buoys. These frequent, similar activities are expected to be implemented along the U.S. Atlantic coast in the three Atlantic Renewable Energy Regions (North Atlantic Planning Area, Mid-Atlantic Planning Area, and South Atlantic Planning Area). The meteorological buoys and geophysical and geotechnical surveys are expected to occur to support the potential future siting of offshore wind turbines, cables, and associated offshore facilities such as substations or service platforms.

Action Agencies
As noted above, the activities considered here may be authorized, funded, or carried out by BOEM, the DOE, the EPA, the USACE, and NMFS. The roles of these action agencies are described here.

BOEM
The Outer Continental Shelf Lands Act (OCSLA), as amended, mandates the Secretary of the Interior (Secretary), through BOEM, to manage the siting and development of the Outer Continental Shelf (OCS) for renewable energy facilities. BOEM is delegated the responsibility for overseeing offshore renewable energy development in Federal waters (30 C.F.R. Part 585). Through these regulations, BOEM oversees responsible offshore renewable energy development, including the issuance of leases for offshore wind development. This consultation considers the effects of certain data collection activities (geophysical and geotechnical surveys and deployment of meteorological buoys) that may be undertaken to support offshore wind development. BOEM regulations require that a lessee provide the results of shallow hazard, geological, geotechnical, biological, and archaeological surveys with its Site Assessment Plan and Construction and Operations Plan (see 30 C.F.R. 585.610(b) and 30 C.F.R. 585.626(a)). BOEM also funds data collection projects, such as seafloor mapping through the Environmental Studies Program (ESP). The activities considered here may or may not occur in association with a BOEM lease. This consultation does not obviate the need for an appropriate consultation to occur on lease issuance or the approval of a Site Assessment Plan or Construction and Operations Plan.

DOE
The DOE's Office of Energy Efficiency and Renewable Energy (EERE) provides federal funding (financial assistance) in support of renewable energy technologies. EERE's Wind Energy Technologies Office invests in energy science research and development activities that enable the innovations needed to advance U.S. wind systems, reduce the cost of electricity, and accelerate the deployment of wind power, including offshore wind. EERE's Water Power Technologies Office enables research, development, and testing of emerging technologies to advance marine energy. DOE's financial assistance in support of renewable energy projects could have consequences for listed species in federal or state waters. Data collection activities that may be supported by DOE and are considered in this programmatic consultation include deployment of meteorological buoys and geotechnical and geophysical surveys.

EPA
Section 328(a) of the Clean Air Act (CAA) (42 U.S.C. § 7401 *et seq.*) as amended by Public Law 101-549 enacted on November 15, 1990, required the EPA to establish air pollution control requirements for OCS sources subject to the OCSLA for all areas of the OCS, except those located in the Gulf of Mexico west of 87.5 degrees longitude (near the border of Florida and Alabama),[1] in order to attain and maintain Federal and State ambient air quality standards and comply with the provisions of part C of title I of the Act.[2] To comply with this statutory mandate, on September 4, 1992, EPA promulgated "Outer Continental Shelf Air Regulations" at 40 C.F.R. part 55. (57 Fed. Reg. 40,791). 40 C.F.R part 55 also established procedures for

[1] Public Law 112-74, enacted on December 23, 2011, amended § 328(a) to add an additional exception from EPA regulation for OCS sources "located offshore of the North Slope Borough of the State of Alaska."
[2] Part C of title I contains the Prevention of Significant Deterioration of Air Quality (PSD) requirements.

implementation and enforcement of air pollution control requirements for OCS sources. 40 C.F.R. § 55.2 states:

> OCS source means any equipment, activity, or facility, which:
> (1) Emits or has the potential to emit any air pollutant;
> (2) Is regulated or authorized under OCSLA (43 U.S.C. § 1331 *et seq.*); and,
> (3) Is located on the OCS or in or on waters above the OCS.
> This definition shall include vessels only when they are:
> (1) Permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing, or producing resources therefrom …; or
> (2) Physically attached to an OCS facility, in which case only the stationary sources aspects of the vessels will be regulated.

As described in the BA, where activities considered in this consultation emit or will have the potential to emit air pollutants and are located on the OCS or in or on waters above the OCS, the activities may be subject to the 40 C.F.R. part 55 requirements, including the 40 C.F.R. § 55.6 permitting requirements. Such activities are expected to be limited to vessel operations and some meteorological buoys.

USACE

Of the activities considered in this consultation, the deployment of meteorological buoys and carrying out geotechnical surveys may require authorization from the USACE. The USACE has regulatory responsibilities under Section 10 of the Rivers and Harbors Act of 1899 to approve/permit any structures or activities conducted below the mean high water line of navigable waters of the United States. The USACE also has responsibilities under Section 404 of the Clean Water Act (CWA) to prevent water pollution, obtain water discharge permits and water quality certifications, develop risk management plans, and maintain such records. A USACE Nationwide Permit (NWP) 5 or Regional General Permit (RGP) for Scientific Measurement Devices is required for devices and scientific equipment whose purpose is to record scientific data through such means as meteorological stations (which would include buoys); water recording and biological observation devices, water quality testing and improvement devices, and similar structures. In New England States, RGPs are required instead of the NWP. As stated in both types of permit, "*upon completion of the use of the device to measure and record scientific data, the measuring device and any other structures or fills associated with that device (e.g., foundations, anchors, buoys, lines, etc.) must be removed to the maximum extent practicable and the site restored to preconstruction elevations,"* as prescribed by Section 404 of the CWA (U. S. Army Corps of Engineers 2012).

Consideration of Potential Issuance of Incidental Harassment Authorizations for Survey Activities

The Marine Mammal Protection Act (MMPA), and its implementing regulations, allows, upon request, the incidental take of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographic region. Incidental take is an unintentional, but not unexpected, "take." Upon receipt and review of an adequate and complete application, NMFS OPR may authorize the incidental take of marine mammals incidental to the marine site characterization surveys pursuant to the MMPA, if the required findings are made. Proponents of some survey activities considered here may be required to

obtain Incidental Take Authorizations (ITAs) under the MMPA. Therefore, the Federal actions considered in this consultation include the issuance of ITAs for survey activities described herein. Those ITAs may or may not provide MMPA take authorization for marine mammal species that are also listed under the ESA. As noted above, we have determined that all activities considered (inclusive of all PDC and BMPs) in this consultation will have no effect or are not likely to adversely affect any species listed under the ESA. By definition, that means that no take, as defined in the ESA, is anticipated. However, given the differences in the definitions of "harassment" under the MMPA and ESA, it is possible the site characterization surveys could result in harassment, as defined under the MMPA, but meet the ESA definition of "not likely to adversely affect." This consultation addresses such situations.

Under the MMPA (16 U.S.C. §1361 et seq.), take is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" and further defined by regulation (50 C.F.R. §216.3). Harassment is defined under the MMPA as any act of pursuit, torment, or annoyance which: has the potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B Harassment). As defined in the MMPA, Level B harassment does not include an act that has the potential to injure a marine mammal or marine mammal stock in the wild.

Under the ESA, take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct." Harm is defined by regulation (50 C.F.R. §222.102) as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding, or sheltering." NMFS does not have a regulatory definition of "harass." However, on December 21, 2016, NMFS issued interim guidance[3] on the term "harass," under the ESA, defining it as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." The NMFS interim ESA definition of "harass" is not equivalent to MMPA Level B harassment. Due to the differences in the definition of "harass" under the MMPA and ESA, there may be activities that result in effects to a marine mammal that would meet the threshold for harassment under both the MMPA and the ESA, while other activities may result in effects that would meet the threshold for harassment under the MMPA but not under the ESA. This issue is addressed further in the Marine Mammals section of this letter.

For this consultation, we considered NMFS' interim guidance on the term "harass" under the ESA when evaluating whether the proposed activities are likely to harass ESA-listed species, and we considered the available scientific evidence to determine the likely nature of the behavioral responses and their potential fitness consequences. As explained below, we determined that the effects to ESA-listed marine mammals resulting from the survey activities considered here would be insignificant and not result in harassment per NMFS' interim guidance on harassment under the ESA.

[3] NMFS Policy Directive 02-110-19; available at *https://media.fisheries.noaa.gov/dam-migration/02-110-19.pdf*; last accessed March 25, 2021.

Activities Considered in this Programmatic Consultation

The survey activities that are considered here consist of high resolution geophysical (HRG) and geotechnical surveys designed to characterize benthic and subsurface conditions and deployment, operation, and retrieval of environmental data collection buoys. A complete description of representative survey equipment to be used is included in Appendix A (Tables A.1 and A.2). Additionally, this consultation considers effects of deploying, operating, and retrieving buoys equipped with scientific instrumentation to collect oceanographic, meteorological, and biological data. All activities considered here will comply with a set of PDC (see Appendix B). We also consider the effects of vessel traffic associated with these activities. All vessels carrying out these activities, including during transits, will comply with measures outlined in Appendix B regardless of the equipment used or the sound levels/frequency at which equipment is operating. This consultation does not consider the effects of any survey activities that have the potential to result in directed or incidental capture or collection of any ESA-listed species (e.g., trawl surveys in areas where ESA-listed sea turtles occur).

This consultation does not evaluate the construction of any commercial electricity generating facilities or transmission cables with the potential to export electricity. Consistent with our understanding of the relevant regulations, BOEM has indicated that any such proposals for installation of electricity generating facilities (i.e., installation of wind turbines) or transmission cables would be a separate federal action (including authorization from BOEM) requiring a separate section 7 consultation. "Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action" (50 CFR §402.02; see also 50 CFR §402.17). The construction, operation, and/or decommissioning of any offshore wind facility or appurtenant facilities (e.g., cables, substations, etc.) are not consequences of the proposed survey activities considered here as they are not reasonably certain to occur. As such, this consultation does not consider these activities.

Action Area

The action area is defined by regulation as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The Action Area for this consultation includes the areas to be surveyed and where buoys will be deployed, areas where increased levels of noise will be experienced as well as the vessel transit routes between existing Atlantic coast ports and the survey area. This area encompasses all effects of the proposed action considered here.

Surveys considered in this programmatic consultation will take place at depths 100-meters (m) or less within the three Atlantic Renewable Energy Regions (North Atlantic Planning Area, Mid-Atlantic Planning Area, and South Atlantic Planning Area) located on the Atlantic Outer Continental Shelf (OCS) and may also occur along potential cable corridor routes in nearshore waters of Atlantic coast states. The three planning areas extend from the US/Canada border in the north to Palm Bay, Florida in the south. The North, Mid-Atlantic, and South Atlantic planning

areas together extend seaward from the U.S./Canadian border in the North to Palm Bay, Florida in the South. For the purposes of this consultation, the action area includes the Atlantic Renewable Energy Regions in OCS waters out to the 100 m depth contour in the North Atlantic, extending from waters offshore Maine to New Jersey; Mid-Atlantic, extending from waters offshore Delaware to North Carolina; and the South Atlantic extending from waters offshore South Carolina to east-central Florida and the adjacent coastal waters to the Atlantic coast (see Figure 1 in Appendix A for map of the action area). The offshore extent of the action area is defined by the anticipated maximum water depth where potential offshore wind facilities could be constructed. The seaward limit for siting a wind energy facility on the OCS is approximately 25 nautical miles (nm) (46.3 kilometers [km]) from shore or 100 m (328 feet [ft.]) water depth due to economic viability limitations. The current fixed foundation technologies are limited to depths of about 60 m. Although the majority of site assessment and site characterization activities will occur in water <60 m to accommodate the depth limitations in support of fixed foundations for wind turbine generators, floating foundations may be used in water depths >60 m in the future.

IMPLEMENTATION, TRACKING, AND REPORTING FOR THIS PROGRAMMATIC CONSULTATION

As noted above, activities considered in this consultation may be authorized, funded, or carried out by one or more action agencies. When one of these action agencies identifies a proposed activity that they believe falls within the scope of this programmatic consultation, they will first identify a lead action agency for the review (we anticipate that in most cases this will be BOEM). They will then review the activity to confirm that it is consistent with the activities covered by this consultation, including a review to confirm that all relevant PDCs (as outlined in Appendix B) will be implemented. The lead action agency for the activity will send written correspondence to the NMFS Greater Atlantic Regional Fisheries Office (GARFO) (nmfs.gar.esa.section7@noaa.gov) providing a brief summary of the proposed activity, including location and duration, and the agency's determination that the proposed activity is consistent with the scope of activities considered in this consultation. The action agency will also confirm in writing that all relevant PDCs will be implemented. If NMFS GARFO has any questions about the activity or determines it is not within the scope of this consultation, a written reply will be provided to the action agency within 15 calendar days. Activities that are determined to not be within the scope of this consultation can be modified by the action agency to bring them within the scope of this consultation or the action agency can request a stand-alone ESA section 7 consultation outside of this programmatic consultation.

To provide flexibility while maintaining the intent of this programmatic consultation, if an action agency proposes use of an equipment type different than described in this consultation, but can demonstrate that the acoustic characteristics are similar to the representative equipment described in Table A.2 and that implementation of the PDCs will result in the same effects considered here, this can be described when the survey plan is transmitted to us. Similarly, it is possible to consider modifications to the PDCs for a particular survey plan when the lead action agency can demonstrate that the same conservation benefit or risk reduction can be achieved with an alternate proposal.

In order to track activities carried out under this programmatic consultation, by February 15 of each year, BOEM, as the lead agency for this programmatic consultation, will provide a written report to NMFS documenting the activities that occurred under the scope of this consultation in

the previous year (e.g., the report for 2021 activities will be due by February 15, 2022). This annual report will also transmit any monitoring reports and any reports of instances where PDCs were not implemented (e.g., where human safety prevented implementation of an otherwise required speed reduction). Following the receipt of the annual report, a meeting will be held if necessary to review and update any PDCs and to update the list of representative equipment.

ESA-LISTED SPECIES AND CRITICAL HABITAT CONSIDERED IN THIS CONSULTATION

In their BA, BOEM described the ESA-listed species and critical habitats that occur along the U.S. Atlantic coast. Of the species listed in the BA, we have determined that oceanic whitetip shark (*Carcharhinus longimanus*), Nassau grouper (*Epinephelus striatus*)[4], staghorn coral (*Acropora cervicornis*), elkhorn coral (*Acropora palmata*), pillar coral (*Dendrogyra cylindrus*), rough cactus coral (*Mycetophyllia ferox*), lobed star coral (*Orbicella annularis*), mountainous star coral (*Orbicella faveolata*), and boulder star coral (*Orbicella franksi*) do not occur in the action area.

ESA-Listed Species in the Action Area

The following listed species occur in the action area and are considered in this consultation:

Table 1. ESA-listed species that may be affected by the proposed action.

Common Name	Scientific Name	ESA Status
Marine Mammals – Cetaceans		
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Sea Turtles		
Loggerhead turtle - Northwest Atlantic DPS	*Caretta*	Threatened
Green turtle - North Atlantic DPS and South Atlantic DPS	*Chelonia mydas*	Threatened
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered

[4] Nassau grouper may occur in nearshore and offshore waters in the Florida Straits Planning Area but are not known to occur in nearshore or offshore waters of the South Atlantic Planning Area (NMFS 2013)

Leatherback turtle	*Dermochelys coriacea*	Endangered
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Fishes		
Atlantic salmon	*Salmo salar*	Endangered
Atlantic sturgeon	*Acipenser oxyrinchus*	Endangered
New York Bight DPS		Endangered
Chesapeake Bay DPS		Endangered
Carolina DPS		Endangered
South Atlantic DPS		Endangered
Gulf of Maine DPS		Threatened
Giant Manta Ray	*Manta birostris*	Threatened
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Smalltooth sawfish	*Pristis pectinate*	Endangered

BOEM has determined the proposed action is not likely to adversely affect any of these species. We concur with this determination based on the rationale presented below. More information on the status of the species and critical habitat considered in this consultation, as well as relevant listing documents, status reviews, and recovery plans, can be found within the BA and on NMFS webpages accessible at: *https://www.greateratlantic.fisheries.noaa.gov/protected/section7/listing/index.html*, *https://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/index.html*, and *https://www.fisheries.noaa.gov/species-directory*.

Critical Habitat in the Action Area

The action area overlaps, at least in part, with critical habitat designated for all five DPSs of Atlantic sturgeon, North Atlantic right whales, and the Northwest Atlantic Ocean DPS of loggerhead sea turtles. While critical habitat is designated for some of the other species considered in this consultation, that critical habitat does not occur in the action area. Critical habitat for the Gulf of Maine DPS of Atlantic salmon is limited to certain mainstem rivers in the State of Maine. At this time, we do not know of any geotechnical or geophysical survey activities that are likely to occur in those waters. As such, the proposed action will not overlap with critical habitat designated for the Gulf of Maine DPS of Atlantic salmon. BOEM determined that the activities considered here may affect, but are not likely to adversely affect critical habitat designated for the five DPSs of Atlantic sturgeon or the Northwest Atlantic DPS of loggerhead sea turtles. We concur with these determinations based on the rationale presented in the Effects of the Action section below.

BOEM determined that the activities considered here would have no effect on critical habitat designated for North Atlantic right whales. We agree with this determination as described briefly below.

Critical Habitat designated for the North Atlantic Right Whale

On January 27, 2016, NMFS issued a final rule designating critical habitat for North Atlantic right whales (81 FR 4837). Critical habitat includes two areas (Units) located in the Gulf of Maine and Georges Bank Region (Unit 1) and off the coast of North Carolina, South Carolina, Georgia and Florida (Unit 2). Geophysical and geotechnical surveys and met buoy deployment may occur in Unit 1 and Unit 2. Note that there are seasonal restrictions on certain acoustic survey equipment in Unit 1 and Unit 2 (PDC 4); however, these seasonal restrictions are in place to further reduce the potential for effects to right whales in these areas and are not related to effects on the features of that critical habitat.

Consideration of Potential Effects to Unit 1

As identified in the final rule (81 FR 4837), the physical and biological features essential to the conservation of the North Atlantic right whale that provide foraging area functions in Unit 1 are: The physical oceanographic conditions and structures of the Gulf of Maine and Georges Bank region that combine to distribute and aggregate *C. finmarchicus* for right whale foraging, namely prevailing currents and circulation patterns, bathymetric features (basins, banks, and channels), oceanic fronts, density gradients, and temperature regimes; low flow velocities in Jordan, Wilkinson, and Georges Basins that allow diapausing *C. finmarchicus* to aggregate passively below the convective layer so that the copepods are retained in the basins; late stage *C. finmarchicus* in dense aggregations in the Gulf of Maine and Georges Bank region; and diapausing *C. finmarchicus* in aggregations in the Gulf of Maine and Georges Bank region.

The activities considered here will not affect the physical oceanographic conditions and structures of the region that distribute and aggregate *C. finmarchicus* for foraging. This is because the activities considered here have no potential to affect currents and circulation patterns, flow velocities, bathymetric features (basins, banks, and channels), oceanic fronts, density gradients, or temperature regimes. Therefore, we have determined that the activities considered in this programmatic consultation will have no effect on Unit 1 of right whale critical habitat.

Consideration of Potential Effects to Unit 2

As identified in the final rule (81 FR 4837), the physical and biological features essential to the conservation of the North Atlantic right whale, which provide calving area functions in Unit 2, are: (i) Sea surface conditions associated with Force 4 or less on the Beaufort Scale; (ii) Sea surface temperatures of 7 °C to 17 °C; and, (iii) Water depths of 6 to 28 meters, where these features simultaneously co-occur over contiguous areas of at least 231 nmi^2 of ocean waters during the months of November through April. When these features are available, they are selected by right whale cows and calves in dynamic combinations that are suitable for calving, nursing, and rearing, and which vary, within the ranges specified, depending on factors such as weather and age of the calves.

The activities considered here will have no effect on the features of Unit 2; this is because geophysical and geotechnical surveys, met buoys, and vessel operations do not affect sea surface state, water temperature, or water depth. Therefore, we have determined that the activities considered in this programmatic consultation will have no effect on Unit 2 of right whale critical habitat

EFFECTS OF THE ACTION ON NMFS LISTED SPECIES AND CRITICAL HABITAT

Potential effects of the proposed action on listed species can be broadly categorized into the following categories: (1) effects to individual animals of exposure to noise associated with the survey activities (HRG, geotechnical), (2) effects of buoy deployment, operation, and retrieval; (3) effects to habitat from survey activities (including consideration of effects to Atlantic sturgeon and loggerhead critical habitat), and (4) effects of vessel use.

Effects of Exposure to Noise Associated With Survey Activities

Here we consider effects of noise associated with HRG and geotechnical surveys on ESA-listed species. Noise associated with meteorological buoys and vessel operations is discussed in those sections of this consultation.

Acoustic Thresholds

Due to the different hearing sensitivities of different species groups, NMFS uses different sets of acoustic thresholds to consider effects of noise on ESA-listed species. Below, we present information on thresholds considered for ESA-listed whales, sea turtles, and fish considered in this consultation.

ESA-listed Whales

NMFS *Technical Guidance for Assessing the Effects of Anthropogenic Noise on Marine Mammal Hearing* compiles, interprets, and synthesizes scientific literature to produce updated acoustic thresholds to assess how anthropogenic, or human-caused, sound affects the hearing of all marine mammals under NMFS jurisdiction (NMFS 2018[5]). Specifically, it identifies the received levels, or thresholds, at which individual marine mammals are predicted to experience temporary or permanent changes in their hearing sensitivity for acute, incidental exposure to underwater anthropogenic sound sources. As explained in the document, these thresholds represent the best available scientific information. These acoustic thresholds cover the onset of both temporary (TTS) and permanent hearing threshold shifts (PTS).

[5] See *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance* for more information.

Table 2. Impulsive acoustic thresholds identifying the onset of permanent threshold shift and temporary threshold shift for ESA-listed whales (NMFS 2018).

Hearing Group	Generalized Hearing Range[6]	Permanent Threshold Shift Onset[7]	Temporary Threshold Shift Onset
Low-Frequency Cetaceans (LF: baleen whales)	7 Hz to 35 kHz	*L*pk,flat: 219 dB *L*E,LF,24h: 183 dB	*L*pk,flat: 213 dB *L*E,LF,24h: 168 dB
Mid-Frequency Cetaceans (MF: sperm whales)	150 Hz to 160 kHz	*L*pk,flat: 230 dB *L*E,MF,24h: 185 dB	*L*pk,flat: 224 dB *L*E,MF,24h: 170 dB

These thresholds are a dual metric for impulsive sounds, with one threshold based on peak sound pressure level (0-pk SPL) that does not incorporate the duration of exposure, and another based on cumulative sound exposure level (SEL_{cum}) that does incorporate exposure duration. The two metrics also differ in regard to considering information on species hearing. The cumulative sound exposure criteria incorporate auditory weighting functions, which estimate a species group's hearing sensitivity, and thus susceptibility to TTS and PTS, over the exposed frequency range, whereas peak sound exposure level criteria do not incorporate any frequency dependent auditory weighting functions.

Additionally, NMFS considers exposure to impulsive/intermittent noise greater than 160 dB re 1uPa rms to have the potential to result in Level B harassment, as defined under the MMPA (which does not necessarily equate to ESA harassment). This value is based on observations of behavioral responses of baleen whales (Malme et al. 1983; Malme et al. 1984; Richardson et al. 1986; Richardson et al. 1990), but is used for all marine mammal species.

Sea Turtles

In order to evaluate the effects of exposure to the survey noise by sea turtles, we rely on the available scientific literature. Sea turtles are low frequency hearing specialists, typically hearing frequencies from 30 Hz to 2 kHz, with a range of maximum sensitivity between 100 to 800 Hz (Ridgway et al. 1969, Lenhardt 1994, Bartol et al. 1999, Lenhardt 2002, Bartol and Ketten 2006). Currently, the best available data regarding the potential for noise to cause behavioral disturbance come from studies by O'Hara and Wilcox (1990) and McCauley et al. (2000), who experimentally examined behavioral responses of sea turtles in response to seismic airguns. O'Hara and Wilcox

[6] Represents the generalized hearing range for the entire group as a composite (i.e., all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on approximately 65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall et al. 2007).

[7] $L_{pk,flat}$: unweighted ($_{flat}$) peak sound pressure level (L_{pk}) with a reference value of 1 µPa; $L_{E,XF,24h}$: weighted (by species group; $_{LF}$: Low Frequency, or $_{MF}$: Mid-Frequency) cumulative sound exposure level (L_E) with a reference value of 1 μPa^2-s and a recommended accumulation period of 24 hours ($_{24h}$)

(1990) found that loggerhead turtles exhibited avoidance behavior at estimated sound levels of 175 to 176 dB re: 1 µPa (rms) (or slightly less) in a shallow canal. McCauley et al. (2000) reported a noticeable increase in swimming behavior for both green and loggerhead turtles at received levels of 166 dB re: 1 µPa (rms). At 175 dB re: 1 µPa (rms), both green and loggerhead turtles displayed increased swimming speed and increasingly erratic behavior (McCauley et al. 2000). Based on these data, we assume that sea turtles would exhibit a behavioral response when exposed to received levels of 175 dB re: 1 µPa (rms) and higher.

In order to evaluate the effects of exposure to the survey noise by sea turtles that could result in physical effects, we relied on the available literature related to the noise levels that would be expected to result in sound-induced hearing loss (i.e., temporary threshold shift (TTS) or permanent threshold shift (PTS)); we relied on acoustic thresholds for PTS and TTS for impulsive sounds developed by the U.S. Navy for Phase III of their programmatic approach to evaluating the environmental effects of their military readiness activities (U.S. Navy 2017). At the time of this consultation, we consider these the best available data since they rely on all available information on sea turtle hearing and employ the same statistical methodology to derive thresholds as in NMFS recently issued technical guidance for auditory injury of marine mammals (NMFS 2018). Below we briefly detail these thresholds and their derivation. More information can be found in the U.S. Navy's Technical report on the subject (U.S. Navy 2017).

To estimate received levels from airguns and other impulsive sources expected to produce TTS in sea turtles, the U.S. Navy compiled all sea turtle audiograms available in the literature in an effort to create a composite audiogram for sea turtles as a hearing group. Since these data were insufficient to successfully model a composite audiogram via a fitted curve as was done for marine mammals, median audiogram values were used in forming the hearing group's composite audiogram. Based on this composite audiogram and data on the onset of TTS in fishes, an auditory weighting function was created to estimate the susceptibility of sea turtles to TTS. Data from fishes were used since there are currently no data on TTS for sea turtles and fishes are considered to have hearing more similar to sea turtles than do marine mammals (Popper et al. 2014). Assuming a similar relationship between TTS onset and PTS onset as has been described for humans and the available data on marine mammals, an extrapolation to PTS susceptibility of sea turtles was made based on the methods proposed by (Southall et al. 2007). From these data and analyses, dual metric thresholds were established similar to those for marine mammals: one threshold based on peak sound pressure level (0-pk SPL) that does not incorporate the auditory weighting function nor the duration of exposure, and another based on cumulative sound exposure level (SEL_{cum}) that incorporates both the auditory weighting function and the exposure duration (Table 3).

Table 3. Acoustic thresholds identifying the onset of permanent threshold shift and temporary threshold shift for sea turtles exposed to impulsive sounds (U.S. Navy 2017, McCauley et al. 2000).

Hearing Group	Generalized Hearing Range	Permanent Threshold Shift Onset	Temporary Threshold Shift Onset	Behavioral Response
Sea Turtles	30 Hz to 2 kHz	204 dB re: 1 $\mu Pa^2 \cdot s$ SEL_{cum}	189 dB re: 1 $\mu Pa^2 \cdot s$ SEL_{cum}	175 dB re: 1 µPa (rms)
		232 dB re: 1 µPa SPL (0-pk)	226 dB re: 1 µPa SPL (0-pk)	

Marine Fish

There are no criteria developed for considering effects to ESA-listed fish specific to HRG equipment. However, all of the equipment that operates within a frequency that these fish species are expected to respond to, produces intermittent or impulsive sounds; therefore, it is reasonable to use the criteria developed for impact pile driving, seismic, and explosives when considering effects of exposure to this equipment (FHWG 2008). However, unlike impact pile driving, which produces repetitive impulsive noise in a single location, the geophysical survey sound sources are moving; therefore, the potential for repeated exposure to multiple pulses is much lower when compared to pile driving. We expect fish to react to noise that is disturbing by moving away from the sound source and avoiding further exposure. Injury and mortality is only known to occur when fish are very close to the noise source and the noise is very loud and typically associated with pressure changes (i.e., impact pile driving or blasting).

The Fisheries Hydroacoustic Working Group (FHWG) was formed in 2004 and consists of biologists from NMFS, United States Fish and Wildlife Service, Federal Highway Administration, USACE, and the California, Washington, and Oregon Department of Transportations, supported by national experts on underwater sound producing activities that affect fish and wildlife species of concern. In June 2008, the agencies signed an MOA documenting criteria for assessing physiological effects of impact pile driving on fish. The criteria were developed for the acoustic levels at which physiological effects to fish could be expected. It should be noted, that these are onset of physiological effects (Stadler and Woodbury, 2009), and not levels at which fish are necessarily mortally damaged. These criteria were developed to apply to all fish species. The interim criteria are:

- Peak SPL: 206 dB re 1 µPa
- SELcum: 187 B re 1μPa^2-s for fishes 2 grams or larger (0.07 ounces).
- SELcum: 183 dB re 1μPa^2-s for fishes less than 2 grams (0.07 ounces).

At this time, these criteria represent the best available information on the thresholds at which physiological effects to ESA-listed marine fish are likely to occur. It is important to note that physiological effects may range from minor injuries from which individuals are anticipated to completely recover with no impact to fitness to significant injuries that will lead to death. The

severity of injury is related to the distance from the noise source and the duration of exposure. The closer to the source and the greater the duration of the exposure, the higher likelihood of significant injury. Use of the 183 dB re 1 μPa^2-s cSEL threshold, is not appropriate for this consultation because all sturgeon in the action area will be larger than 2 grams. Physiological effects could range from minor injuries that a fish is expected to completely recover from with no impairment to survival to major injuries that increase the potential for mortality, or result in death.

We use 150 dB re: 1 µPa RMS as a threshold for examining the potential for behavioral responses by individual listed fish to noise with frequency less than 1 kHz. This is supported by information provided in a number of studies (Andersson et al. 2007, Purser and Radford 2011, Wysocki et al. 2007). Responses to temporary exposure of noise of this level is expected to be a range of responses indicating that a fish detects the sound, these can be brief startle responses or in the worst case, we expect that listed fish would completely avoid the area ensonified above 150 dB re: 1 uPa rms. Popper et al. (2014) does not identify a behavioral threshold but notes that the potential for behavioral disturbance decreases with the distance from the source.

HRG Acoustic Sources

HRG surveys are used for a number of site characterization purposes: locating shallow hazards, cultural resources, and hard-bottom areas; evaluating installation feasibility; assisting in the selection of appropriate foundation system designs; and determining the variability of subsurface sediments. The equipment typically used for these surveys includes: Bathymetry/Depth Sounder; Magnetometer; Seafloor Imagery/Side-Scan Sonar; Shallow and Medium (Seismic) Penetration Sub-bottom Profilers (e.g., CHIRPs, boomers, bubble guns). This consultation does not consider the use of seismic airguns because this equipment is not required for site characterization activities to support offshore wind development (due to the shallow sediment depths that need to be examined, compared to the miles into the seabed that are examined for oil and gas exploration where airguns are used).

As described in the BA, BOEM completed a desktop analysis of nineteen HRG sources in Crocker and Fratantonio (2016) to evaluate the distance to thresholds of concern for listed species (see tables in Appendix A). Equipment types or frequency settings that would not be used for the survey purposes by the offshore wind industry were not included in this analysis. To provide the maximum impact scenario for these calculations, the highest power levels and most sensitive frequency setting for each hearing group were used when the equipment had the option for multiple user settings. All sources were analyzed at a tow speed of 2.315 m/s (4.5 knots), which is the expected speed vessels will travel while towing equipment. PTS cumulative exposure distances were calculated for the low-frequency hearing group (sei, fin, and North Atlantic right whales), the mid-frequency group (sperm whales), and for a worst-case exposure scenario of 60 continuous minutes for sea turtles and fish.

Tables 4 and 5 describe the greatest distances to thresholds of concern for the various equipment types analyzed by BOEM. It is important to note that as different species groups have different hearing sensitivities, not all equipment operates within the hearing threshold of all species considered here. Complete tables are included in Appendix B of BOEM's BA.

Table 1. Summary of greatest PTS Exposure Distances from mobile HRG Sources at Speeds of 4.5 knots.

HRG SOURCE	PTS DISTANCE (m)								
	Highest Source Level (dB re 1 µPa)	Sea Turtles		Fish[b]		Baleen Whales		Sperm Whales[c]	
Mobile, Impulsive, Intermittent Sources									
		Peak	*SEL*	*Peak*	*SEL*	*Peak*	*SEL*	*Peak*	*SEL*
Boomers, Bubble Guns	176 dB SEL 207 dB RMS 216 PEAK	0	0	3.2	0	0	0.3	0	0
Sparkers	188 dB SEL 214 dB RMS 225 PEAK	0	0	9	0	2	12.7	0	0.2
Chirp Sub-Bottom Profilers	193 dB SEL 209 dB RMS 214 PEAK	NA	NA	NA	NA	0	1.2	0	0.3
Mobile, Non-impulsive, Intermittent Sources									
Multi-beam echosounder (100 kHz)	185 dB SEL 224 dB RMS 228 PEAK	NA	NA	NA	NA	NA	NA	0	0.5
Multi-beam echosounder (>200 kHz) (mobile, non-impulsive, intermittent)	182 dB SEL 218 dB RMS 223 PEAK	NA	NA	NA	NA	NA	NA	NA	NA
Side-scan sonar (>200 kHz) (mobile, non-impulsive, intermittent)	184 dB SEL 220 dB RMS 226 PEAK	NA	NA	NA	NA	NA	NA	NA	NA

[a] Sea turtle PTS distances were calculated for 203 cSEL and 230 dB peak criteria from Navy (2017).
[b] Fisheries Hydroacoustic Working Group (2008).
[c] PTS injury distances for listed marine mammals were calculated with NOAA's sound exposure spreadsheet tool using sound source characteristics for HRG sources in Crocker and Fratantonio (2016)
NA = not applicable due to the sound source being out of the hearing range for the group.

Using the same sound sources for the PTS analysis, BOEM calculated the distances to 175 dB re 1 µPa rms for sea turtles, 160 dB re 1 µPa rms for marine mammals, and 150 dB re 1 µPa rms for fish were calculated using a spherical spreading model (20 LogR) (Table 5). BOEM has conservatively used the highest power levels for each sound source reported in Crocker and Fratantonio (2016). Additionally, the spreadsheet and geometric spreading models do not

consider the tow depth and directionality of the sources; therefore, these are likely overestimates of actual disturbance distances.

Table 5. Summary of greatest disturbance distances by equipment type.

HRG SOURCE	DISTURBANCE DISTANCE (m)			
	Sea Turtles (175 dB re 1uPa rms)	Fish (150 dB re 1uPa rms)	Baleen Whales (160 dB re 1uPa rms)	Sperm Whales (160 dB re 1uPa rms)
Boomers, Bubble Guns	40	708	224	224
Sparkers	90	1,996[a]	502	502
Chirp Sub-Bottom Profilers	2	32	10	10
Multi-beam Echosounder (100 kHz)	NA	NA	NA	<369[b]
Multi-beam Echosounder (>200 kHz)	NA	NA	NA	NA
Side-scan Sonar (>200 kHz)	NA	NA	NA	NA

a – the calculated distance to the 150 dB rms threshold for the Applied Acoustics Dura-Spark is 1,996m; however, the distances for other equipment in this category is significantly smaller
b – this distance was recalculated using the NMFS spreadsheet following receipt of the BA.
NA = not applicable due to the sound source being out of the hearing range for the group.

Marine Mammals

Considering peak noise levels, the equipment resulting in the greatest isopleth to the marine mammal PTS threshold is the sparker (2.0 m for baleen whales, 0 m for sperm whales; Table A.3). Considering the cumulative threshold (24 hour exposure), the greatest distance to the PTS threshold is 12.7 m for baleen whales and 0.5 m for sperm whales. Animals in the survey area during the HRG survey are unlikely to incur any hearing impairment due to the characteristics of the sound sources, considering the source levels (176 to 205 dB re 1 µPa-m) and generally very short pulses and duration of the sound. Individuals would have to make a very close approach and

also remain very close to vessels operating these sources (<13 m) in order to receive multiple exposures at relatively high levels, as would be necessary to have the potential to result in any hearing impairment. Kremser et al. (2005) noted that the probability of a whale swimming through the area of exposure when a sub-bottom profiler emits a pulse is small—because if the animal was in the area, it would have to pass the transducer at close range in order to be subjected to sound levels that could cause PTS and would likely exhibit avoidance behavior to the area near the transducer rather than swim through at such a close range. Further, the restricted beam shape of many of HRG survey devices planned for use makes it unlikely that an animal would be exposed more than briefly during the passage of the vessel. The potential for exposure to noise that could result in PTS is even further reduced by the clearance zone and the use of PSOs to all for a shutdown of equipment operating within the hearing range of ESA-listed whales should a right whale or unidentified large whale be detected within 500 m or 100 m for an identified sei, fin, or sperm whale, see PDC 4. Based on these considerations, it is extremely unlikely that any ESA-listed whale will be exposed to noise that could result in PTS.

Masking is the obscuring of sounds of interest to an animal by other sounds, typically at similar frequencies. Marine mammals are highly dependent on sound, and their ability to recognize sound signals amid other sounds is important in communication and detection of both predators and prey (Tyack 2000). Although masking is a phenomenon which may occur naturally, the introduction of loud anthropogenic sounds into the marine environment at frequencies important to marine mammals increases the severity and frequency of occurrence of masking. The components of background noise that are similar in frequency to the signal in question primarily determine the degree of masking of that signal. In general, little is known about the degree to which marine mammals rely upon detection of sounds from conspecifics, predators, prey, or other natural sources. In the absence of specific information about the importance of detecting these natural sounds, it is not possible to predict the impact of masking on marine mammals (Richardson et al., 1995). In general, masking effects are expected to be less severe when sounds are transient than when they are continuous. Masking is typically of greater concern for those marine mammals that utilize low-frequency communications, such as baleen whales, because of how far low-frequency sounds propagate. NMFS has previously concluded that marine mammal communications would not likely be masked appreciably by the sub-bottom profiler signals given the directionality of the signals for most HRG survey equipment types planned for use for the types of surveys considered here and the brief period when an individual mammal is likely to be within its beam (see for example, 86 FR 22160). Based on this, any effects of masking on ESA-listed whales will be insignificant.

For equipment that operates within the functional hearing range (7 Hz to 35 kHz) of baleen whales, the area ensonified by noise greater than 160 dB re: 1uPa rms will extend no further than 502 m from the source (sparkers; the distance for chirp (10 m) and boomers and bubble guns (224 m) is smaller (Table A.5)). For equipment that operates within the functional hearing range of sperm whales (150 Hz to 160 kHz), the area ensonified by noise greater than 160 dB re: 1uPa rms will extend no further than 369 m from the source (100 kHz Multi-beam echosounder; the distance for sparkers (502 m), boomers and bubble guns (224 m), and chirp (10 m) is smaller; Table A.5).

Given that the distance to the 160 dB re: 1 uPa rms threshold extends beyond the required Shutdown Zone, it is possible that ESA-listed whales will be exposed to potentially disturbing levels of noise during the surveys considered here. We have determined that, in this case, the exposure to noise above the MMPA Level B harassment threshold (160 dB re: 1uPa rms) will result in effects that are insignificant. We expect that the result of this exposure would be, at worst, temporary avoidance of the area with underwater noise louder than this threshold, which is a reaction that is considered to be of low severity and with no lasting biological consequences (e.g., Ellison et al. 2007). The noise source itself will be moving. This means that any co-occurrence between a whale, even if stationary, will be brief and temporary. Given that exposure will be short (no more than a few seconds, given that the noise signals themselves are short and intermittent and because the vessel towing the noise source is moving) and that the reaction to exposure is expected to be limited to changing course and swimming away from the noise source only far/long enough to get out of the ensonified area (502 m or less, depending on the noise source), the effect of this exposure and resulting response will be so small that it will not be able to be meaningfully detected, measured or evaluated and, therefore, is insignificant. Further, the potential for disruption to activities such as breeding, feeding (including nursing), resting, and migrating is extremely unlikely given the very brief exposure to any noise (given that the source is traveling and the area ensonified at any given moment is so small). Any brief interruptions of these behaviors are not anticipated to have any lasting effects. Because the effects of these temporary behavioral changes are so minor, it is not reasonable to expect that, under the NMFS' interim ESA definition of harassment, they are equivalent to an act that would "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering."

Sea Turtles

None of the equipment being operated for these surveys that overlaps with the hearing range (30 Hz to 2 kHz) for sea turtles has source levels loud enough to result in PTS or TTS based on the peak or cumulative exposure criteria (Table A.4). Therefore, physical effects are extremely unlikely to occur.

As explained above, we assume that sea turtles would exhibit a behavioral response when exposed to received levels of 175 dB re: 1 µPa (rms) and are within their hearing range (below 2 kHz). For boomers and bubble guns the distance to this threshold is 40 m, and is 90 m for sparkers and 2 m for chirps (Table A.5). Thus, a sea turtle would need to be within 90 m of the source to be exposed to potentially disturbing levels of noise. We expect that sea turtles would react to this exposure by swimming away from the sound source; this would limit exposure to a short time period, just the few seconds it would take an individual to swim away to avoid the noise.

The risk of exposure to potentially disturbing levels of noise is reduced by the use of PSOs to monitor for sea turtles. As required by the PDC 4, a Clearance Zone (500 m in all directions) for ESA-listed species must be monitored around all vessels operating equipment at a frequency of less than 180 kHz. At the start of a survey, equipment cannot be turned on until the Clearance Zone is clear for at least 30 minutes. This condition is expected to reduce the potential for sea turtles to be exposed to noise that may be disturbing. However, even in the event that a sea turtle is submerged and not seen by the PSO, in the worst case, we expect that sea turtles would avoid the area ensonified by the survey equipment that they can perceive. Because the area where

increased underwater noise will be experienced is transient and increased underwater noise will only be experienced in a particular area for only seconds, we expect any effects to behavior to be minor and limited to a temporary disruption of normal behaviors, temporary avoidance of the ensonified area and minor additional energy expenditure spent while swimming away from the noisy area. If foraging or migrations are disrupted, we expect that they will quickly resume once the survey vessel has left the area. No sea turtles will be displaced from a particular area for more than a few minutes. While the movements of individual sea turtles will be affected by the sound associated with the survey, these effects will be temporary (seconds to minutes) and localized (avoiding an area no larger than 90 m) and there will be only a minor and temporary impact on foraging, migrating or resting sea turtles. For example, BOEM calculated that for a survey with equipment being towed at 3 knots, exposure of a turtle that was within 90 m of the source would last for less than two minutes. We also note that, to minimize disturbance to the Northwest Atlantic Ocean DPS of loggerhead sea turtles, a voluntary pause in sparker operation will be implemented for all vessels operating in nearshore critical habitat for loggerhead sea turtles if any loggerhead or other sea turtle is observed within a 100 m Clearance Zone during a survey. This will further reduce the potential for behavioral disturbance.

Given the intermittent and short duration of exposure to any potentially disturbing noise from HGR equipment, major shifts in habitat use or distribution or foraging success are not expected. Effects to individual sea turtles from brief exposure to potentially disturbing levels of noise are expected to be minor and limited to a brief startle, short increase in swimming speed and/or short displacement, and will be so small that they cannot be meaningfully measured, detected, or evaluated; therefore, effects are insignificant.

Marine Fish

Of the equipment that may be used for geophysical surveys, only equipment that operates at a frequency within the estimated hearing range of the ESA-listed fish that may occur in the action area (i.e., frequency less than 1 kHz; Lovell et al. 2005; Meyer et al. 2010) may affect these species. Generally, this includes sparkers, boomers, and bubble guns (see Table A.2). All other survey equipment operates at a frequency higher than the ESA-listed fish considered here are expected to hear; therefore, we do not expect any effects to ESA-listed fish exposed to increased underwater noise from the other higher frequency survey equipment. Due to their typically submerged nature, monitoring clearance or shutdown zones for marine fish is not expected to be effective. As required by PDC 4, the surveys will use a ramp up procedure; that is, noise producing equipment will not be used at full energy right away. This gives any fish in the immediate area a “warning” and an opportunity to leave the area before the full energy of the survey equipment is used.

As explained above, the available information suggests that for noise exposure to result in physiological impacts to the fish species considered here, received levels need to be at least 206 dB re: 1uPa peak sound pressure level (SPLpeak) or at least 187 dB re: u1Pa cumulative. The peak thresholds are exceeded only very close to the noise source (<3.2 m for the boomers/bubble guns and <9 m for the sparkers (see Table A.4); the cumulative threshold is not exceeded at any distance. As such, in order to be exposed to peak sound pressure levels of 206 dB re: 1uPa from any of these sources, an individual fish would need to be within 9 m of the source (Table A.4). This is extremely unlikely to occur given the dispersed nature of the distribution of ESA-listed fish

in the action area, the use of a ramp up procedure, the moving and intermittent/pulsed characteristic of the noise source, and the expectation that ESA-listed fish will swim away, rather than towards the noise source. Based on this, no physical effects to any ESA-listed fish, including injury or mortality, are expected to result from exposure to noise from the geophysical surveys.

We use 150 dB re: 1 µPa root mean square (RMS) sound pressure level (SPL) as a threshold for examining the potential for behavioral responses to underwater noise by ESA-listed fish. This is supported by information provided in a number of studies (Andersson et al. 2007, Purser and Radford 2011, Wysocki et al. 2007). In the worst case, we expect that ESA-listed fish would completely avoid an area ensonified above 150 dB re: 1uPa rms for the period of time that noise in that area was elevated. The calculated distances to the 150 dB re: 1 uPa rms threshold for the boomers/bubble guns, sparkers, and sub-bottom profilers is 708 m, 1,996 m, and 32 m, respectively (Table A.5). It is important to note that BOEM has conservatively used the highest power levels for each sound source reported in Crocker and Fratantonio (2016) to calculate these distances; thus, they likely overestimate actual sound fields.

Because the area where increased underwater noise will be experienced is transient (because the survey vessel towing the equipment is moving), increased underwater noise will only be experienced in a particular area for a short period of time. Given the transient and temporary nature of the increased noise, we expect any effects to behavior to be minor and limited to a temporary disruption of normal behaviors, potential temporary avoidance of the ensonified area and minor additional energy expenditure spent while swimming away from the noisy area. If foraging, resting, or migrations are disrupted, we expect that these behaviors will quickly resume once the survey vessel has left the area (i.e., in seconds to minutes, given its traveling speed of 3 – 4.5 knots). Therefore, no fish will be displaced from a particular area for more than a few minutes. While the movements of individual fish will be affected by the sound associated with the survey, these effects will be temporary and localized and these fish are not expected to be excluded from any particular area and there will be only a minimal impact on foraging, migrating, or resting behaviors. Sustained shifts in habitat use or distribution or foraging success are not expected. Effects to individual fish from brief exposure to potentially disturbing levels of noise are expected to be limited to a brief startle or short displacement and will be so small that they cannot be meaningfully measured, detected, or evaluated; therefore, effects of exposure to survey noise are insignificant.

Acoustic Effects - Geotechnical Surveys

Geotechnical surveys generally do not use active acoustic sources, but may have some low-level ancillary sounds associated with them. As described in the BA, the loudest noises are from drilling associated with obtaining bore samples. Small-scale drilling noise associated with bore samples taken in shallow water has been measured to produce broadband sounds centered at 10 Hz with source levels at 71-89 dB re 1 µPa rms and 75-97 dB re 1 µPa peak depending on the water depth of the work site (Willis et al. 2010). Another study reported measured drilling noise from a small jack-up rig at 147 – 151 db re 1 µPa rms in the 1 Hz to 22 kHz range at 10 m from source (Erbe and McPherson 2017).

Noise associated with geotechnical surveys is below the level that we expect may result in physiological or behavioral responses by any ESA-listed species considered here. As such, effects

to listed whales, sea turtles, or fish from exposure to this noise source are extremely unlikely to occur.

Meteorological Buoys

A meteorological buoy (met buoy) is designed to collect meteorological data for a period of four-five years. During this time, data will be collected and transmitted to onshore facilities. The operation of the meteorological data collection instrumentation (i.e., light detection and ranging remote sensing technology (LIDAR) and Acoustic Doppler Current Profilers (ADCP)) will have no effect on any listed species as it does not operate in any way that could result in effects to listed species. Bathymetric LIDAR uses water-penetrating green light to also measure seafloor and riverbed elevations. ADCP uses extremely high frequency sound (well above the hearing frequency of any species considered in this consultation) to measure water currents. No other acoustic effects from the deployment of the met buoys are anticipated.

Buoys will be deployed and retrieved by vessels; maintenance will also be carried out from vessels. Potential effects of vessel traffic for all activities considered in this consultation is addressed below. PDCs for siting the buoy will result in avoidance of anchoring buoys on any sensitive habitats (i.e., placement will occur on unconsolidated and uncolonized areas only, avoiding eelgrass, corals, etc.) (see PDC 1). Buoys will be anchored to a clump weight anchor and attached to the anchor with heavy chain. We have considered the potential for any listed species, including whales and/or sea turtles, to interact with the buoy and to become entangled in the buoy or mooring system and have determined that this is extremely unlikely to occur for the reasons outlined below.

In order for an entanglement to occur, an animal must first encounter the gear, which has an extremely low likelihood based on the number of buoys and total area where buoys may be deployed (Atlantic OCS). BOEM predicts that up to two met buoys could be deployed in any potential lease area, for a maximum of 60 buoys deployed in the entirety of the Atlantic OCS. Given the small number of buoys and their dispersed locations on the OCS, the potential for encounter between an individual whale or sea turtle and a buoy is extremely low. However even if there is co-occurrence between an individual animal and one or more buoys, entanglement is extremely unlikely to occur. This is because the buoy will be attached to the anchor with heavy gauge chain, which reduces the risk of entanglement due to the tension that the buoy will be under and the gauge of the chain, which prevents any slack in the chain that could result in an entanglement (see PDC 6). There have been no documented incidences of any listed species, including whales or sea turtles, entangled in United States Coast Guard navigational buoys, which have a similar mooring configuration to these met buoys, but also far outnumber the potential number of deployed met buoys (there are 1000s of navigational buoys within the range of ESA-listed whales and sea turtles and no recorded entanglements). Based on the analysis herein, it is extremely unlikely that any ESA-listed species will interact with the buoy and anchor system such that it becomes entangled. As such, effects are extremely unlikely to occur.

Effects to Habitat

Vibracores and grab samples may be used to document habitat types during geophysical and geotechnical survey activities. Both of these survey methods will result in temporary disturbance

of the benthos and a potential temporary loss of benthic resources. Additionally, bottom disturbance will occur in the area where a met buoy is anchored.

The vibracores and grab samples will affect an extremely small area (approximately 0.1 to 2.7 ft^2) at each sampling location, with sampling locations several hundred meters apart. While the vibracore and grab sampler will take a portion of the benthos that will be brought onto the ship, because of the small size of the sample and the nature of the removal, there is little to no sediment plume associated with the sampling. While there may be some loss of benthic species at the sample sites, including potential forage items for listed species that feed on benthic resources, the amount of benthic resources potentially lost will be extremely small and limited to immobile individuals that cannot escape capture during sampling. As such a small area will be disturbed and there will be a large distance between disturbed areas, recolonization is expected to be rapid. The amount of potential forage lost for any benthic feeding species is extremely small, localized, and temporary. While the area of the bottom impacted by the anchoring of the met buoy is larger (i.e., several meters in diameter), as stated above, there will be a small number of buoys deployed along the entire Atlantic OCS. Any loss of benthic resources will be small, temporary, and localized.

These temporary, isolated reductions in the amount of benthic resources are not likely to have a measurable effect on any foraging activity or any other behavior of listed species; this is due to the small size of the affected areas in relation to remaining available habitat in the OCS and the temporary nature of any disturbance. As effects to listed species will be so small that they cannot be meaningfully measured, detected, or evaluated, effects are insignificant.

Other Considerations – Geotechnical Surveys
The PDCs include a seasonal prohibition on any activities involving disturbance of the bottom in areas where early life stages of Atlantic or shortnose sturgeon may occur (see PDC 2). The seasonal prohibition is designed to avoid any activity that could disturb potential spawning or rearing substrate during the time of year that spawning or rearing may occur in that river. This PDC will also ensure that no bottom disturbing survey activities will occur at a time that eggs or other immobile or minimally mobile early life stages of sturgeon are present. This will ensure that sampling activities will not result in the disturbance, injury, or mortality of any sturgeon. Based on this, any effects to sturgeon spawning habitat or early life stages are extremely unlikely to occur.

Atlantic Sturgeon Critical Habitat
Critical habitat has been designated for all five DPSs of Atlantic sturgeon (82 FR 39160; effective date September 18, 2017). While there is no Atlantic sturgeon critical habitat in the three Atlantic Renewable Energy Regions located on the Atlantic OCS, survey activities along potential cable routes, including vessel transits, may occur within Atlantic sturgeon critical habitat. While BOEM anticipates that activities would be limited to overlapping with critical habitat designated in the Hudson, Delaware, and James rivers for the New York Bight and Chesapeake Bay DPSs respectively, the conclusions reached here apply to critical habitat designated for all five DPSs.

The PDCs include a seasonal prohibition on any geophysical and geotechnical survey activities involving disturbance of the bottom in freshwater (salinity less than 0.5 parts per thousand (ppt))

areas designated as critical habitat for any DPS of Atlantic sturgeon (see PDC # 2 for more detail). The PDCs also require operation of vessels in a way that ensures that vessel activities do not result in disturbance of bottom habitat.

In order to determine if the proposed action may affect critical habitat, we consider whether it would impact the habitat in a way that would affect its ability to support reproduction and recruitment. Specifically, we consider the effects of the action on the physical features of the proposed critical habitat. The Physical and Biological Features (PBFs) essential for Atlantic sturgeon conservation identified in the final rule (82 FR 39160) are:

> (1) Hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0.0 to 0.5 ppt range) for settlement of fertilized eggs, refuge, growth, and development of early life stages;
>
> (2) Aquatic habitat with a gradual downstream salinity gradient of 0.5 up to as high as 30 ppt and soft substrate (e.g., sand, mud) between the river mouth and spawning sites for juvenile foraging and physiological development;
>
> (3) Water of appropriate depth and absent physical barriers to passage (e.g., locks, dams, thermal plumes, turbidity, sound, reservoirs, gear, etc.) between the river mouth and spawning sites necessary to support: (i) Unimpeded movement of adults to and from spawning sites; (ii) Seasonal and physiologically dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary; and, (iii) Staging, resting, or holding of subadults or spawning condition adults. Water depths in main river channels must also be deep enough (e.g., at least 1.2 m) to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river.
>
> (4) Water, between the river mouth and spawning sites, especially in the bottom meter of the water column, with the temperature, salinity, and oxygen values that, combined, support: (i) Spawning; (ii) Annual and interannual adult, subadult, larval, and juvenile survival; and, (iii) Larval, juvenile, and subadult growth, development, and recruitment (e.g., 13 degrees Celsius [°C] to 26 °C for spawning habitat and no more than 30 °C for juvenile rearing habitat, and 6 milligrams per liter (mg/L) dissolved oxygen (DO) or greater for juvenile rearing habitat).

PBF 1: Hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0.0–0.5 ppt range) for settlement of fertilized eggs, refuge, growth, and development of early life stages

In considering effects to PBF 1, we consider whether the proposed action will have any effect on areas of hard substrate in low salinity waters that may be used for settlement of fertilized eggs, refuge, growth, and development of early life stages; therefore, we consider effects of the action on hard bottom substrate and any change in the value of this feature in the action area.

Vessel operations during transits or surveys would not affect hard bottom habitat in the part of the river with salinity less than 0.5 ppt, because they would not impact the river bottom in any way or change the salinity of portions of the river where hard bottom is found. Similarly, geophysical

surveys use acoustics to accurately map the seafloor, which would not impact any hard bottom that is present.

Grab samples, geotechnical surveys, and any other activity that may affect hard bottom is prohibited in areas with salinity less than 0.5 ppt during the time of year that these areas may be used for spawning or rearing (PDC 2). Given the very small footprint of all survey activities that may affect the hard bottom (3-4 inch diameter area would be disturbed during sampling) and the spacing of sampling several hundred meters apart, any effects to hard bottom substrate from survey activities outside of the time of year when these areas may be used for spawning and rearing would be small, localized, and dispersed. Given the dynamic nature of river sediments and the small area that will be disturbed, we expect that substrate conditions will recover to pre-survey conditions within days to weeks of sampling occurring. As such, any effects to hard bottom substrate and the value of this feature in the action area or to any of the critical habitat units as a whole are temporary and so small that they cannot be meaningfully measured, evaluated, or detected and, therefore, are insignificant.

PBF 2: Aquatic habitat with a gradual downstream salinity gradient of 0.5 up to as high as 30 ppt and soft substrate (e.g., sand, mud) between the river mouth and spawning sites for juvenile foraging and physiological development

In considering effects to PBF 2, we consider whether the proposed action will have any effect on areas of soft substrate within transitional salinity zones between the river mouth and spawning sites for juvenile foraging and physiological development; therefore, we consider effects of the action on soft substrate and salinity and any change in the value of this feature in the action area.

Project vessels (whether transiting or surveying) do not have the potential to effect salinity. Vessels are expected to maintain a minimum of 4-feet clearance with the river bottom (see PDC 2) and, therefore, effects to the soft substrate are extremely unlikely. The vessels' operations would not preclude or significantly delay the development of soft bottom habitat in the transitional salinity zone because they would not impact salinity or the river bottom in any way. Similarly, geophysical surveys use acoustics to accurately map the bottom, which would not affect any soft substrate that is present.

Grab samples and geotechnical surveys may impact soft substrate; however, given the very small footprint of any such activities (3-4 inch diameter area would be disturbed during sampling) and the spacing of sampling locations several hundred meters apart, any effects to soft substrate would be small, localized, and dispersed. Given the dynamic nature of river sediments and the small area that will be disturbed, we expect that substrate conditions will recover to pre-survey conditions within days to weeks of sampling occurring. As such, any effects to soft substrate and the value of this feature in the action area, are extremely unlikely or so small that they cannot be meaningfully measured, evaluated, or detected.

PBF 3: Water absent physical barriers to passage between the river mouth and spawning sites

In considering effects to PBF 3, we consider whether the proposed action will have any effect on water of appropriate depth and absent physical barriers to passage (e.g., locks, dams, thermal

plumes, turbidity, sound, reservoirs, gear, etc.) between the river mouth and spawning sites necessary to support: unimpeded movements of adults to and from spawning sites; seasonal and physiologically dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary, and; staging, resting, or holding of subadults or spawning condition adults. We also consider whether the proposed action will affect water depth or water flow, as if water is too shallow it can be a barrier to sturgeon movements, and an alteration in water flow could similarly impact the movements of sturgeon in the river, particularly early life stages that are dependent on downstream drift. Therefore, we consider effects of the action on water depth and water flow and whether the action results in barriers to passage that impede the movements of Atlantic sturgeon.

Survey activities, including vessel transits, will have no effect on this feature as they will not have any effect on water depth or water flow and will not be physical barriers to passage for any life stage of Atlantic sturgeon that may occur in this portion of the action area. As explained above, noise associated with the geotechnical surveys is below the threshold that would be expected to result in any disturbance of sturgeon; therefore, noise associated with geotechnical surveys will not affect the habitat in any way that would affect the movement of Atlantic sturgeon. Similarly, while HRG surveys may affect the movement of individual sturgeon, the effects are short-term and transient; noise is not expected to result in a barrier to passage. Based on this analysis, any effects to PBF 3 will be insignificant.

PBF 4: Water with the temperature, salinity, and oxygen values that, combined, provide for DO values that support successful reproduction and recruitment and are within the temperature range that supports the habitat function

In considering effects to PBF 4, we consider whether the proposed action will have any effect on water, between the river mouth and spawning sites, especially in the bottom meter of the water column, with the temperature, salinity, and oxygen values that, combined, support: spawning; annual and interannual adult, subadult, larval, and juvenile survival; and larval, juvenile, and subadult growth, development, and recruitment. Therefore, we consider effects of the action on temperature, salinity and DO needs for Atlantic sturgeon spawning and recruitment. These water quality conditions are interactive and both temperature and salinity influence the DO saturation for a particular area. We also consider whether the action will have effects to access to this feature, temporarily or permanently and consider the effect of the action on the action area's ability to develop the feature over time. Survey activities, including vessel transit, will have no effect on this feature as they will not have any effect on temperature, salinity or dissolved oxygen.

Summary of effects to Atlantic sturgeon critical habitat
We have determined that the effects of the activities considered here will be insignificant on PBFs 1, 2, and 3, and will have no effects to PBF 4. As such, the activities considered here are not likely to adversely affect Atlantic sturgeon critical habitat designated for any of the five DPSs.

Critical Habitat Designated for the Northwest Atlantic Ocean DPS of Loggerhead Sea Turtles
Critical habitat for the Northwest Atlantic Ocean DPS of loggerhead sea turtles was designated in 2014 (79 FR 39855). Specific areas for designation include 38 occupied marine areas within the range of the Northwest Atlantic Ocean DPS. These areas contain one or a combination of habitat

types: Nearshore reproductive habitat, winter area, breeding areas, constricted migratory corridors, and/or *Sargassum* habitat. There is no critical habitat designated in the North Atlantic Renewable Energy Region. Winter, breeding, and migratory habitat occur in the Mid-Atlantic and South Atlantic regions of the action areas; there is also a small amount of overlap with *Sargassum* critical habitat on the outer edges of the action area near the 100-m isobaths. Geophysical and geotechnical surveys and met buoy deployment may take place within this critical habitat. As explained below, the activities considered in this programmatic consultation are not likely to adversely affect critical habitat designated for the Northwest Atlantic Ocean DPS of loggerheads.

Nearshore Reproductive
The PBF of nearshore reproductive habitat is described as a portion of the nearshore waters adjacent to nesting beaches that are used by hatchlings to egress to the open-water environment as well as by nesting females to transit between beach and open water during the nesting season. The occurrence of designated nearshore reproductive habitat in the action area is limited to the area between the beach to 1 mile offshore along the Atlantic coast from Cape Hatteras, North Carolina to the southern extent of the South Atlantic planning area along the Florida coast.

As described in the final rule, the primary constituent elements (PCE) that support this habitat are the following: (1) Nearshore waters directly off the highest density nesting beaches and their adjacent beaches as identified in 50 CFR 17.95(c) to 1.6 km (1 mile) offshore; (2) Waters sufficiently free of obstructions or artificial lighting to allow transit through the surf zone and outward toward open water; and, (3) Waters with minimal manmade structures that could promote predators (i.e., nearshore predator concentration caused by submerged and emergent offshore structures), disrupt wave patterns necessary for orientation, and/or create excessive longshore currents.

Met buoys will only be deployed in federal waters; therefore, no met buoys will be deployed in nearshore reproductive habitat. HRG and geotechnical surveys and associated vessel transits could occur in this nearshore habitat. The intermittent noise associated with these activities will not be an obstruction to turtles moving through the surf zone; this is because the noise that can be perceived by sea turtles would dissipate to non-disturbing levels within 90 m of the moving source (see further explanation above) and the area with potentially disturbing levels of noise would be limited to one area within 90 m of the source at any given time. Therefore, given the small geographic area affected by noise and that these effects will be temporary (experienced for no more than 2 minutes in any given area), the effects to habitat are insignificant. Any lighting associated with the surveys would be limited to lights on vessels in the ocean, this lighting would not disorient turtles the way that artificial lighting along land can. Additionally, there are no mechanisms by which the HRG and geotechnical surveys and vessel activities would promote predators or disrupt wave patterns necessary for orientation or create excessive longshore currents.

Winter
The PBF of winter habitat is described as warm water habitat south of Cape Hatteras, North Carolina near the western edge of the Gulf Stream used by a high concentration of juveniles and adults during the winter months. The one area of winter critical habitat identified in the final rule extends from Cape Hatteras at the 20 m depth contour straight across 35.27° N. lat. to the 100 m (328 ft.) depth contour, south to Cape Fear at the 20 m (66 ft.) depth contour (approximately

33.47° N. lat., 77.58° W. long.) extending in a diagonal line to the 100 m (328 ft.) depth contour (approximately 33.2° N. lat., 77.32° W. long.). This southern diagonal line (in lieu of a straight latitudinal line) was chosen to encompass the loggerhead concentration area (observed in satellite telemetry data) and identified habitat features, while excluding the less appropriate habitat (e.g., nearshore waters at 33.2° N. lat.). PCEs that support this habitat are the following: (1) Water temperatures above 10°C from November through April; (2) Continental shelf waters in proximity to the western boundary of the Gulf Stream; and, (3) Water depths between 20 and 100 m.

Met buoy deployment/operation, HRG and geotechnical surveys, and vessel transits that may occur within the designated winter habitat will have no effect on this habitat because they will not: affect or change water temperatures above 10° C from November through April; affect continental shelf waters in proximity to the western boundary of the Gulf Stream; or, affect or change water depths between 20 and 100 m.

Breeding

The PBFs of concentrated breeding habitat are sites with high densities of both male and female adult individuals during the breeding season. Two units of breeding critical habitat are identified in the final rule. One occurs in the action area – a concentrated breeding site located in the nearshore waters just south of Cape Canaveral, Florida. The PCEs that support this habitat are the following: (1) High densities of reproductive male and female loggerheads; (2) Proximity to primary Florida migratory corridor; and, (3) Proximity to Florida nesting grounds.

Met buoys, HRG and geotechnical surveys, and vessel transits will not affect the habitat in the breeding units in a way that would change the density of reproductive male or female loggerheads. This is because (as explained fully above), any effects to distribution of sea turtles will be limited to intermittent, temporary disturbance limited to avoidance of an area no more than 90m from the survey vessel. The impacts to habitat from temporary increases in noise will be so small that they will be insignificant.

Constricted Migratory Corridors

The PBF of constricted migratory habitat is high use migratory corridors that are constricted (limited in width) by land on one side and the edge of the continental shelf and Gulf Stream on the other side. The final rule describes two units of constricted migratory corridor habitat. The constricted migratory corridor off North Carolina serves as a concentrated migratory pathway for loggerheads transiting to neritic foraging areas in the north, and back to winter, foraging, and/or nesting areas in the south. The constricted migratory corridor in Florida stretches from the westernmost edge of the Marquesas Keys (82.17° W. long.) to the tip of Cape Canaveral (28.46° N. lat.) and partially overlaps with the action area (i.e., the designated habitat extends further south than the action area). PCEs that support this habitat are the following: (1) Constricted continental shelf area relative to nearby continental shelf waters that concentrate migratory pathways; and, (2) Passage conditions to allow for migration to and from nesting, breeding, and/or foraging areas.

Noise associated with the survey activities considered here will have minor and temporary effects on winter habitat; however, as explained fully above, any effects to sea turtles will be limited to intermittent, temporary disturbance or avoidance of an area no more than 90m from the survey vessel. These temporary and intermittent increases in underwater noise will have insignificant

effects on the conditions of the habitat that will not result in any decreased ability or availability of habitat for passage of sea turtles. No other activities will affect passage of loggerhead sea turtles in the wintering habitat.

Sargassum
The PBF of loggerhead *Sargassum* habitat is developmental and foraging habitat for young loggerheads where surface waters form accumulations of floating material, especially *Sargassum*. Two areas are identified in the final rule – the Atlantic Ocean area and the Gulf of Mexico area. The Atlantic Ocean area extends from the Gulf of Mexico along the northern/western boundary of the Gulf Stream and east to the outer edge of the U.S. EEZ. There is a small amount of overlap between the action area and the Atlantic Ocean *Sargassum* critical habitat unit on the outer edges of the action area near the 100-m isobaths. PCEs that support this habitat are the following: (i) Convergence zones, surface-water downwelling areas, the margins of major boundary currents (Gulf Stream), and other locations where there are concentrated components of the *Sargassum* community in water temperatures suitable for the optimal growth of *Sargassum* and inhabitance of loggerheads; (ii) *Sargassum* in concentrations that support adequate prey abundance and cover; (iii) Available prey and other material associated with *Sargassum* habitat including, but not limited to, plants and cyanobacteria and animals native to the *Sargassum* community such as hydroids and copepods; and, (iv) Sufficient water depth and proximity to available currents to ensure offshore transport (out of the surf zone), and foraging and cover requirements by *Sargassum* for post-hatchling loggerheads, i.e., >10 m depth.

Given the distance from shore, met buoy deployment is not anticipated in areas designated as *Sargassum* critical habitat. The occasional project vessel transits, HRG and geotechnical surveys that may occur within the designated *Sargassum* habitat will have no effect on: conditions that result in convergence zones, surface-water downwelling areas, the margins of major boundary currents (Gulf Stream), and other locations where there are concentrated components of the *Sargassum* community in water temperatures suitable for the optimal growth of *Sargassum* and inhabitance of loggerheads; the concentration of *Sargassum*; the availability of prey within *Sargassum*; or the depth of water in any area. This is because these activities do not affect hydrological or oceanographic processes, no *Sargassum* will be removed due to survey activities, and the intermittent noise associated with surveys will not affect the availability of prey within *Sargassum*.

Summary of effects to critical habitat
Any effects to designated critical habitat will be insignificant. Therefore, the survey activities considered in this programmatic consultation are not likely to adversely affect critical habitat designated for the Northwest Atlantic DPS of loggerhead sea turtles.

Vessel Traffic
The HRG and geotechnical surveys are carried out from vessels. Additionally, vessels will be used to transport met buoys to and from deployment sites and to carry out any necessary inspections. As described in BOEM's BA, survey operations involve slow moving vessels, traveling at no more than 3-4.5 knots. HRG and geotechnical surveys typically involve one to three survey vessels operating within the area to be surveyed; up to approximately 36 areas may be surveyed over the 10-year period considered here. During transits to or from survey locations,

these vessels would travel at a maximum speed of around 12 knots. Met buoy deployment, retrieval, and inspection will also involve one or two vessels at a time; a total of 60 buoys are considered in this consultation. These vessels will typically travel at speeds of 12 knots or less; however, service vessels (limited to one trip per month per buoy) may travel at speeds of up to 25 knots (BOEM 2021).

Marine Mammals

As detailed in Appendix B, a number of Best Management Practices (BMPs) (see PDC 5), designed to reduce the risk of vessel strike, will be implemented for all activities covered by this programmatic consultation, including the following requirements:

1. All vessel operators and crews will maintain a vigilant watch for marine mammals at all times, and slow down or stop their vessel to avoid any interaction.
2. PSOs monitoring a Vessel Strike Avoidance Zone during all vessel operations.
3. Complying with speed restrictions in North Atlantic right whale management areas including Seasonal Management Areas (SMAs), active Dynamic Management Areas (DMAs)/visually triggered Slow Zones.
4. Daily monitoring of the NMFS North Atlantic right whale reporting systems.
5. Reducing vessel speeds to ≤10 knots when mother/calf pairs, pods, or large assemblages of ESA-listed marine mammals are observed.
6. Maintaining >500 m separation distance from all ESA-listed whales or an unidentified large marine mammal; if a whale is sighted within 200 m of the forward path of the vessel, then reducing speed and shifting the engines into neutral, and must not be engaged until the whale has move outside of the vessel's path and beyond 500 m.

An examination of all known ship strikes from all shipping sources (civilian and military) indicates vessel speed is a principal factor in whether a vessel strike results in death of a whale (Kelley et al. 2020; Knowlton and Kraus 2001; Laist et al., 2001; Jensen and Silber 2003; Vanderlaan and Taggart 2007). In assessing records with known vessel speeds, Laist et al. (2001) found a direct relationship between the occurrence of a whale strike and the speed of the vessel involved in the collision. The authors concluded that most deaths occurred when a vessel was traveling in excess of 24.1 km/h (14.9 mph; 13 knots (kn)). Additionally, Kelley et al (2020) found that collisions that create stresses in excess of 0.241 megapascals were likely to cause lethal injuries to large whales and through biophysical modeling that vessels of all sizes can yield stresses higher than this critical level. Survey vessels will typically travel slowly (less than 4.5 knots) as necessary for data acquisition, will have PSOs monitoring for whales, and will adjust vessel operations as necessary to avoid striking whales during survey operations and transits. The only times that survey vessels will operate at speeds above 4 knots is during transit to and from the survey site where they may travel at speeds up to 12 knots (although several circumstances described below will restrict speed to 10 knots), a number of measures (see PDC 5) will be in place to minimize the risk of strike during these transits. Slow operating speeds mean that vessel operators have more time to react and steer the vessel away from a whale. The

use of dedicated PSOs to keep a constant watch for whales and to alert vessel operators of any sightings also allows vessel operators to avoid striking any sighted whales.

As noted above, vessels used to inspect and maintain met buoys may travel at speeds up to 25 knots. This vessel traffic will be an extremely small increase in the amount of vessel traffic in the action area (i.e., if 60 buoys are deployed this would be a maximum of 60 trips per month spread out along the entire Atlantic OCS), which is transited by thousands of vessels each day. These vessels are subject to all of the vessel related BMPs (see PDC 5) noted above, including use of a dedicated lookout, vessel strike avoidance procedures, and requirements to slow down to 10 knots in areas where North Atlantic right whales have been documented (i.e., within SMAs, DMAs/visually triggered Slow Zones). Based on this analysis, it is extremely unlikely that a vessel associated with the survey activities considered here, when added to the environmental baseline, will strike an ESA-listed whale. We note that similar activities have taken place since at least 2012 in association with BOEM's renewable energy program and there have been no reports of any vessel strikes of marine mammals.

The frequency range for vessel noise (10 to 1000 Hz; MMS 2007) overlaps with the generalized hearing range for sei, fin, and right whales (7 Hz to 35 kHz) and sperm whales (150 Hz to 160 kHz) and would therefore be audible. Vessels without ducted propeller thrusters would produce levels of noise of 150 to 170 dB re 1 µPa-1 meter at frequencies below 1,000 Hz, while the expected sound-source level for vessels with ducted propeller thrusters level is 177 dB (RMS) at 1 meter (BOEM 2015, Rudd et al. 2015). For ROVs, source levels may be as high as 160 dB (BOEM 2021). Given that the noise associated with the operation of project vessels is below the thresholds that could result in injury, no injury is expected.

Marine mammals may experience masking due to vessel noises. For example, right whales were observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks et al. 2007) as well as increasing the amplitude (intensity) of their calls (Parks et al. 2011a; Parks et al. 2009). Right whales also had their communication space reduced by up to 84 percent in the presence of vessels (Clark et al. 2009). Although humpback whales did not change the frequency or duration of their vocalizations in the presence of ship noise, their source levels were lower than expected, potentially indicating some signal masking (Dunlop 2016).

Vessel noise can potentially mask vocalizations and other biologically important sounds (e.g., sounds of prey or predators) that marine mammals may rely on. Potential masking can vary depending on the ambient noise level within the environment, the received level and frequency of the vessel noise, and the received level and frequency of the sound of biological interest. In the open ocean, ambient noise levels are between about 60 and 80 dB re 1 µPa in the band between 10 Hz and 10 kHz due to a combination of natural (e.g., wind) and anthropogenic sources (Urick 1983), while inshore noise levels, especially around busy ports, can exceed 120 dB re 1 µPa. When the noise level is above the sound of interest, and in a similar frequency band, masking could occur. This analysis assumes that any sound that is above ambient noise levels and within an animal's hearing range may potentially cause masking. However, the degree of masking increases with increasing noise levels; a noise that is just detectable over ambient levels is unlikely to cause any substantial masking.

Vessel noise has the potential to disturb marine mammals and elicit an alerting, avoidance, or other behavioral reaction. These reactions are anticipated to be short-term, likely lasting the amount of time the vessel and the whale are in close proximity (e.g., Magalhaes et al. 2002; Richardson et al. 1995; Watkins 1981), and not consequential to the animals. Additionally, short-term masking could occur. Masking by passing ships or other sound sources transiting the action area would be short term and intermittent, and therefore unlikely to result in any substantial costs or consequences to individual animals or populations. Areas with increased levels of ambient noise from anthropogenic noise sources such as areas around busy shipping lanes and near harbors and ports may cause sustained levels of masking for marine mammals, which could reduce an animal's ability to find prey, find mates, socialize, avoid predators, or navigate.

Based on the best available information, ESA-listed whales are either not likely to respond to vessel noise or are not likely to measurably respond in ways that would significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding or sheltering. Therefore, the effects of vessel noise on ESA-listed whales are insignificant (i.e., so minor that the effect cannot be meaningfully evaluated or detected).

Sea Turtles

As detailed in Appendix B, a number of BMPs (see PDC 5), designed to reduce the risk of vessel strike, will be implemented for all activities covered by this programmatic consultation, including dedicated lookouts on board all transiting vessels, reduced speeds and avoidance of areas where sea turtles are likely to occur (e.g., Sargassum patches), and required separation distances from any observed sea turtles.

Sea turtles are vulnerable to vessel collisions because they regularly surface to breathe and often rest at or near the surface. Sea turtles often congregate close to shorelines during the breeding season, where boat traffic is denser (Schofield et al. 2007; Schofield et al. 2010) which can increase vulnerability to vessel strike in such areas, particularly by smaller, fast moving vessels. Sea turtles, with the exception of hatchlings and pre-recruitment juveniles, spend a majority of their time submerged (Renaud and Carpenter 1994; Sasso and Witzell 2006). Although, Hazel et al. (2007) demonstrated sea turtles preferred to stay within the three meters of the water's surface, despite deeper water being available. Any of the sea turtle species found in the action area can occur at or near the surface in open-ocean and coastal areas, whether resting, feeding or periodically surfacing to breathe.

While research is limited on the relationship between sea turtles, vessel strikes and vessel speeds, sea turtles are at risk of vessel strike where they co-occur with vessels. Sea turtle detection is likely based primarily on the animal's ability to see the oncoming vessel, which would provide less time to react to vessels traveling at speeds at or above 10 knots (Hazel et al. 2007). Hazel et al. (2007) examined vessel strike risk to green sea turtles and suggested that sea turtles may habituate to vessel sound and are more likely to respond to the sight of a vessel rather than the sound of a vessel, although both may play a role in eliciting responses (Hazel et al. 2007). Regardless of what specific stressor associated with vessels turtles are responding, they only appear to show responses (avoidance behavior) at approximately 10 m or closer (Hazel et al. 2007). This is a concern because faster vessel speeds also have the potential to result in more

serious injuries (Work et al. 2010). Although sea turtles can move quickly, Hazel et al. (2007) concluded that at vessel speeds above 4 km/hour (2.1 knots) vessel operators cannot rely on turtles to actively avoid being struck. Thus, sea turtles are not considered reliably capable of moving out of the way of vessels moving at speeds greater than 2.1 knots.

While vessel struck sea turtles have been observed throughout their range, including in the action area, the regions of greatest concern for vessel strike are areas with high concentrations of recreational-boat traffic such as the eastern Florida coast, the Florida Keys, and the shallow coastal bays in the Gulf of Mexico (NRC 1990). In general, the risk of strike for sea turtles is considered to be greatest in areas with high densities of sea turtles and small, fast moving vessels such as recreational vessels or speed boats (NRC 1990). Similarly, Foley et al. (2019) concluded that in a study in Florida, vessel strike risk for sea turtles was highest at inlets and passes. Stetzar (2002) reports that 24 of 67 sea turtles stranded along the Atlantic Delaware coast from 1994-1999 had evidence of boat interactions (hull or propeller strike); however, it is unknown how many of these strikes occurred after the sea turtle died. There are no estimates of the total number of sea turtles struck by vessels in the Atlantic Ocean each year. Foley et al. (2019), estimated that strikes by motorized watercraft killed a mean of 1,326–4,334 sea turtles each year in Florida during 2000–2014 (considering the Atlantic and Gulf coasts of Florida). As described in NRC 1990, vessel strike risk for sea turtles in the Atlantic Ocean is highest in Florida.

The proposed survey activities will result in an increase in vessel traffic in the action area. Compared to baseline levels of vessel traffic in the action area (in its entirety and in any particular portion), the survey vessels, which will be likely two or three vessels operating in a particular survey area at a time (and spaced such that the sound fields of any noise producing equipment do not overlap), represent an extremely small fraction of total vessel traffic. For example, the U.S. Coast Guard's Atlantic Coast Port Access Route Study (ACPARS; USCG 2015), reports nearly 36,000 unique vessel transits through wind energy areas and lease areas along the Atlantic Coast. Those vessel transits represent only a fraction of the total coastal traffic as the wind energy areas and lease areas are located further offshore than most of the routes used by coastal tug traffic, for example. The U.S. Coast Guard's New Jersey PARS (USCG 2021) reports between 77,000 and 80,000 unique trips annual in the Atlantic Ocean off a portion of the coast of New Jersey in 2017-2019. This data is not wholly representative of all vessel traffic in this area as it only includes vessels carrying AIS systems, which is only required for vessels 65 feet in length or greater (although smaller vessels can utilize AIS and some do). Even if there were 3-boat surveys occurring in each of the four lease areas located in the New Jersey PARS study area, this would represent an increase of 12 vessels off New Jersey in a single year; this represents an approximately 0.01% increase in vessel traffic in that area. We expect that this increase is similar in other portions of the action area. If we assume that any increase in vessel traffic in the action area would increase the risk of vessel strike to sea turtles, then we could also assume that this would result in a corresponding increase in the number of sea turtles struck by vessels. However, it is unlikely that all vessels represent an equal increase in risk and the slow speeds (up to 4.5 knots) that the majority of vessels considered here will typically be moving, requirements to monitor for sea turtles during vessel transits, avoid or slowdown in areas where sea turtles are likely to occur, and to maintain distance from any sighted turtles, means that the risk to sea turtles from the survey vessels is considerably less than other vessels, particularly small, fast vessels operating in nearshore areas where sea turtle densities are high.

An analysis conducted by NMFS Southeast Regional Office (Barnette 2018) considered sea turtle vessel strike risk in Florida; the portion of the action area where risk is considered highest due to the concentration of sea turtles and vessels. Barnette (2018) concluded that, when using the conservative mean estimate of a sea turtle strike every 193 years (range of 135-250 years) per vessel, it would require approximately 200 new vessels introduced to an area to potentially result in a single sea turtle strike in any single year. Considering that the proposed action will introduce significantly fewer vessels in any particular area and that survey vessels will increase vessel traffic in the action area by less than 0.01%, and the measures that will be in place to reduce risk of vessel strike, as well as the slow speed of the survey vessels, we conclude that any increase in the number of sea turtles struck in the action area because of the increase in traffic resulting from survey vessels added to the environmental baseline is extremely unlikely. Therefore, effects of this increase in traffic are extremely unlikely.

The vessels used for the proposed project will produce low-frequency, broadband underwater sound below 1 kHz (for larger vessels), and higher-frequency sound between 1 kHz to 50 kHz (for smaller vessels), although the exact level of sound produced varies by vessel type.

ESA-listed turtles could be exposed to a range of vessel noises within their hearing abilities. Depending on the context of exposure, potential responses of green, Kemp's ridley, leatherback, and loggerhead sea turtles to vessel noise disturbance, would include startle responses, avoidance, or other behavioral reactions, and physiological stress responses. Very little research exists on sea turtle responses to vessel noise disturbance. Currently, there is nothing in the available literature specifically aimed at studying and quantifying sea turtle response to vessel noise. However, a study examining vessel strike risk to green sea turtles suggested that sea turtles may habituate to vessel sound and may be more likely to respond to the sight of a vessel rather than the sound of a vessel, although both may play a role in prompting reactions (Hazel et al. 2007). Regardless of the specific stressor associated with vessels to which turtles are responding, they only appear to show responses (avoidance behavior) at approximately 10 m or closer (Hazel et al. 2007).

Therefore, the noise from vessels is not likely to affect sea turtles from further distances, and disturbance may only occur if a sea turtle hears a vessel nearby or sees it as it approaches. These responses appear limited to non-injurious, minor changes in behavior based on the limited information available on sea turtle response to vessel noise.

For these reasons, vessel noise is expected to cause minimal disturbance to sea turtles. If a sea turtle detects a vessel and avoids it or has a stress response from the noise disturbance, these responses are expected to be temporary and only endure while the vessel transits through the area where the sea turtle encountered it. Therefore, sea turtle responses to vessel noise disturbance are considered insignificant (i.e., so minor that the effect cannot be meaningfully evaluated), and a sea turtle would be expected to return to normal behaviors and stress levels shortly after the vessel passes by.

Marine Fish

The only listed fish in the action area that are known to be at risk of vessel strike are shortnose and Atlantic sturgeon and giant manta ray. Vessel activities will have no effect on Atlantic salmon or

smalltooth sawfish. There is no information to indicate that Atlantic salmon are struck by vessels; therefore, we have concluded that strike is extremely unlikely to occur. A vessel strike to smalltooth sawfish is extremely unlikely; smalltooth sawfish are primarily demersal and rarely would be at risk from moving vessels. PDC 5 requires vessels to maintain sufficient clearance above the bottom and to reduce speeds to 5 knots or less in waters with less than 4 feet of clearance. These conditions, combined with the low likelihood of vessels operating in nearshore coastal waters of Florida where sawfish occur, is expected to eliminate risk of vessel strikes with smalltooth sawfish.

Giant Manta Ray

Giant manta rays can be frequently observed traveling just below the surface and will often approach or show little fear toward humans or vessels (Coles 1916), which may also make them vulnerable to vessel strikes (Deakos 2010); vessel strikes can injure or kill giant manta rays, decreasing fitness or contributing to non-natural mortality (Couturier et al. 2012; Deakos et al. 2011). However, information about interactions between vessels and giant manta rays is limited. We have at least some reports of vessel strike, including a report of five giant manta rays struck by vessels from 2016 through 2018; individuals had injuries (i.e., fresh or healed dorsal surface propeller scars) consistent with a vessel strike. These interactions were observed by researchers conducting surveys from Boynton Beach to Jupiter, Florida (J. Pate, Florida Manta Project, pers. comm. to M. Miller, NMFS OPR, 2018) and it is unknown where the manta was at the time of the vessel strike. The giant manta ray is frequently observed in nearshore coastal waters and feeding at inlets along the east coast of Florida. As recreational vessel traffic is concentrated in and around inlets and nearshore waters, this overlap exposes the giant manta ray in these locations to an increased likelihood of potential vessel strike injury especially from faster moving recreational vessels. Yet, few instances of confirmed or suspected strandings of giant manta rays are attributed to vessel strike injury. This lack of documented mortalities could also be the result of other factors that influence carcass detection (i.e., wind, currents, scavenging, decomposition etc.); however, giant manta rays appear to be able to be fast and agile enough to avoid most moving vessels, as anecdotally evidenced by videos showing rays avoiding interactions with high-speed vessels.

While there is limited available information on the giant manta ray, we expect the circumstances and factors resulting in vessel strike injury are similar between sea turtles and the giant manta ray because these species are both found in nearshore waters (including in the vicinity of inlets where vessel traffic may also be concentrated) and may spend significant time at or near the surface. Therefore, consistent with Barnette 2018, we will rely on the more robust available data on sea turtle vessel strike injury to serve as a proxy for the giant manta ray. Because the activities considered here will result in far fewer than 200 new vessels, it is extremely unlikely that any giant manta rays will be struck by new or increased vessel traffic.

Sturgeon

Here, we consider whether the increase in vessel traffic is likely to increase the risk of strike for Atlantic or shortnose sturgeon in any part of the action area. Because the increase in traffic will be limited to no more than two or three survey vessels operating in an area being surveyed at one time, the increase in vessel traffic in any portion of the action area, as well as the action area as a whole, will be extremely small.

We do not expect shortnose sturgeon to occur along the survey routes in the Atlantic Ocean because coastal migrations are extremely rare. However, Atlantic sturgeon are present in this part of the action area. Both shortnose and Atlantic sturgeon may occur in nearshore waters and rivers and bays that may be surveyed for potential cable corridors and/or may be used for survey vessel transits to or from ports.

While we know that vessels and sturgeon co-occur in many portions of their range, we have no reports of vessel strikes outside of rivers and coastal bays. The risk of strike is expected to be considerably less in the Atlantic Ocean than in rivers. This is because of the greater water depth, lack of obstructions or constrictions and the more disperse nature of vessel traffic and more disperse distribution of individual sturgeon. All of these factors are expected to decrease the likelihood of an encounter between an individual sturgeon and a vessel and also increase the likelihood that a sturgeon would be able to avoid any vessel. While we cannot quantify the risk of vessel strike in the portions of the Atlantic Ocean that overlap with the action area, we expect the risk to be considerably lower than it is within the Delaware River, which is considered one of the areas with the highest risk of vessel strike for Atlantic sturgeon.

As evidenced by reports and collections of Atlantic and shortnose sturgeon with injuries consistent with vessel strike (NMFS unpublished data[8]), both species are struck and killed by vessels in the Delaware River. Brown and Murphy (2010) reported that from 2005-2008, 28 Atlantic sturgeon carcasses were collected in the Delaware River; approximately 50% showed signs of vessel interactions. Delaware Division of Fish and Wildlife has been recording information on suspected vessel strikes since 2005. From May 2005 – March 2016, they recorded a total of 164 carcasses, 44 of which were presumed to have a cause of death attributable to vessel interaction. Estimates indicate that up to 25 Atlantic sturgeon may be struck and killed in the Delaware River annually (Fox, unpublished 2016). Information on the number of shortnose sturgeon struck and killed by vessels in the Delaware River is currently limited to reports provided to NMFS through our sturgeon salvage permit. A review of the database indicates that of the 53 records of salvaged shortnose sturgeon (2008-2016), 11 were detected in the Delaware River. Of these 11, 6 had injuries consistent with vessel strike. This is considerably less than the number of records of Atlantic sturgeon from the Delaware River with injuries consistent with vessel strike (15 out of 33 over the same time period). Based on this, we assume that more Atlantic sturgeon are struck by vessels in the Delaware River than shortnose sturgeon.

Several major ports are present along the Delaware River. In 2014, there were 42,398 one-way trips reported for commercial vessels in the Delaware River Federal navigation channel (USACE 2014). In 2020, 2,195 cargo ships visited Delaware River ports[9]. Neither of these numbers include any recreational or other non-commercial vessels, ferries, tug boats assisting other larger vessels or any Department of Defense vessels (i.e., Navy, USCG, etc.).

If we assume that any increase in vessel traffic in the Delaware River would increase the risk of vessel strike to shortnose or Atlantic sturgeon, then we could also assume that this would result in

[8] The unpublished data are reports received by NMFS and recorded as part of the sturgeon salvage program authorized under ESA permit 17273.

[9] *https://ajot.com/news/maritime-exchange-reports-2020-ship-arrivals*; last accessed March 24, 2021

a corresponding increase in the number of sturgeon struck and killed in the Delaware River. However, it is unlikely that all vessels represent an equal increase in risk, the slow speeds (4.5 knots) and shallower drafts of the survey vessels may mean that the risk to sturgeon is not as greater as faster moving deep draft cargo or tanker vessels as sturgeon may be able to more readily avoid the survey vessels and may not even overlap in the same part of the water column. The survey activities considered here will involve up to three slow-moving (up to 4.5 knots) vessels operating in a similar area. Sets of survey vessels will be dispersed along the coast and not co-occur in time or space. Even if there were four surveys in a year that transited the Delaware River (equivalent to the number of BOEM leases that are proximal to the entrance of Delaware Bay), that would be an increase of 12 vessels annually. Considering only the number of commercial one way trips in a representative year (42,398), an increase of 12 vessels operating in the Delaware River represents an approximately 0.03% increase in vessel traffic in the Delaware River navigation channel in a particular year. The actual percent increase in vessel traffic is likely even less considering that commercial traffic is only a portion of the vessel traffic in the river. Even in a worst-case scenario that assumes that all 25 Atlantic sturgeon struck and killed in the Delaware River in an average year occurred in the portion of the Delaware River that will be transited by the survey vessels, and that any increase in vessel traffic results in a proportionate increase in vessel strikes, this increase in vessel traffic would result in a hypothetical additional 0.0075 Atlantic sturgeon struck and killed in the Delaware River in a given year. Assuming a maximum case that four, 3-boat surveys transit the Delaware River every year for the 10 years considered here, that would result in a hypothetical additional 0.075 Atlantic sturgeon struck and killed in the Delaware River. Because we expect fewer strikes of shortnose sturgeon, the hypothetical increase in the number of struck shortnose sturgeon would be even less. Given this very small increase in traffic and the similar very small potential increase in risk of strike and a calculated potential increase in the number of strikes that is very close to zero, we conclude that any increase in the number of sturgeon struck because of the increase in traffic resulting from survey vessels operating in the Delaware River or Delaware Bay is extremely unlikely. BOEM has indicated that survey vessels may also transit the lower Chesapeake Bay and New York Bight/lower Hudson River. The risk of vessel strike in these areas is considered to be lower than in the Delaware River; thus, any prediction of vessel strike for the Delaware River can be considered a conservative estimate of vessel strike risk in other areas. Even applying this hypothetical increased risk for all three areas, we would estimate that a hypothetical additional 0.2 Atlantic sturgeon would be killed coast-wide over a 10-year period. As noted above, this is likely an overestimate given the slower speed of survey vessels compared to other vessels which is anticipated to reduce risk. Based on this analysis, effects of this increase in traffic are extremely unlikely. In addition, given the very small increase in risk and the calculated increase in strikes is close to zero, the effect of adding the survey vessels to the baseline cannot be meaningfully measured, detected, or evaluated; therefore, effects are also insignificant.

Vessel Noise

The vessels used for the proposed project will produce low-frequency, broadband underwater sound below 1 kHz (for larger vessels), and higher-frequency sound between 1 kHz to 50 kHz (for smaller vessels), although the exact level of sound produced varies by vessel type. In general, information regarding the effects of vessel noise on fish hearing and behaviors is limited. Some TTS has been observed in fishes exposed to elevated background noise and other white noise, a continuous sound source similar to noise produced from vessels. Caged studies on sound pressure

sensitive fishes show some TTS after several days or weeks of exposure to increased background sounds, although the hearing loss appeared to recover (e.g., Scholik and Yan 2002; Smith et al. 2006; Smith et al. 2004a). Smith et al. (2004b) and Smith et al. (2006) exposed goldfish (a fish with hearing specializations, unlike any of the ESA-listed species considered in this opinion) to noise with a sound pressure level of 170 dB re 1 μPa and found a clear relationship between the amount of TTS and duration of exposure, until maximum hearing loss occurred at about 24 hours of exposure. A short duration (e.g., 10-minute) exposure resulted in 5 dB of TTS, whereas a three-week exposure resulted in a 28 dB TTS that took over two weeks to return to pre-exposure baseline levels (Smith et al. 2004b). Recovery times were not measured by researchers for shorter exposure durations, so recovery time for lower levels of TTS was not documented.

Vessel noise may also affect fish behavior by causing them to startle, swim away from an occupied area, change swimming direction and speed, or alter schooling behavior (Engas et al. 1998; Engas et al. 1995; Mitson and Knudsen 2003). Physiological responses have also been documented for fish exposed to increased boat noise. Nichols et al. (2015) demonstrated physiological effects of increased noise (playback of boat noise) on coastal giant kelpfish. The fish exhibited acute stress responses when exposed to intermittent noise, but not to continuous noise. These results indicate variability in the acoustic environment may be more important than the period of noise exposure for inducing stress in fishes. However, other studies have also shown exposure to continuous or chronic vessel noise may elicit stress responses indicated by increased cortisol levels (Scholik and Yan 2001; Wysocki et al. 2006). These experiments demonstrate physiological and behavioral responses to various boat noises that have the potential to affect species' fitness and survival, but may also be influenced by the context and duration of exposure. It is important to note that most of these exposures were continuous, not intermittent, and the fish were unable to avoid the sound source for the duration of the experiment because this was a controlled study. In contrast, wild fish are not hindered from movement away from an irritating sound source, if detected, so are less likely to subjected to accumulation periods that lead to the onset of hearing damage as indicated in these studies. In other cases, fish may eventually become habituated to the changes in their soundscape and adjust to the ambient and background noises.

All fish species can detect vessel noise due to its low-frequency content and their hearing capabilities. Because of the characteristics of vessel noise, sound produced from vessels is unlikely to result in direct injury, hearing impairment, or other trauma to ESA-listed fish. Plus, in the near field, fish are able to detect water motion as well as visually locate an oncoming vessel. In these cases, most fishes located in close proximity that detect the vessel either visually, via sound and motion in the water would be capable of avoiding the vessel or move away from the area affected by vessel sound. Thus, fish are more likely to react to vessel noise at close range than to vessel noise emanating from a greater distance away. These reactions may include physiological stress responses, or avoidance behaviors. Auditory masking due to vessel noise can potentially mask biologically important sounds that fish may rely on. However, impacts from vessel noise would be intermittent, temporary, and localized, and such responses would not be expected to compromise the general health or condition of individual fish from continuous exposures. Instead, the only impacts expected from exposure to project vessel noise for Atlantic sturgeon may include temporary auditory masking, physiological stress, or minor changes in behavior.

Therefore, similar to marine mammals and sea turtles, exposure to vessel noise for fishes could result in short-term behavioral or physiological responses (e.g., avoidance, stress). Vessel noise would only result in brief periods of exposure for fishes and would not be expected to accumulate to the levels that would lead to any injury, hearing impairment or long-term masking of biologically relevant cues. For these reasons, any effects of vessel noise on ESA-listed fish is considered insignificant (i.e., so minor that the effect cannot be meaningfully measured, detected, or evaluated).

Consideration of Effects of the Actions on Air Quality

In order to issue an OCS Air Permit for an activity considered in this consultation, EPA must conclude that the activity will not cause or contribute to a violation of applicable national ambient air quality standards (NAAQS) or prevention of significant deterioration (PSD) increments. The NAAQS are health-based standards that the EPA sets to protect public health with an adequate margin of safety. The PSD increments are designed to ensure that air quality in an area that meets the NAAQS does not significantly deteriorate from baseline levels. At this time, there is no information on the effects of air quality on listed species that may occur in the action area. However, as the PSD increments are designed to ensure that air quality in the area regulated by any OCS Air Permit do not significantly deteriorate from baseline levels, we conclude that any effects to listed species from these emissions will be so small that they cannot be meaningfully measured, detected, or evaluated and therefore are insignificant.

CONCLUSIONS

As explained above, we have determined that the actions considered here are not likely to adversely affect any ESA-listed species or critical habitat. The requirements for reviewing survey activities as they are developed will ensure that surveys carried out under this programmatic consultation do not have effects that exceed those considered here.

Reinitiation of consultation is required and shall be requested by BOEM or by NMFS where discretionary federal involvement or control over the action has been retained or is authorized by law and "(a) If the amount or extent of taking specified in the incidental take statement is exceeded; (b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) If a new species is listed or critical habitat designated that may be affected by the identified action." For the activities considered here, no take is anticipated or exempted; take is defined in the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." If there is any incidental take of a listed species, reinitiation would be required. As required by the PDCs outlined in Appendix B, all observations of dead or injured listed species should be reported to us immediately.

Should you have any questions regarding this consultation, please contact Julie Crocker of my staff at (978) 282-8480 or by e-mail (*Julie.Crocker@noaa.gov*).

Sincerely,

Jennifer Anderson
Assistant Regional Administrator
for Protected Resources

ec: Hooker, Baker - BOEM
Burns - GARFO HSED
Bernhart - SERO
Harrison, Daly, Carduner - OPR
DOE
EPA
USACE

File Code: Sec 7 BOEM OSW site assessment programmatic (2021)
ECO ID: GARFO-2021-0999

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Appendix A – Tables and Figures

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Figure 1. Action Area for this programmatic consultation.

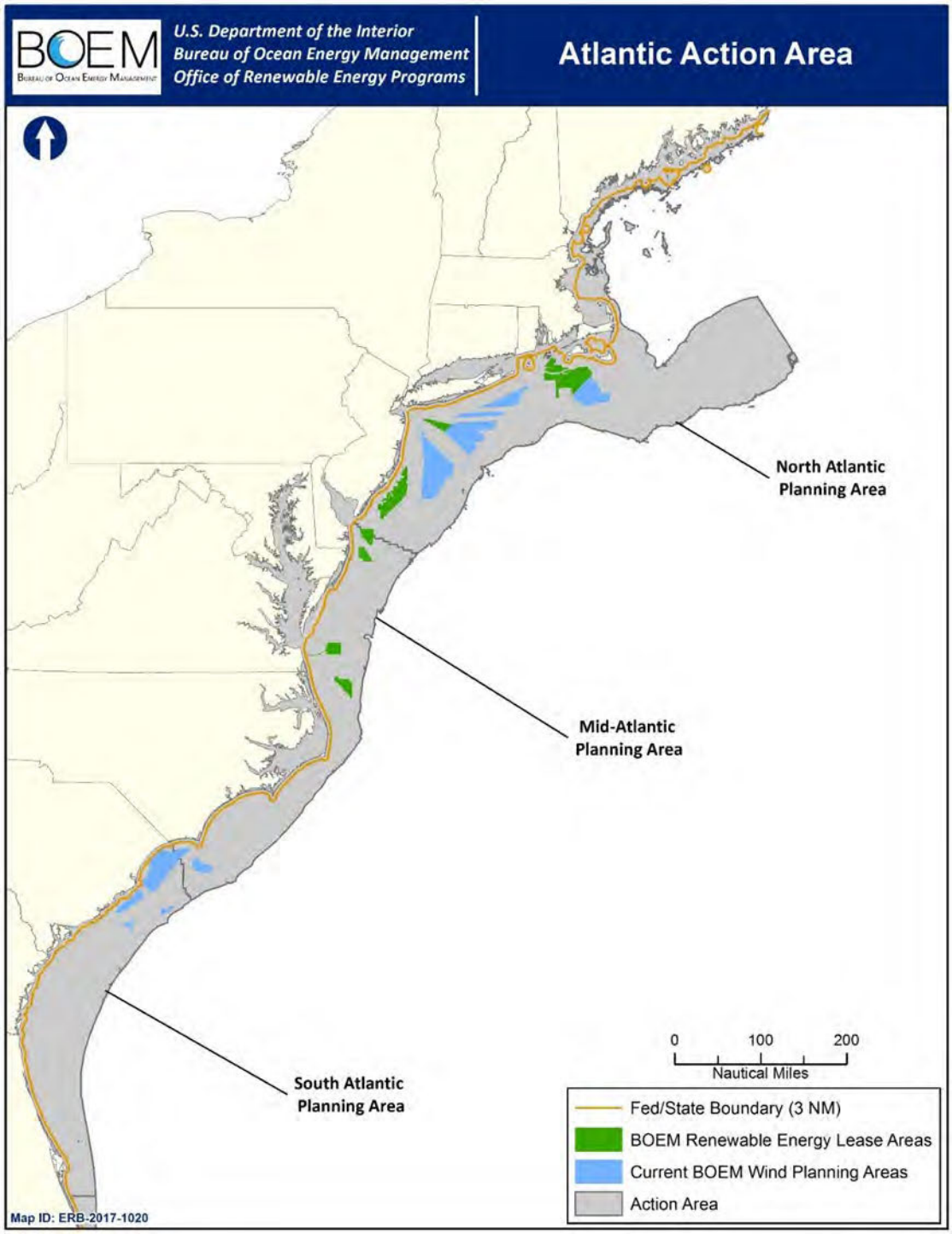


Table A.1 Description of Representative HRG Survey Equipment and Methods

Equipment Type	Data Collection and/or Survey Types	Description of the Equipment
Acoustic Corer™ (https://www.pangeosubsea.com/acoustic-corer/)	Stationary acoustic source deployed on the seafloor with low and mid frequency chirp sonars to detect shallow (15 m to 40 m) subsea hazards such as boulders, cavities, and abandoned infrastructure by generating a 3D, 12-m diameter "acoustic core" to full penetration depth (inset above).	A seabed deployed unit with dual subsurface scanning sonar heads attached to a 12-m boom. The system is set on a tripod on the seafloor. Each arm rotates 180 degrees to cover a full 360 degrees. Chirp sonars of different frequencies can be attached to each arm providing for multi-aspect depth resolution. Acoustic cores supplement geophysical surveys such as bore holes and Cone Penetration Testing.
Bathymetry/ multi-beam echosounder	Bathymetric charting	A depth sounder is a microprocessor-controlled, high-resolution survey-grade system that measures precise water depths in both digital and graphic formats. The system would be used in such a manner as to record with a sweep appropriate to the range of water depths expected in the survey area.
Magnetometer	Collection of geophysical data for shallow hazards and archaeological resources assessments	Surveys would be used to detect and aid in the identification of ferrous or other objects having a distinct magnetic signature. A sensor is typically towed as near as possible to the seafloor and anticipated to be no more than approximately 20 ft. (6 m) above the seafloor.
Shallow and Medium (Seismic) Penetration Profilers (i.e. Chirps, Sparkers, Boomers, Bubble Guns)	Collection of geophysical data for shallow hazards and archaeological resources assessments and to characterize subsurface sediments	High-resolution CHIRP System sub-bottom profiler or boomers are used to generate a profile view below the bottom of the seabed, which is interpreted to develop a geologic cross-section of subsurface sediment conditions under the track line surveyed. Another type of sub-bottom profiler that may be employed is a medium penetration system such as a boomer, bubble pulser or impulse-type system. Sub-bottom profilers are capable of penetrating sediment depth ranges of 10 ft. (3 m) to greater than 328 ft. (100 m), depending on frequency and bottom composition.
Side-Scan Sonar	Collection of geophysical data for shallow hazards and archaeological resources assessments	This survey evaluates surface and near-surface sediments, seafloor morphology, and potential surface obstructions (MMS, 2007a). A typical side-scan sonar system consists of a top-side processor, tow cable, and towfish with transducers (or "pingers") located on the sides. Typically, a lessee would use a digital dual-frequency side-scan sonar system with 300 to 500 kHz frequency ranges or greater to record continuous planimetric images of the seafloor.

Table A.2. Acoustic Characteristics of Representative HRG Survey Equipment. Note list of equipment is representative and surveys may use similar equipment and actual source levels may be below those indicated.

	Highest Measured Source Level (Highest Power Setting)						
HRG Source	**Source Setting**	**PK**	**RMS**	**SEL**	**Pulse Width (s)**	**Main Pulse Frequency (kHz)**	**Inter-Pulse Interval (s) (1/PPS)**
Mobile, Impulsive, Intermittent Sources							
AA200 Boomer Plate	250 J (low)	209	200	169	0.0008	4.3	1.0 (1 pps)
AA251 Boomer Plate	300 J (high)	216	207	176	0.0007	4.3	1.0 (1 pps)
Applied Acoustic Delta Sparker	2400 J at 1 m depth, 0.5 kHz	221	205	185	0.0095	0.5	.33333 (1-3 pps)
Applied Acoustic Dura-Spark	2400 J (high), 400 tips	225	214	188	0.0022	2.7	.33333 (1-3 pps)
Applied Acoustics S-Boom (3 AA252 boomer plates)	700 J	211	205	172	0.0006	6.2	1.0 (1 pps)
Applied Acoustics S-Boom (CSP-N Source)	1000 J	209	203	172	0.0009	3.8	.33333 (3 pps)
ELC820 Sparker	750 J (high) 1m depth	214	206	182	0.0039	1.2	1.0 (1 pps)
FSI HMS-620D Bubble Gun	Dual Channel 86 cm	204	198	173	0.0033	1.1	8.0 (1 per 8 s)
Mobile, Non-Impulsive, Intermittent Sources							
Bathyswath SWATHplus-M	100%, 234 kHz	223	218	180	0.00032	≥200 kHz	0.2000 pps (unknown)
Echotrac CV100 Single-Beam Echosounder	Power 12, 80 cycles, 200 kHz	196	193	159	0.00036	≥200 kHz	0.0500 (20 pps)
EdgeTech 424 with 3200-XS topside processor (Chirp)	100% power, 4-20 kHz	187	180	156	0.0046	7.2-11	.12500 (8 pps)

EdgeTech 512i Sub-bottom Profiler, 8.9 kHz (Chirp)	100% power, 2-12 kHz	186	180	159	0.0087	6.3-8.9	.12500 (8 pps)
EdgeTech 4200 Side-Scan	100%, 100 kHz (also a 400 kHz setting)	206	201	179	0.0072	100 kHz	.03333 (30 pps)
Klein 3000 Side-Scan	132 kHz (also capable of 445 kHz)	224	219	184	0.000343	132 kHz	.03333 (30 pps)
Klein 3900 Side-Scan	445 kHz	226	220	179	0.000084	≥200 kHz	unreported
Knudsen 3202 Sub-bottom Profiler (2 transducers), 5.7 kHz	Power 4	214	209	193	0.0217	3.3-5.7	0.25000 (4 pps)
Reson Seabat 7111 Multibeam Echosounder	100 kHz	228	224	185	0.00015	100 kHz	0.0500 (20 pps)
Reson Seabat T20P Multibeam Echosounder	200, 300, or 400 kHz	221	218	182	0.00025	≥200 kHz	0.0200 (50 pps)

Source: Highest reported source levels reported in Crocker and Fratantonio (2016).

Table 1. Predicted isopleths for peak pressure (using 20 LogR) and cSEL using NOAA's general spreadsheet tool (December 2020 Revision) to predict cumulative exposure distances using the highest power levels were used for each sound source reported in Crocker and Fratantonio (2016).

HRG SOURCE	PTS INJURY DISTANCE (m)							
	Low Frequency Cetaceans		Mid Frequency Cetaceans		High Frequency Cetaceans		Seals (Phocids)	
	PK	SEL	PK	SEL	PK	SEL	PK	SEL
AA200 Boomer Plate	0	0.1	0	0	2.2	0.9	0	0.0
AA251 Boomer Plate	0	0.3	0	0	5.0	4.7	0.0	0.2
Applied Acoustics S-Boom (3 AA252 boomer plates)	0	0.1	0	0.0	2.8	5.6	0	0.1
Applied Acoustics S-Boom (CSP-N Source)	0	0.3	0	0	2.2	3.7	0	0.2
FSI HMS-620D Bubble Gun (impulsive)	0	0	0	0	1.3	0	0	0
ELC820 Sparker (impulsive)	0	3.2	0	0	4.0	0.7	0.0	0.7

HRG SOURCE	PTS INJURY DISTANCE (m)							
	Low Frequency Cetaceans		Mid Frequency Cetaceans		High Frequency Cetaceans		Seals (Phocids)	
	PK	SEL	PK	SEL	PK	SEL	PK	SEL
Applied Acoustics Dura-Spark (impulsive)	2.0	12.7	0	0.2	14.1	47.3	2.2	6.4
Applied Acoustics Delta Sparker (impulsive)	1.3	5.7	0	0	8.9	0.1	1.4	0.3
EdgeTech 424 Sub-bottom profiler 3200-XS, 7.2 kHz	—	0	—	0	—	0.0	—	0
EdgeTech 512i Sub-bottom Profiler, 6.39 kHz	—	0	—	0	—	0.0	—	0
Knudsen 3202 Chirp Sub-bottom profiler (2 transducers), 5.7 kHz	—	1.2	—	0.3	—	35.2	—	<1
Reson Seabat 7111 Multibeam Echosounder,100 kHz	—	0	—	0.5	—	251.4	—	0.0
Reson Seabat T20P Multibeam Echosounder	—	0	—	0	—	0	—	0
Bathyswath SWATHplus-M	—	0	—	0	—	0	—	0
Echotrac CV100 Single-Beam Echosounder	—	0	—	0	—	0	—	0
Klein 3000 Side-Scan, 132 kHz	—	0	—	0.4	—	193.6	—	0.0
Klein 3000 Side-Scan, 445 kHz	—	0	—	0	—	0	—	0
Klein 3900 Side-Scan, 445 kHz	—	0	—	0	—	0	—	0

Table A.4. PTS distance for sea turtles and listed fish for impulsive HRG sound sources (60 minutes duration using the highest power levels were used for each sound source reported in Crocker and Fratantonio (2016)).

HRG SOURCE		Sea Turtles*, ESA-listed Fish			
		PTS INJURY DISTANCE (m) for Impulsive HRG Sources			
	SEL Source level	Fish cSEL[a] Distance to 187 dB (m)	Turtle cSEL[a] Distance (m)	Peak Source Level	Fish Peak Distance to 206 dB (m)
AA200 Boomer Plate	169	0	0	209	1.4
AA251 Boomer Plate	176	0	0	216	3.2
Applied Acoustics S-Boom (3 AA252 boomer plates)	172	0	0	211	2.5
Applied Acoustics S-Boom (CSP-N Source)	172	0	0	209	1.4
FSI HMS-620D Bubble Gun (impulsive)	173	0	0	204	0
ELC820 Sparker (impulsive)	182	0	0	214	4.0

HRG SOURCE		Sea Turtles*, ESA-listed Fish			
		PTS INJURY DISTANCE (m) for Impulsive HRG Sources			
	SEL Source level	Fish cSEL[a] Distance to 187 dB (m)	Turtle cSEL[a] Distance (m)	Peak Source Level	Fish Peak Distance to 206 dB (m)
Applied Acoustics Dura-Spark (impulsive)	188	1.6	0	225	9.0
Applied Acoustics Delta Sparker (impulsive)	185	1.1	0	221	5.7
EdgeTech 424 Sub-bottom profiler 3200-XS, 7.2 kHz	156	NA	NA	187	NA
EdgeTech 512i Sub-bottom Profiler, 8.9 kHz	159	NA	NA	186	NA
Knudsen 3202 Chirp Sub-bottom profiler (2 transducers), 5.7 kHz	193	NA	NA	214	NA
Reson Seabat 7111 Multibeam Echosounder,100 kHz	185	NA	NA	228	NA
Reson Seabat T20P Multibeam Echosounder	182	NA	NA	221	NA
Bathyswath SWATHplus-M	180	NA	NA	223	NA
Echotrac CV100 Single-Beam Echosounder	159	NA	NA	196	NA
Klein 3000 Side-Scan, 132 kHz	184	NA	NA	224	NA
Klein 3000 Side-Scan, 445 kHz	179	NA	NA	226	NA
EdgeTech 4200 Side-Scan, 100 kHz	169	NA	NA	206	NA
EdgeTech 4200 Side-Scan, 400 kHz	176	NA	NA	210	NA

[a] = cSEL distances were calculated by 20 log(Source Level + 10 log(1800 sec) – Threshold Level)

NA = Frequencies are out of the hearing range of the sea turtles, sturgeon, and salmon

*Sea Turtle peak pressure distances for all HRG sources are below the threshold level of 232dB.

Table A.5. Disturbances distances for marine mammals (160 dB RMS), sea turtles (175 dB RMS), and fish (150 dB RMS) using 20LogR spherical spreading loss using the highest power levels were used for each sound source reported in Crocker and Fratantonio (2016).

HRG SOURCE	DISTANCE OF POTENTIAL DISTURBANCE (m)*		
	Marine Mammals	Sea Turtles	Fish
AA200 Boomer Plate	100	18	317
AA251 Boomer Plate	224	40	708
Applied Acoustics S-Boom (3 AA252 boomer plates)	178	32	563
Applied Acoustics S-Boom (CSP-N Source)	142	26	447

FSI HMS-620D Bubble Gun	80	15	252
ELC820 Sparker	200	36	631
Applied Acoustics Dura-Spark	502	90	1,996
Applied Acoustics Delta Sparker	178	32	563
EdgeTech 424 Sub-bottom Profiler, 7.2 and 11 kHz	10	2	32
EdgeTech 512i Sub-bottom Profiler	10	2	32
Knudsen 3202 Echosounder (2 transducers)	892	NA	NA
Reson Seabat 7111 Multibeam Echosounder[1]	NA	NA	NA
Reson Seabat T20P Multibeam Echosounder[1]	NA	NA	NA
Bathyswath SWATHplus-M	NA	NA	NA
Echotrac CV100 Single-Beam Echosounder[1]	NA	NA	NA
Klein 3000 Side-Scan, 132 kHz	NA	NA	NA
Klein 3000 Side-Scan, 445 kHz	NA	NA	NA
Klein 3900 Side-scan, 445 kHz	NA	NA	NA
EdgeTech 4200 Side-Scan, 100 kHz	NA	NA	NA
EdgeTech 4200 Side-Scan, 400 kHz	NA	NA	NA

NA = Not Audible

[1] These multi-beam echosounder and side-scan sonars are only audible to mid- and high-frequency hearing groups of marine mammals.

* Disturbance distances have been round up to the next nearest whole number.

APPENDIX B

Project Design Criteria (PDC) and Best Management Practices (BMPs) for Threatened and Endangered Species for Site Characterization and Site Assessment Activities to Support Offshore Wind Projects

Any survey plan must meet the following minimum requirements specified below, except when complying with these requirements would put the safety of the vessel or crew at risk.

PDC 1: Avoid Live Bottom Features

BMPs:

1. All vessel anchoring and any seafloor-sampling activities (i.e., drilling or boring for geotechnical surveys) are restricted from seafloor areas with consolidated seabed features.[1] All vessel anchoring and seafloor sampling must also occur at least 150 m from any known locations of threatened or endangered coral species. All sensitive live bottom habitats (eelgrass, cold-water corals, etc.) should be avoided as practicable. All vessels in coastal waters will operate in a manner to minimize propeller wash and seafloor disturbance and transiting vessels should follow deep-water routes (e.g., marked channels), as practicable, to reduce disturbance to sturgeon and sawfish habitat.

PDC 2: Avoid Activities that Could Affect Early Life Stages of Atlantic Sturgeon

BMP:

1. No geotechnical or bottom disturbing activities will take place during the spawning/rearing season within freshwater reaches of rivers where Atlantic or shortnose sturgeon spawning occurs. Any survey plan that includes geotechnical or other benthic sampling activities in freshwater reaches (salinity 0-0.5 ppt) of such rivers will identify a time of year restriction that will avoid such activities during the time of year when Atlantic sturgeon spawning and rearing of early life stages occurs in that river. Appropriate time of year restrictions include the following:

River	No Work Window	Area Affected
Hudson	April – July	Upstream of the Delaware Memorial Bridge
Delaware	April – July	Upstream of Newburgh, NY - Beacon Bridge/Rt 84

This table will be supplemented with additional rivers as necessary.

PDC 3: Marine Trash and Debris Awareness and Prevention

"*Marine trash and debris*" is defined as any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper or any other solid, man-made item or material that is lost or discarded in the marine environment by the Lessee or an authorized representative of the Lessee (collectively, the

[1] Consolidated seabed features for this measure are pavement, scarp walls, and deep/cold-water coral reefs and shallow/mesophotic reefs as defined in the CMECS Geologic Substrate Classifications.

"Lessee") while conducting activities on the OCS in connection with a lease, grant, or approval issued by the Department of the Interior (DOI). To understand the type and amount of marine debris generated, and to minimize the risk of entanglement in and/or ingestion of marine debris by protected species, lessees must implement the following BMPS.

BMPs:

1. Training: All vessel operators, employees, and contractors performing OCS survey activities on behalf of the Lessee (collectively, "Lessee Representatives") must complete marine trash and debris awareness training annually. The training consists of two parts: (1) viewing a marine trash and debris training video or slide show (described below); and (2) receiving an explanation from management personnel that emphasizes their commitment to the requirements. The marine trash and debris training videos, training slide packs, and other marine debris related educational material may be obtained at https://www.bsee.gov/debris. The training videos, slides, and related material may be downloaded directly from the website. Lessee Representatives engaged in OCS survey activities must continue to develop and use a marine trash and debris awareness training and certification process that reasonably assures that they, as well as their respective employees, contractors, and subcontractors, are in fact trained. The training process must include the following elements:
    a. Viewing of either a video or slide show by the personnel specified above;
    b. An explanation from management personnel that emphasizes their commitment to the requirements;
    c. Attendance measures (initial and annual); and
    d. Recordkeeping and availability of records for inspection by DOI.

    By January 31 of each year, the Lessee must submit to DOI an annual report signed by the Lessee that describes its marine trash and debris awareness training process and certifies that the training process has been followed for the previous calendar year. You must send the reports via email to *renewable_reporting@boem.gov* and to *marinedebris@bsee.gov*.

2. Marking: Materials, equipment, tools, containers, and other items used in OCS activities which are of such shape or configuration that they are likely to snag or damage fishing devices, and could be lost or discarded overboard, must be clearly marked with the vessel or facility identification and properly secured to prevent loss overboard. All markings must clearly identify the owner and must be durable enough to resist the effects of the environmental conditions to which they may be exposed.

3. Recovery: Lessees must recover marine trash and debris that is lost or discarded in the marine environment while performing OCS activities when such incident is likely to: (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to those that could result in the entanglement of or ingestion by marine protected species; or (b) significantly interfere with OCS uses (e.g., are likely to snag or damage fishing

equipment, or present a hazard to navigation). Lessees must notify DOI when recovery activities are (i) not possible because conditions are unsafe; or (ii) not practicable because the marine trash and debris released is not likely to result in any of the conditions listed in (a) or (b) above. The lessee must recover the marine trash and debris lost or discarded if DOI does not agree with the reasons provided by the Lessee to be relieved from the obligation to recover the marine trash and debris. If the marine trash and debris is located within the boundaries of a potential archaeological resource/avoidance area, or a sensitive ecological/benthic resource area, the Lessee must contact DOI for approval prior to conducting any recovery efforts.

Recovery of the marine trash and debris should be completed immediately, but no later than 30 days from the date in which the incident occurred. If the Lessee is not able to recover the marine trash or debris within 48 hours (*See* BMP 4. Reporting), the Lessee must submit a recovery plan to DOI explaining the recovery activities to recover the marine trash or debris ("Recovery Plan"). The Recovery Plan must be submitted no later than 10 calendar days from the date in which the incident occurred. Unless otherwise objected by DOI within 48 hours of the filing of the Recovery Plan, the Lessee can proceed with the activities described in the Recovery Plan. The Lessee must request and obtain approval of a time extension if recovery activities cannot be completed within 30 days from the date in which the incident occurred. The Lessee must enact steps to prevent similar incidents and must submit a description of these actions to BOEM and BSEE within 30 days from the date in which the incident occurred.

4. Reporting: The Lessee must report all marine trash and debris lost or discarded to DOI (using the email address listed on DOI's most recent incident reporting guidance). This report applies to all marine trash and debris lost or discarded, and must be made monthly, no later than the fifth day of the following month. The report must include the following:

    a. Project identification and contact information for the lessee, operator, and/or contractor;
    b. The date and time of the incident;
    c. The lease number, OCS area and block, and coordinates of the object's location (latitude and longitude in decimal degrees);
    d. A detailed description of the dropped object to include dimensions (approximate length, width, height, and weight) and composition (e.g., plastic, aluminum, steel, wood, paper, hazardous substances, or defined pollutants);
    e. Pictures, data imagery, data streams, and/or a schematic/illustration of the object, if available;
    f. Indication of whether the lost or discarded item could be a magnetic anomaly of greater than 50 nanoTesla (nT), a seafloor target of greater than 0.5 meters (m), or a sub-bottom anomaly of greater than 0.5m when operating a magnetometer or gradiometer, side scan sonar, or sub-bottom profile in accordance with DOI's applicable guidance;
    g. An explanation of how the object was lost; and

h. A description of immediate recovery efforts and results, including photos.

In addition to the foregoing, the Lessee must submit a report within 48 hours of the incident ("48-hour Report") if the marine trash or debris could (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to those that could result in the ingestion by or entanglement of marine protected species; or (b) significantly interfere with OCS uses (e.g., are likely to snag or damage fishing equipment, or present a hazard to navigation). The information in the 48-hour Report would be the same as that listed above, but just for the incident that triggered the 48-hour Report. The Lessee must report to DOI if the object is recovered and, as applicable, any substantial variation in the activities described in the Recovery Plan that were required during the recovery efforts. Information on unrecovered marine trash and debris must be included and addressed in the description of the site clearance activities provided in the decommissioning application required under 30 CFR § 585.906. The Lessee is not required to submit a report for those months in which no marine trash and debris was lost or discarded.

PDC 4: Minimize Interactions with Listed Species during Geophysical Survey Operations
To avoid injury of ESA-listed species and minimize any potential disturbance, the following measures will be implemented for all vessels operating impulsive survey equipment that emits sound at frequency ranges <180 kHz (within the functional hearing range of marine mammals)[2] as well as CHIRP sub bottom profilers. The Clearance Zone is defined as the area around the sound source that needs to be visually cleared of listed species for 30 minutes before the sound source is turned on. The Clearance Zone is equivalent to a minimum visibility zone for survey operations to begin (*See* BMP 6). The Shutdown Zone is defined as the area around the sound source that must be monitored for possible shutdown upon detection of protected species within or entering that zone. For both the Clearance and Shutdown Zones, these are minimum visibility distances and for situational awareness PSOs should observe beyond this area when possible.

BMPs:

1. For situational awareness a Clearance Zone extending at least (500 m in all directions) must be established around all vessels operating sources <180 kHz.
    a. The Clearance Zone must be monitored by approved third-party PSOs at all times and any observed listed species must be recorded (see reporting requirements below).
    b. For monitoring around the autonomous surface vessel (ASV) where remote PSO monitoring must occur from the mother vessel, a dual thermal/HD camera must be installed on the mother vessel facing forward and angled in a direction so as to provide a field of view ahead of the vessel and around the ASV. PSOs must be able to monitor the real-time output of the camera on hand-held computer tablets. Images from the cameras must be able to be captured and reviewed to assist in verifying species identification. A monitor must also be installed in the bridge displaying the real-time images from the thermal/HD camera installed on

[2] Note that this requirement does not apply to Parametric Subbottom Profilers, Ultra Short Baseline, echosounders or side scan sonar; the acoustic characteristics (frequency, narrow beam width, rapid attenuation) are such that no effects to listed species are anticipated.

the front of the ASV itself, providing a further forward view of the craft. In addition, night-vision goggles with thermal clip-ons and a handheld spotlight must be provided and used such that PSOs can focus observations in any direction around the mother vessel and/or the ASV.

2. To minimize exposure to noise that could be disturbing, Shutdown Zone(s) (500 m for North Atlantic right whales and 100 m for other ESA-listed whales visible at the surface) must be established around the sources operating at <180 kHz being towed from the vessel .
    a. The Shutdown Zone(s) must be monitored by third-party PSOs at all times when noise-producing equipment (<180 kHz) is being operated and all observed listed species must be recorded (see reporting requirements below).
    b. If an ESA-listed species is detected within or entering the respective Shutdown Zone, any noise-producing equipment operating below 180 kHz must be shut off until the minimum separation distance from the source is re-established (500 m for North Atlantic right whales and 100 m for other ESA-listed species, including other ESA-listed marine mammals) and the measures in (5) are carried out.
        i. A PSO must notify the survey crew that a shutdown of all active boomer, sparker, and bubble gun acoustic sources below 180 kHz is immediately required. The vessel operator and crew must comply immediately with any call for a shutdown by the PSO. Any disagreement or discussion must occur only after shutdown.
    c. If the Shutdown Zone(s) cannot be adequately monitored for ESA-listed species presence (i.e., a PSO determines conditions, including at night or other low-visibility conditions, are such that listed species cannot be reliably sighted within the Shutdown Zone(s), no equipment operating at <180 kHz can be deployed until such time that the Shutdown Zone(s) can be reliably monitored.
3. Before any noise-producing survey equipment (operating at <180 kHz) is deployed, the Clearance Zone (500 m for all listed species) must be monitored for 30 minutes of pre-clearance observation.
    a. If any ESA-listed species is observed within the Clearance Zone during the 30-minute pre-clearance period, the 30-minute clock must be paused. If the PSO confirms the animal has exited the zone and headed away from the survey vessel, the 30-minute clock that was paused may resume. The pre-clearance clock will reset to 30 minutes if the animal dives or visual contact is otherwise lost.
4. When technically feasible, a “ramp up” of the electromechanical survey equipment must occur at the start or re-start of geophysical survey activities. A ramp up must begin with the power of the smallest acoustic equipment for the geophysical survey at its lowest power output. When technically feasible the power will then be gradually turned up and other acoustic sources added in a way such that the source level would increase gradually.
5. Following a shutdown for any reason, ramp up of the equipment may begin immediately only if: (a) the shutdown is less than 30 minutes, (b) visual monitoring of

the Shutdown Zone(s) continued throughout the shutdown, (c) the animal(s) causing the shutdown was visually followed and confirmed by PSOs to be outside of the Shutdown Zone(s) (500 m for North Atlantic right whales and 100 m for other ESA-listed species, including other ESA-listed marine mammals) and heading away from the vessel, and (d) the Shutdown Zone(s) remains clear of all listed species. If all (a, b, c, and d) the conditions are not met, the Clearance Zone (500 m for all listed species) must be monitored for 30 minutes of pre-clearance observation before noise-producing equipment can be turned back on.

6. In order for geophysical surveys to be conducted at night or during low-visibility conditions, PSOs must be able to effectively monitor the Clearance and Shutdown Zone(s). No may occur if the Clearance and Shutdown Zone(s) cannot be reliably monitored for the presence of ESA-listed species to ensure avoidance of injury to those species.
    a. An Alternative Monitoring Plan (AMP) must be submitted to BOEM (or the federal agency authorizing, funding, or permitting the survey) detailing the monitoring methodology that will be used during nighttime and low-visibility conditions and an explanation of how it will be effective at ensuring that the Shutdown Zone(s) can be maintained during nighttime and low-visibility survey operations. The plan must be submitted 60 days before survey operations are set to begin.
    b. The plan must include technologies that have the technical feasibility to detect all ESA-listed whales out to 500 m and sea turtles to 100 m.
    c. PSOs should be trained and experienced with the proposed alternative monitoring technology.
    d. The AMP must describe how calibration will be performed, for example, by including observations of known objects at set distances and under various lighting conditions. This calibration should be performed during mobilization and periodically throughout the survey operation.
    e. PSOs shall make nighttime observations from a platform with no visual barriers, due to the potential for the reflectivity from bridge windows or other structures to interfere with the use of the night vision optics.
7. To minimize risk to North Atlantic right whales, no surveys may occur in Cape Cod Bay from January 1 - May 15 of any year (in an area beginning at 42°04′56.5″ N-070°12′00.0″ W; thence north to 42°12′00.0″ N-070°12′00.0″ W; thence due west to charted mean high water line; thence along charted mean high water within Cape Cod Bay back to beginning point).
8. Sound sources used within the North Atlantic right whale Critical Habitat Southeastern U.S. Calving Area (i.e., Unit 2) during the calving and nursing season (December-March) shall operate at frequencies <7 kHz and >35 kHz (functional hearing range of right whales) at night or low visibility conditions.
9. At times when multiple survey vessels are operating within a lease area, adjacent lease areas, or exploratory cable routes, a minimum separation distance (to be determined on a survey specific basis, dependent on equipment being used) must be maintained between survey vessels to ensure that sound sources do not overlap.
10. To minimize disturbance to the Northwest Atlantic Ocean DPS of loggerhead sea turtles, a voluntary pause in sparker operation should be implemented for all vessels

operating in nearshore critical habitat for loggerhead sea turtles. These conditions apply to critical habitat boundaries for nearshore reproductive habitats LOGG N-3 through LOGG N-16 (79 FR 39855) from April 1 to September 30. Following pre-clearance procedures, if any loggerhead or other unidentified sea turtles is observed within a 100 m Clearance Zone during a survey, sparker operation should be paused by turning off the sparker until the sea turtle is beyond 100 m of the survey vessel. If the animal dives or visual contact is otherwise lost, sparker operation may resume after a minimum 2-minute pause following the last sighting of the animal.

11. Any visual observations of listed species by crew or project personnel must be communicated to PSOs on-duty.
12. During good conditions (e.g., daylight hours; Beaufort scale 3 or less) when survey equipment is not operating, to the maximum extent practicable, PSOs must conduct observations for protected species for comparison of sighting rates and behavior with and without use of active geophysical survey equipment. Any observed listed species must be recorded regardless of any mitigation actions required.

PDC 5: Minimize Vessel Interactions with Listed Species

All vessels associated with survey activities (transiting [i.e., travelling between a port and the survey site] or actively surveying) must comply with the vessel strike avoidance measures specified below. The only exception is when the safety of the vessel or crew necessitates deviation from these requirements. If any such incidents occur, they must be reported as outlined below under Reporting Requirements (PDC 8). The Vessel Strike Avoidance Zone is defined as 500 m or greater from any sighted ESA-listed species or other unidentified large marine mammal.

BMPs:

1. Vessel captain and crew must maintain a vigilant watch for all protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any listed species. The presence of a single individual at the surface may indicate the presence of submerged animals in the vicinity; therefore, precautionary measures should always be exercised. If pinnipeds or small delphinids of the following genera: Delphinus, Lagenorhynchus, Stenella, and Tursiops are visually detected approaching the vessel (i.e., to bow ride) or towed equipment, vessel strike avoidance and shutdown is not required.
2. Anytime a survey vessel is underway (transiting or surveying), the vessel must maintain a 500 m minimum separation distance and a PSO must monitor a Vessel Strike Avoidance Zone (500 m or greater from any sighted ESA-listed species or other unidentified large marine mammal visible at the surface) to ensure detection of that animal in time to take necessary measures to avoid striking the animal. If the survey vessel does not require a PSO for the type of survey equipment used, a trained crew lookout may be used (see #3). For monitoring around the autonomous surface vessels, regardless of the equipment it may be operating, a dual thermal/HD camera must be installed on the mother vessel facing forward and angled in a direction so as to provide a field of view ahead of the vessel and around the ASV. A dedicated operator must be able to monitor the real-time output of the camera on hand-held computer tablets. Images from the cameras must be able to be captured and reviewed to assist in verifying species identification. A monitor must also be

installed in the bridge displaying the real-time images from the thermal/HD camera installed on the front of the ASV itself, providing a further forward view of the craft.

a. Survey plans must include identification of vessel strike avoidance measures, including procedures for equipment shut down and retrieval, communication between PSOs/crew lookouts, equipment operators, and the captain, and other measures necessary to avoid vessel strike while maintaining vessel and crew safety. If any circumstances are anticipated that may preclude the implementation of this PDC, they must be clearly identified in the survey plan and alternative procedures outlined in the plan to ensure minimum distances are maintained and vessel strikes can be avoided.
b. All vessel crew members must be briefed in the identification of protected species that may occur in the survey area and in regulations and best practices for avoiding vessel collisions. Reference materials must be available aboard all project vessels for identification of listed species. The expectation and process for reporting of protected species sighted during surveys must be clearly communicated and posted in highly visible locations aboard all project vessels, so that there is an expectation for reporting to the designated vessel contact (such as the lookout or the vessel captain), as well as a communication channel and process for crew members to do so.
c. The Vessel Strike Avoidance Zone(s) are a minimum and must be maintained around all surface vessels at all times.
d. If a large whale is identified within 500 m of the forward path of any vessel, the vessel operator must steer a course away from the whale at 10 knots (18.5 km/hr) or less until the 500 m minimum separation distance has been established. Vessels may also shift to idle if feasible.
e. If a large whale is sighted within 200 m of the forward path of a vessel, the vessel operator must reduce speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 m. If stationary, the vessel must not engage engines until the large whale has moved beyond 500 m.
f. If a sea turtle or manta ray is sighted within the operating vessel's forward path, the vessel operator must slow down to 4 knots (unless unsafe to do so) and steer away as possible. The vessel may resume normal operations once the vessel has passed the individual.
g. During times of year when sea turtles are known to occur in the survey area, vessels must avoid transiting through areas of visible jellyfish aggregations or floating vegetation (e.g., sargassum lines or mats). In the event that operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through such areas.
h. Vessels operating in water depths with less than 4 ft. clearance between the vessel and the bottom should maintain speeds no greater than 4 knots to minimize vessel strike risk to sturgeon and sawfish.

3. To monitor the Vessel Strike Avoidance Zone, a PSO (or crew lookout if PSOs are not required) must be posted during all times a vessel is underway (transiting or surveying) to monitor for listed species in all directions.

   a. Visual observers monitoring the vessel strike avoidance zone can be either PSOs or crew members (if PSOs are not required). If the trained lookout is a vessel crew member, this must be their designated role and primary responsibility while the vessel is transiting. Any designated crew lookouts must receive training on protected species identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements. All observations must be recorded per reporting requirements.
   b. Regardless of monitoring duties, all crew members responsible for navigation duties must receive site-specific training on ESA-listed species sighting/reporting and vessel strike avoidance measures.
4. Regardless of vessel size, vessel operators must reduce vessel speed to 10 knots (18.5 mph) or less while operating in any Seasonal Management Area (SMA), Dynamic Management Area (DMA)/Slow Zones triggered by visual detection of North Atlantic right whales. The only exception to this requirement is for vessels operating in areas within a DMA/visually triggered Slow Zone where it is not reasonable to expect the presence of North Atlantic right whales (e.g. Long Island Sound, shallow harbors). Reducing vessel speed to 10 knots or less while operating in Slow Zones triggered by acoustic detections of North Atlantic right whales is encouraged.
5. Vessels underway must not divert their course to approach any listed species.
6. All vessel operators must check for information regarding mandatory or voluntary ship strike avoidance (SMAs, DMAs, Slow Zones) and daily information regarding North Atlantic right whale sighting locations. These media may include, but are not limited to: NOAA weather radio, U.S. Coast Guard NAVTEX and channel 16 broadcasts, Notices to Mariners, the Whale Alert app, or WhaleMap website.
   a. North Atlantic right whale Sighting Advisory System info can be accessed at: https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html
   b. Information about active SMAs, DMAs, and Slow Zones can be accessed at: https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-vessel-strikes-north-atlantic-right-whales

PDC 6: Minimize Risk During Buoy Deployment, Operations, and Retrieval

Any mooring systems used during survey activities prevent any potential entanglement or entrainment of listed species, and in the unlikely event that entanglement does occur, ensure proper reporting of entanglement events according to the measures specified below.

BMPs:

1. Ensure that any buoys attached to the seafloor use the best available mooring systems. Buoys, lines (chains, cables, or coated rope systems), swivels, shackles, and anchor designs must prevent any potential entanglement of listed species while ensuring the safety and integrity of the structure or device.
2. All mooring lines and ancillary attachment lines must use one or more of the following measures to reduce entanglement risk: shortest practicable line length, rubber sleeves, weak-links, chains, cables or similar equipment types that prevent lines from looping, wrapping, or entrapping protected species.
3. Any equipment must be attached by a line within a rubber sleeve for rigidity. The length of the line must be as short as necessary to meet its intended purpose.

4. During all buoy deployment and retrieval operations, buoys should be lowered and raised slowly to minimize risk to listed species and benthic habitat. Additionally, PSOs or trained project personnel (if PSOs are not required) should monitor for listed species in the area prior to and during deployment and retrieval and work should be stopped if listed species are observed within 500 m of the vessel to minimize entanglement risk.
5. If a live or dead marine protected species becomes entangled, you must immediately contact the applicable NMFS stranding coordinator using the reporting contact details (see Reporting Requirements section) and provide any on-water assistance requested.
6. All buoys must be properly labeled with owner and contact information.

PDC 7: Protected Species Observers
Qualified third-party PSOs to observe Clearance and Shutdown Zones must be used as outlined in the conditions above.

BMPs:

1. All PSOs must have completed an approved PSO training program and must receive NMFS approval to act as a PSO for geophysical surveys. Documentation of NMFS approval for geophysical survey activities in the Atlantic and copies of the most recent training certificates of individual PSOs' successful completion of a commercial PSO training course with an overall examination score of 80% or greater must be provided upon request. Instructions and application requirements to become a NMFS-approved PSO can be found at: *www.fisheries.noaa.gov/national/endangered-species-conservation/protected-species-observers*.
2. In situations where third-party party PSOs are not required, crew members serving as lookouts must receive training on protected species identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements.
3. PSOs deployed for geophysical survey activities must be employed by a third-party observer provider. While the vessel is underway, they must have no other tasks than to conduct observational effort, record data, and communicate with and instruct relevant vessel crew to the presence of listed species and associated mitigation requirements. PSOs on duty must be clearly listed on daily data logs for each shift.
    a. Non-third-party observers may be approved by NMFS on a case-by-case basis for limited, specific duties in support of approved, third-party PSOs.
4. A minimum of one PSO (assuming condition 5 is met) must be on duty observing for listed species at all times that noise-producing equipment <180 kHz is operating, or the survey vessel is actively transiting during daylight hours (i.e. from 30 minutes prior to sunrise and through 30 minutes following sunset). Two PSOs must be on duty during nighttime operations. A PSO schedule showing that the number of PSOs used is sufficient to effectively monitor the affected area for the project (e.g., surveys) and record the required data must be included. PSOs must not be on watch for more than 4 consecutive hours, with at least a 2-hour break after a 4-hour watch. PSOs must not be on active duty observing for more than 12 hours in any 24-hour period.
5. Visual monitoring must occur from the most appropriate vantage point on the associated operational platform that allows for 360-degree visual coverage around the vessel. If

360-degree visual coverage is not possible from a single vantage point, multiple PSOs must be on watch to ensure such coverage.

6. Suitable equipment must be available to each PSO to adequately observe the full extent of the Clearance and Shutdown Zones during all vessel operations and meet all reporting requirements.
    a. Visual observations must be conducted using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.
    b. Rangefinders (at least one per PSO, plus backups) or reticle binoculars (e.g., 7 x 50) of appropriate quality (at least one per PSO, plus backups) to estimate distances to listed species located in proximity to the vessel and Clearance and Shutdown Zone(s).
    c. Digital full frame cameras with a telephoto lens that is at least 300 mm or equivalent. The camera or lens should also have an image stabilization system. Used to record sightings and verify species identification whenever possible.
    d. A laptop or tablet to collect and record data electronically.
    e. Global Positioning Units (GPS) if data collection/reporting software does not have built-in positioning functionality.
    f. PSO data must be collected in accordance with standard data reporting, software tools, and electronic data submission standards approved by BOEM and NMFS for the particular activity.
    g. Any other tools deemed necessary to adequately perform PSO tasks.

PDCs 8: Reporting Requirements

To ensure compliance and evaluate effectiveness of mitigation measures, regular reporting of survey activities and information on listed species will be required as follows.

BMPs:

1. Data from all PSO observations must be recorded based on standard PSO collection and reporting requirements. PSOs must use standardized electronic data forms to record data. The following information must be reported electronically in a format approved by BOEM and NMFS:

    Visual Effort:
    a. Vessel name;
    b. Dates of departures and returns to port with port name;
    c. Lease number;
    d. PSO names and affiliations;
    e. PSO ID (if applicable);
    f. PSO location on vessel;
    g. Height of observation deck above water surface (in meters);
    h. Visual monitoring equipment used;
    i. Dates and times (Greenwich Mean Time) of survey on/off effort and times corresponding with PSO on/off effort;
    j. Vessel location (latitude/longitude, decimal degrees) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts; recorded at 30 second intervals if obtainable from data collection software, otherwise at practical regular interval;

k. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any change;
l. Water depth (if obtainable from data collection software) (in meters);
m. Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including wind speed and direction, Beaufort scale, Beaufort wind force, swell height (in meters), swell angle, precipitation, cloud cover, sun glare, and overall visibility to the horizon;
n. 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);
o. 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.);

Visual Sighting (all Visual Effort fields plus):

a. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
b. Vessel/survey activity at time of sighting;
c. PSO/PSO ID who sighted the animal;
d. Time of sighting;
e. Initial detection method;
f. Sightings cue;
g. Vessel location at time of sighting (decimal degrees);
h. Direction of vessel's travel (compass direction);
i. Direction of animal's travel relative to the vessel;
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. Species reliability;
l. Radial distance;
m. Distance method;
n. Group size; Estimated number of animals (high/low/best);
o. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
p. 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);
q. 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);
r. Mitigation Action; 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.
s. Behavioral observation to mitigation;
t. Equipment operating during sighting;
u. Source depth (in meters);

v. Source frequency;
w. Animal's closest point of approach and/or closest distance from the center point of the acoustic source;
x. Time entered shutdown zone;
y. Time exited shutdown zone;
z. Time in shutdown zone;
aa. Photos/Video

2. The project proponent must submit a final monitoring report to BOEM and NMFS (to *renewable_reporting@boem.gov* and *nmfs.gar.incidental-take@noaa.gov*) within 90 days after completion of survey activities. The report must fully document the methods and monitoring protocols, summarizes the survey activities and the data recorded during monitoring, estimates of the number of listed species that may have been taken during survey activities, describes, assesses and compares the effectiveness of monitoring and mitigation measures. PSO sightings and effort data and trackline data in Excel spreadsheet format must also be provided with the final monitoring report.
3. Reporting sightings of North Atlantic right whales:
    a. If a North Atlantic right whale is observed at any time by a PSO or project personnel during surveys or vessel transit, sightings must be reported within two hours of occurrence when practicable and no later than 24 hours after occurrence. In the event of a sighting of a right whale that is dead, injured, or entangled, efforts must be made to make such reports as quickly as possible to the appropriate regional NOAA stranding hotline (from Maine-Virginia report sightings to 866-755-6622, and from North Carolina-Florida to 877-942-5343). Right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16 and through the WhaleAlert App (http://www.whalealert.org/).
    b. Further information on reporting a right whale sighting can be found at: *https://apps-nefsc.fisheries.noaa.gov/psb/surveys/documents/20120919_Report_a_Right_Whale.pdf*
4. In the event of a vessel strike of a protected species by any survey vessel, the project proponent must immediately report the incident to BOEM (*renewable_reporting@boem.gov*) and NMFS (*nmfs.gar.incidental-take@noaa.gov*) and for marine mammals to the NOAA stranding hotline: from Maine-Virginia, report to 866-755-6622, and from North Carolina-Florida to 877-942-5343 and for sea turtles from Maine-Virginia, report to 866-755-6622, and from North Caroline-Florida to 844-732-8785. The report must include the following information:
    a. Name, telephone, and email or the person providing the report;
    b. The vessel name;
    c. The Lease Number;
    d. Time, date, and location (latitude/longitude) of the incident;
    e. Species identification (if known) or description of the animal(s) involved;
    f. Vessel's speed during and leading up to the incident;
    g. Vessel's course/heading and what operations were being conducted (if applicable);
    h. Status of all sound sources in use;

i. 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;
j. Environmental conditions (wave height, wind speed, light, cloud cover, weather, water depth);
k. Estimated size and length of animal that was struck;
l. Description of the behavior of the species immediately preceding and following the strike;
m. If available, description of the presence and behavior of any other protected species immediately preceding the strike;
n. Disposition of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, last sighted direction of travel, status unknown, disappeared); and
o. To the extent practicable, photographs or video footage of the animal(s).

5. Sightings of any injured or dead listed species must be immediately reported, regardless of whether the injury or death is related to survey operations, to BOEM (*renewable_reporting@boem.gov*), NMFS (*nmfs.gar.incidental-take@noaa.gov*), and the appropriate regional NOAA stranding hotline (from Maine-Virginia report sightings to 866-755-6622, and from North Carolina-Florida to 877-942-5343 for marine mammals and 844-732-8785 for sea turtles). If the project proponent's activity is responsible for the injury or death, they must ensure that the vessel assist in any salvage effort as requested by NMFS. When reporting sightings of injured or dead listed species, the following information must be included:
    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.
6. Reporting and Contact Information:
    a. Dead and/or Injured Protected Species:
        1. NMFS Greater Atlantic Region's Stranding Hotline: 866-755-6622
        2. NMFS Southeast Region's Stranding Hotline: 877-942-5343 (marine mammals), 844-732-8785 (sea turtles)
    ii. Injurious Takes of Endangered and Threatened Species:
        1. NMFS Greater Atlantic Regional Office, Protected Resources Division (*nmfs.gar.incidental-take@noaa.gov*)
        2. BOEM Environment Branch for Renewable Energy, Phone: 703-787-1340, Email: *renewable_reporting@boem.gov*

Appendix C: Protected Species Monitoring & Mitigation Plan

TETRA TECH
RPS ENERGY

PROTECTED SPECIES MONITORING & MITIGATION PLAN

VINEYARD NORTHEAST LLC
Nearshore High Resolution Geophysical Survey 2025

Version 1
January 28 2025

rpsgroup.com

VINEYARD NORTHEAST LLC NEARSHORE HIGH RESOLUTION GEOPHYSICAL SURVEY 2025

Protected Species Monitoring & Mitigation Plan

Revision		
Date	**Version**	**Revision made**
22 November 2024	V1	Draft issued to Vineyard Northeast for review
28 January 2025	V2	Draft issued to Vineyard Northeast for review

Approval for issue		
Stephanie Milne		28 January 2025

Contents

Tables

Appendix

1 INTRODUCTION

Vineyard Northeast LLC (Vineyard Northeast) has contracted RPS to provide the protected species monitoring assets required to meet the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), monitoring and mitigation requirements during a daytime-only nearshore, limited duration, shallow-water high resolution geophysical (HRG) survey. Because this survey is not being conducted in the lease area and is only being conducted in state waters, BOEM review of the survey plan is not required. RPS has been provided with a survey plan prepared by Vineyard Northeast that includes a statement of compliance with NMFS monitoring and mitigation requirement.

As the proposed Vineyard Northeast survey activities will include the use of geophysical equipment operating below 180 kHz (non-impulsive, non-parametric sub-bottom profilers (SBPs), applied acoustic boomers.), a Protected Species Monitoring and Mitigation Plan (PSMMP) is required. The PSMMP outlines the sound source monitoring and mitigation, and vessel strike avoidance measures that will be implemented for marine mammals, sea turtles, and other protected species for the duration of the survey.

1.1 Applicable Regulatory Documents and Permits

NMFS completed a programmatic consultation for offshore wind data collection and established Project Design Criteria (PDCs) and Best Management Practices (BMPs) for protected species[1] (dated June 29, 2021, last updated September 30, 2021). Further, NOAA issued a Renewal Incidental Harassment Authorization (IHA) to Vineyard Northeast pursuant to Section 101(a)(5) of the Marine Mammal Protection Act (MMPA; 15 U.X.C 1371(a)(5)(D)) which is valid from July 27, 2024, through July 26, 2025. This IHA specifically references PDCs 4, 5, and 7 of the NMFS Programmatic Consultation.

The HRG survey shall be conducted in accordance with the measures stipulated in the IHA, NMFS Programmatic Consultation (PDCs, BMPs), Survey Plan, and Alternative Monitoring Plan (This document outlines the monitoring, mitigation, and reporting procedures applicable to the survey.

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, porpoises)
- Sea turtles
- Atlantic sturgeon
- Shortnose sturgeon
- Smalltooth sawfish
- Giant manta ray

3 PROTECTED SPECIES OBSERVERS

3.1 Staffing Plan

For this nearshore HRG survey, two Protected Species Observers (PSOs) provide by RPS will be on board the R/V Bogue, a nearshore vessel conducting daylight-only survey operations. These personnel will undertake visual monitoring, implement mitigation, and conduct data collection and reporting in accordance

[1] Under this consultation, protected species are defined as threatened and endangered marine species listed under the Endangered Species Act and all marine mammals.

with the IHA, NMFS Programmatic Consultation, Survey Plan, Alternative Monitoring Plan, hereinafter called "Permitting Documents".

A minimum of one (1) PSO during daytime and reduced visibility will be on duty at all times when high-resolution geophysical (HRG) equipment is in use (i.e., daylight operations). Table 1 provides a sample PSO schedule (PDC 7 BMP 4, IHA 4(a)).

For nearshore HRG surveys conducted in daytime hours only, non-independent observers may be approved. In order to be approved to act as PSOs, non-independent observers must have no duties other than marine mammal monitoring while on watch and must be trained on protected species detection and identification, vessel strike minimization procedures, and reporting requirements (IHA 5(b)).

Nearshore vessels will be staffed with a minimum of one (1) designated, unconditionally approved, Lead PSO.

3.2 PSO Requirements

All PSOs will have completed a NMFS approved training program. PSOs will have relevant observation experience in the Atlantic. The resumes, NMFS approval letters, and certifications for proposed PSOs will be provided for submittal to BOEM and NMFS for review no later than seven days prior to the scheduled start of the survey (IHA 5(a), IHA 5(c)).

During good conditions (e.g., daylight hours; Beaufort scale 3 or less) when survey equipment is not operating, to the maximum extent practicable, PSOs must conduct observations for protected species for comparison of sighting rates and behavior with and without use of active geophysical survey equipment. Any observed listed species must be recorded regardless of any mitigation actions required (IHA 5(m), PDC 4 BMP 12.

3.3 Roles and Responsibilities

PSOs must have no tasks other than to conduct monitoring, alert relevant vessel crew to the presence of protected species, request mitigation, and record observational data for reporting.

PSO Team Lead

- Coordinate and oversee PSO operations and ensure compliance with permit monitoring and mitigation conditions
- Visually monitor, detect, and identify protected species and determine distance from the location of the animal when detected to the geophysical source
- Record and report protected species sightings, survey activities, and environmental conditions according to the Permitting Documents
- Communicate with the crew to initiate mitigation actions as required by permit conditions
- Carry out onboard quality control (QC) reviews of PSO data
- Participate in daily meetings and drills with the crew when appropriate

PSO

- Visually monitor, detect, and identify protected species
- Record and report according to the Permitting Documents
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the Permitting Documents
- Communicate with the crew to implement mitigation actions as required by permit conditions
- Participate in daily operation meetings with crew when appropriate
- Consult Lead PSO as needed

4 VISUAL MONITORING METHODS

4.1 PSO General Monitoring Protocol

Two NMFS approved PSOs or trained crew acting as PSO during daytime will visually monitor permit-defined zones at all times when the vessel is away from dock (PDC 7 BMP 4, IHA 4(a)). The following general protocols apply to all operations:

- 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 monitoring shift
- No PSO will be allowed more than four consecutive visual monitoring hours before being allocated a two-hour break
- No PSO will be assigned a combined monitoring schedule of more than 12 hours in a 24-hour period
- PSOs will monitor from the most appropriate location on the vessel; the location shall have a 360° view of the sea surface (IHA 5(h)), without interfering with the navigation or operation of the vessel.
- Visual monitoring will begin no less than 30 minutes prior to the initiation of the SBPs, boomers and sparkers and will continue until 30 minutes after the use of specified acoustic sources ceases (IHA 4(b)).
- If a protected species is observed, the PSO should first initiate any necessary mitigation actions. If no mitigation actions are required, they will note and monitor the 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.

4.2 Daytime Monitoring During Reduced Visibility

In order for geophysical surveys to be conducted during low-visibility conditions, PSOs must be able to effectively monitor 500 meters around the acoustic source (PDC 4 BMP 6).

During these periods, all requirements surrounding monitoring durations and break periods will be adhered to. Additionally, no PSO will conduct additional monitoring shifts. This is to ensure that they have a sufficiently long break with at least 8 hours of uninterrupted sleep.

The PSO team and vessel / survey crew will work together to coordinate monitoring to the best of their abilities to minimize any operational downtime during daytime periods of reduced visibility.

4.2.1 Daytime monitoring equipment

The PSO on duty will monitor for marine protected species using the naked eye and hand-held reticle binoculars (at least one per PSO, plus backups). Reticle binoculars have the capability to accurately determine the distance and bearing to observed marine mammals (IHA 5(k)).

Digital single-lens reflex (DSLR) camera equipment including digital cameras with a telephoto lens that is at least 300 mm or equivalent on a full-frame DSLR (at least one plus backups) will be provided to record sightings and verify species identification. The camera or lens must also have an image stabilization system (IHA 5(k)(iv)).

Additionally, PSOs will have access to Global Positioning System (GPS), compasses and means of communication with vessel crew (IHA 5(k)).

4.3 Reduced Visibility Monitoring

If transits are conducted in reduced visibility conditions, the PSOs will use night vision goggles and/or infrared technology in addition to all of the equipment listed in section 4.2.1 (Alternative Monitoring Plan, PDC 4 BMP 6).

4.3.1 Reduced visibility monitoring equipment

The PSOs on duty will monitor for marine protected species using Morovision PVS-7 Gen 3 PINNACLE night vision goggles with a thermal acquisition clip-on system and handheld infrared light emitting diode spotlights so PSOs can focus observations in any direction (PDC 4 BMP 6b, Alternative Monitoring Plan).

4.4 Visual Monitoring Equipment Calibration

Monitoring equipment will be calibrated, when possible, throughout the duration of survey at least once a week 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.

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 PROPOSED MONITORING SCHEDULES FOR DAYLIGHT OPERATIONS

Table 1: Monitoring Schedule

	Local	PSO1	PSO 2
Dawn	6:00	1.0	
	7:00	1.0	
	8:00		1.0
	9:00		1.0
	10:00	1.0	
	11:00	1.0	
	12:00		1.0
	13:00		1.0
	14:00	1.0	
	15:00	1.0	
	16:00		1.0
Dusk	17:00		1.0
Monitoring Hours		6.0	6.0

*The monitoring schedule is inclusive of monitoring for vessel strike avoidance and source mitigation purposes

6 VESSEL STRIKE AVOIDANCE ON HRG VESSELS

6.1 North Atlantic Right Whale (NARW) Monitoring Notification Systems

The PSO team will monitor NMFS North Atlantic Right Whale (NARW) reporting systems (including the Early Warning System, Sighting Advisory System, and Mandatory Ship Reporting System) for the presence of NARWs during HRG survey operations within or adjacent to the Seasonal Management Area (SMA), Slow Zones, and any established Dynamic Management Areas (DMAs) (IHA 5(n), PDC 5 BMP 6).

https://www.nefsc.noaa.gov/psb/surveys/MapperiframeWithText.html

http://www.whalealert.org/

6.2 Vessel Speed Restriction

Vessel strike avoidance mitigation measures will include all vessels associated with survey activities, including transiting between ports and the survey site or actively surveying (PDC 5).

All survey vessels regardless of size, must observe a 10-knot speed restriction in any Dynamic Management Area (DMA), Seasonal Management Area (SMA), or Slow Zone (IHA 4(f)(ii), PDC 5 BMP 4).

https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales

If protected species are sighted within the relevant separation distance, vessel operators must comply with vessel strike avoidance measures, except under extraordinary circumstances when complying with the requirement puts the safety of the vessel or crew at risk (PDC 5, IHA 4(f)(i)).

6.3 Separation Distances

A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel. Visual observers may be third-party observers or crew members with sufficient training (IHA 4(f)(i),PDC 5 BMP 3a.

Any vessel underway must avoid excessive speed or abrupt changes in direction to avoid injury to a sighted cetacean, pinniped, sea turtle, or giant manta ray (IHA 4(f)(vii)).

The vessel operator must reduce vessel speed to 10 knots or less when any mother/calf pairs, pods, or large assemblages of marine mammals are observed near an underway vessel (IHA 4(f)(iii)).

Vessels underway must not divert their course to approach any listed species (PDC 5 BMP 5).

6.3.1 North Atlantic Right Whale and Large Whales

All survey vessels will maintain a separation distance of 500 meters or greater from any sighted NARW, large whale, or any unidentified large marine mammal (BOEM OCS-A 0522 4.1.1.6.1, IHA 4(f)(iv), PDC 5 BMP 5.2.3).

- If underway and sighted within 500 meters, the vessel must steer a course away from any sighted ESA-listed whale or large unidentified whale at 10 knots or less until the 500-meter minimum separation distance has been established (IHA 4(f)(iv), PDC 5 BMP 5.2.4).
- If sighted in a vessel's path or within 200 meters to an underway vessel, reduce speed and shift the engines to neutral until the ESA-listed whale has moved beyond 500 meters and out of the vessel's path, then re-engage engines and steer away at 10 knots or less (PDC 5 BMP 5.2.4).
- If stationary, the vessel must not engage engines until the ESA-listed whale has moved beyond 500 meters, at which point the vessel must steer a course away from the ESA-listed whale at 10 knots or less, maintaining the 500-meter separation distance (PDC 5 BMP 5.2.5). If a whale is observed but the species cannot be confirmed as being other than an ESA-listed whale, it must be assumed to be an ESA-listed whale and all applicable strike avoidance procedures implemented (IHA 4(f)(iv)).
- If a whale is observed but the species cannot be confirmed as being other than a North Atlantic right whale, it must be assumed to be a right whale and all applicable strike avoidance procedures for NARWs implemented (NMFS PDC 5, BMP 2).

6.3.2 Delphinoid Cetaceans and Pinnipeds

All vessels will maintain a separation distance of 50 meters or greater (as feasible) from any sighted delphinoid cetacean or pinniped (IHA 4(f)(vi)).

- Vessels should not divert to approach delphinoid cetaceans or pinnipeds.
- Underway vessels will remain parallel to a sighted pinniped or delphinoid cetacean's course whenever possible and avoid excessive speed or abrupt changes in direction to avoid injury to the animal (IHA 4(f)(vii)).

6.3.3 Sea Turtles and Giant Manta Ray

All vessels will maintain a separation distance of 500 meters or greater from any sighted sea turtle or giant manta ray (NMFS PDC 5, BMP 2).

- Vessels underway should not divert to approach any sea turtles or giant manta ray (PDC 5, BMP 5).
- If a sea turtle or manta ray is sighted within the operating vessel's forward path, the vessel must slow down to 4 knots (unless unsafe to do so) and steer away as possible. The vessel may resume normal operations once the vessel has passed the individual (PDC 5 BMP 2f).
- During times of year when sea turtles are known to occur in the survey area, vessels must avoid transiting through areas of visible jellyfish aggregations or floating vegetation (e.g., sargassum lines or mats). In the event that operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through such areas (PDC 5 BMP 2g).

6.3.4 Sturgeon sp. and Sawfish

Vessels operating in water depths with less than 4 ft. clearance between the vessel and the bottom should maintain speeds no greater than 4 knots to minimize vessel strike risk to sturgeon and sawfish (PDC 5 BMP 2h).

Table 2 ESA-listed species that may be affected by survey activities

ESA-Listed Cetaceans	ESA-Listed Sea Turtles	ESA-Listed Fish
North Atlantic right whale	Loggerhead turtle	Atlantic sturgeon
Blue whale	Green turtle	Giant manta ray
Fin whale	Kemp's ridley turtle	Shortnose sturgeon
Sei whale	Leatherback turtle	Smalltooth sawfish
Sperm whale	Hawksbill turtle	

7 SOUND EXPOSURE PROCEDURES

7.1 Survey Equipment Subject to Monitoring and Mitigation Procedures

Impulsive equipment that produces sound below 180 kHz (non-impulsive, non-parametric sub-bottom profilers (SBPs), boomers and sparkers) are subject to the following monitoring and mitigation protocols (PDC 4).

The acoustic source must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the source shall be avoided (IHA 3(e)).

Both testing and operations of HRG equipment should be limited to the Lease Area, Cable Corridor, and while the vessel is alongside in port.

At times when multiple survey vessels are operating within a lease area, adjacent lease area, or exploratory cable routes, a minimum separation distance of 1 kilometer must be maintained between survey vessels to ensure that sound sources do not overlap (PDC 4 BMP 9).

7.2 Sound Source Monitoring and Mitigation Zones

PSOs must establish and monitor four types of zones around Vineyard Northeast impulsive survey equipment operating below 180 kHz (SBPs, boomers and sparkers); Clearance Zones (CZ), Shutdown Zones (SZ), sometimes referred to as Exclusion Zones (EZ), Level B Harassment Zones (HZ), and Monitoring Zone (MZ). For the purposes of sound exposure mitigation, these zones are established around the survey equipment and not around the vessel itself (IHA 4(c)).

Clearance Zones (CZ): Applicable during the 30-minute pre-clearance search periods conducted prior to initiating the relevant acoustic sources from silence (IHA 4(b)). Detections of a protected species inside the applicable CZ during the search will result in a delay to operations. Impulsive equipment operating below 180 kHz must not be initiated until an additional time period (described in Section 7.4) has elapsed with no further sighting of the animal (IHA 4(d)).

- **500 meters:** All ESA-listed species, inclusive of sea turtles (PDC 4 BMP 3), (IHA Table 3)
- **100 meters:** All other cetaceans and pinnipeds (IHA Table 3)

Shutdown Zone (SZ): Once the low frequency (LF) sound sources have been activated, detections of a protected species inside it's applicable SZs will result in a shutdown of **boomer and sparker equipment** (PDC 4 BMP 4.2). SBPs may remain active and are not subject to shutdown procedures.

- **500 meters:** North-Atlantic right whales
- **100 meters**: All other ESA-listed species, inclusive of sea turtles (PDC 4 BMP 2b).
- **100 meters**: All other marine mammals with the exception of pinnipeds or delphinid(s) from the genera ***Delphinus, Lagenorhynchus, Stenella or Tursiops*** listed in Table 3 that voluntarily approach the vessel. For voluntarily approaching delphinids listed above, shutdown is not required. PSOs must use best professional judgment in making the decision to call for a shutdown (PDC 5 BMP 1).

Table 3 Distances for Clearance, Vessel Separation and Shutdown Zones in meters per species (IHA Table 3)

<table>
<tr><th>Species</th><th>ESA-Listed?</th><th>Clearance Zone (m)</th><th>Vessel Separation Zone (m)</th><th>Shutdown Zone (m)</th></tr>
<tr><td>North Atlantic right whale</td><td rowspan="5">Yes</td><td rowspan="5">500</td><td rowspan="5">500</td><td>500</td></tr>
<tr><td>Blue whale</td><td rowspan="13">100</td></tr>
<tr><td>Fin whale</td></tr>
<tr><td>Sei whale</td></tr>
<tr><td>Sperm whale</td></tr>
<tr><td>Humpback whale</td><td rowspan="14">No</td><td rowspan="14">100</td><td rowspan="14">50 (as feasible)</td></tr>
<tr><td>Minke whale</td></tr>
<tr><td>Killer whale</td></tr>
<tr><td>False killer whale</td></tr>
<tr><td>Long-finned pilot whale</td></tr>
<tr><td>Risso's dolphin</td></tr>
<tr><td>Harbor porpoise</td></tr>
<tr><td>Gray seal</td><td rowspan="8">Not required for voluntary approach (IHA 4(3.)(iv))</td></tr>
<tr><td>Harbor seal</td></tr>
<tr><td>Atlantic white-sided dophin</td></tr>
<tr><td>Atlantic spotted dolphin</td></tr>
<tr><td>Common bottlenose dolphin (coastal and offshore stocks)</td></tr>
<tr><td>Common dolphin</td></tr>
<tr><td>White-beaked dolphin</td></tr>
<tr><td>All sea turtle species</td><td>Yes</td><td>500</td><td>50</td><td>100</td></tr>
</table>

Level B Harassment Zone (HZ):

- Shutdown of geophysical survey equipment is required upon observation of a species for which authorization has not been granted or observation of a species for which authorization has been granted but the authorized number of takes has been met (IHA 4(e)(vi)) entering the HZ per Table 4:

Table 4 Level B Harassment Zones

Equipment	Distance to Level B harassment threshold (m)
ET 216 CHIRP	4
GeoMarine Geo Sparker	141
Applied Acoustics AA 251 Boomer	178

Monitoring Zone (MZ) / Minimum Visibility Zone (MVZ):

- PSOs must establish and monitor a marine mammal MZ that represents a distance of **500 meters** from the survey equipment.
- If the 500-meter MVZ cannot be adequately **visually** monitored for ESA-listed species presence (i.e., a PSO determines conditions are such that listed species cannot be reliably sighted within the MVZ), no equipment operating at <180 kHz can be deployed until such time that the MVZ can be reliably monitored and no surveying may occur if the MVZ cannot be reliably monitored (PDC 4 BMP 2c, PDC 4 BMP 6). Although mitigation will be applied for animals detected in the aforementioned zones, observations will extend to the furthest observable distances.

7.3 Visual Search Periods

- To activate the SBPs, boomers and sparkers from silence, a minimum of a 30-minute search period must be conducted, with equipment operators notifying the designated PSO no less than 60 minutes prior to the planned ramp-up time (IHA 4(d)(i)). SBPs, boomers and sparkers will not be activated until the protected species observer has reported the pre-clearance zones (CZ) clear of all cetaceans, sea turtles, and pinnipeds for 30 minutes (PDC 4 BMP 3). The visual search period may begin when PSOs can see to the outermost CZ (500 meters) from the geophysical source.
- During periods of reduced visibility, the search must be conducted visually by the PSOs using night vision and thermal equipment.

7.4 Delays to Initiation of SBPs, Boomers, and Sparkers

The Lessee must ensure that the sound source is not activated until the PSO has reported the pre-clearance zones (CZ) clear of all cetaceans, pinnipeds, and sea turtles for 30 minutes, inclusive of dolphins and pinnipeds that voluntarily approach the vessel. If any marine mammal or sea turtle was detected visually inside its respective CZ during the 30-minute search period, initiation of the survey equipment (SBPs, boomers and sparkers) must be delayed until (IHA 4(d)(vi)):

- The animals have been observed exiting the zones and are headed away from the survey vessel

  OR

- An additional time period has elapsed with no further sightings
  - 15 minutes for small odontocetes and seals
  - 30 minutes for all other cetaceans and sea turtles

Both the 30-minute pre-clearance search period and the mandatory delay for animals observed within the CZ must be complete before source initiation.

7.5 Ramp-Up Procedure

The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time must not be less than 60 minutes prior to the planned ramp-up to allow the PSOs time to monitor the Shutdown Zones for 30 minutes prior to the initiation of ramp-up (pre-start clearance) (IHA 4(d)(i)).

A PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO that the Shutdown Zone is clear prior to proceeding (IHA 4(d)(iii)).

Ramp-up procedures cannot be conducted for individual pieces of survey equipment (i.e., Innomar, boomer etc.) without increasing the HSE risk to personnel operating the equipment.

When technically feasible survey equipment must be ramped up at the start or re-start of survey activities. Ramp-up will be conducted by activating the sound producing equipment in a sequence beginning with the lowest sound output level and adding in additional sound producing equipment incrementally, in steps not exceeding 6 dB per 5-minute period, until all of the sound producing equipment is activated (PDC 4 BMP 4).

Ramp-ups shall be scheduled to minimize the time spent with the source activated (IHA 4(d)(ii)).

Ramp-up must not be initiated if any marine mammal is within the applicable Clearance Zone or Shutdown Zone. If a marine mammal is observed within the applicable Clearance Zone during the 30-minute pre-start clearance period, PSOs should implement a delay to the initiation of source initiation as outlined in section 7.4.

Ramp-up may occur at times of poor visibility, including nighttime, if appropriate visual monitoring has occurred with no detections of marine mammals in the 30 minutes prior to beginning ramp-up.

7.6 Short Breaks in HRG Sourcing Operations

In recognition of occasional short periods of silence for a variety of reasons other than encroachment into the shutdown zone by a non-delphinoid cetacean or sea turtle, including, but not limited to, mechanical or electronic failure, the SBPs, boomers and sparkers may be silenced for periods of time not exceeding 30 minutes in duration and may be restarted for operations at its operational level if (IHA 4(d)(ix)):

1. Visual monitoring by PSOs is continued diligently through the silent period (during visual surveys, the SZ must remain visible throughout the silent period) (IHA 4(d)(ix))

   AND

2. No marine protected species are observed in the applicable SZ during the silent period (IHA 4(d)(ix))

If protected species are observed in the applicable SZ during the silent period:

a. Restart may happen immediately without a ramp-up if the animal is seen entering and exiting the SZ (IHA 4(e)(v))
   i. Ramp-up must always occur after an incursion by sea turtle in the SZ.

b. A clearance period and ramp up must occur if marine protected species are seen entering the applicable SZ, but are not observed exiting the SZ (IHA 4(e)(v))
   i. Harbor porpoises – 15-minute clearance period
   ii. All other species – 30-minute clearance period

For a shutdown of 30 minutes or longer, or if visual surveys were not continued diligently during the pause of 30-minutes or less, the PSOs must restart the pre-clearance search period procedures outlined in Section 7.2. Acoustic sources can be activated using the full ramp-up procedure after PSOs report that the CZ are free of all cetaceans, pinnipeds and sea turtles for 30 minutes (PDC 4 BMP 5).

7.7 Shutdown Procedures

Any PSO on duty has the authority to call for a shutdown of the acoustic source if a marine mammal is detected within the applicable Shutdown Zone (IHA 4(e)(i)).

The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown commands are conveyed and implemented swiftly while allowing PSOs to maintain watch (IHA 4(e)(ii)).

If a protected species is sighted approaching or within the Shutdown Zone, an immediate shutdown of the boomer and sparker is required, EXCEPT if it is a pinniped or delphinid(s) from the genera ***Delphinus, Lagenorhynchus, Stenella or Tursiops,*** that is voluntarily approaching (i.e., bow riding) the vessel or towed survey equipment and the PSO determines that it is a voluntary approach (PDC 5 BMP1)***.*** The vessel operator must comply immediately with the initiation of mitigation by the observer. Any disagreement should be discussed only after shutdown (IHA 4(e)(iii)).

Subsequent restart of the survey equipment must use the ramp-up provisions described in Section 7.5 and may only occur following clearance of the SZ of all protected species, except harbor porpoise, following a 30-minute pre-clearance watch and ramp-up as described in Sections 7.3 and 7.5 (IHA 4(e)(v)). For harbor porpoise, ramp-up can occur after a 15-minute pre-clearance watch.

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.

Project Information

- Lease Number
- Vessel Name(s)
- Vessel Size
- Survey Type (typically HRG)
- Maximum Vessel Speed
- Reporting start and end dates
- Visual monitoring equipment used (e.g., bionics, magnification, IR cameras, etc.)
- PSO names (last, first), position, and training
- Date of PSO Briefing
- Observation height above sea surface

Operations Information

- Vessel name(s)
- HRG equipment type, power levels, source depth, and frequencies used

Monitoring Effort Information

- Date (YYYY-MM-DD)
- HRG equipment (ON/OFF)
- PSOs (Last, First) & affiliations
- Start time (UTC) and latitude/longitude (decimal degrees) of observations
- End time (UTC) and latitude/longitude (decimal degrees) of observations
- Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change
- Duration of visual observation
- Environmental conditions at beginning and end of PSO shift and whenever conditions change significantly
  - Wind speed (knots), from direction
  - Swell (meters), from direction
  - Sea state (Beaufort scale)
  - Water depth (meters)

  - Visibility (km)
  - Weather Condition (clear, cloudy, precipitation, fog)
  - Precipitation (e.g., rain, fog, snow)
  - Glare severity
  - Cloud coverage (%)
- Time pre-clearance visual monitoring began in UTC (HH:MM)
- Time pre-clearance monitoring ended in UTC (HH:MM)
- Duration of pre-clearance visual monitoring
- Was pre-clearance conducted during day or night?
- Time power up/ramp up began
- Time equipment full power was reached
- Duration of power up/ramp up
- Time survey activity began (equipment on)
- Time survey activity ended (equipment off)
- Survey Duration
- Did a shutdown/power down occur?
- Time shutdown was called for (UTC)
- Time equipment was shutdown (UTC)
- Dates and Times of departures and returns to port with port name
- Inhibiting factors of observations (e.g., vessel traffic)

Detection Information

- Date (YYYY-MM-DD)
- Vessel name and type
- Lease area
- Sighting ID (V01, V02, or sequential sighting number for that day) (multiple sightings of same animal or group should use the same ID)
- Date and time at first detection in UTC and EST (YY-MM-DDT HH:MM)
- Time at last detection in UTC and EST (YY-MM-DDT HH:MM)
- PSO name(s) (Last, First)
- Sighting type (acoustic, visual, or both)
- Sighting occurred day or night?
- Initial detection method (e.g., naked eye, reticle binoculars, etc.)
- Latitude (decimal degrees dd.ddddd), longitude (decimal degrees dd.ddddd)
- Compass heading of vessel (degrees)
- Water depth (meters)
- Swell height (meters), direction
- Beaufort scale
- Precipitation
- Visibility (km)
- Cloud coverage (%)
- Glare
- Species including common name, scientific name, or family
- Certainty of identification
- Number of adults
- Number of juveniles
- High, low and best total number of animals
- Bearing to animal(s) when first detected (relative to vessel)
- Range from vessel (reticle distance in meters)
- Description (include features such as overall size; shape of head; color and pattern; size, shape, and position of dorsal fin; height, direction, and shape of blow, etc.)
- Detection narrative (note behavior, especially changes in relation to survey activity and distance from vessel)
- Initial/Final direction of travel (relative to vessel)
- Behaviors observed: indicate behaviors and behavioral changes observed in sequential order
- Pace of animal
- If any bow-riding behavior observed, record total duration during detection (HH:MM)
- Initial heading of animal(s) (degrees)

- Final heading of animal(s) (degrees)
- HRG equipment activity at initial detection
- HRG equipment activity at final detection (on or off)
- Shutdown zone size during detection (meters)
- Was the animal inside the Shutdown zone?
- Closest distance to vessel (reticle distance in meters)
- Closest distance to center of the source
- Time at closest approach (UTC HH:MM)
- Time animal entered shutdown zone (UTC HH:MM)
- Time animal left shutdown zone (UTC HH:MM)
- Duration inside shutdown zone (HH:MM)
- Source mitigation action (delay, shutdown)
- Time shutdown was called for (UTC)
- Time equipment was shutdown (UTC)
- Watch Status (sighting made by PSO on watch, opportunistic, crew)
- Documentation of whether the marine mammal was estimated to have been within 178 meters of active survey equipment

8.2 Reporting NARW Sightings

The Lead PSO will report any sightings of NARW using the designated form. The report will be sent to the Vineyard Northeast Environmental Project Manager and the RPS Project Manager immediately. The PSO team will make every effort to photograph and document all relevant information associated with the sighting.

The Vineyard Northeast Environmental Project Manager will report the NARW to the NMFS NARW Sighting Advisory System: (866) 755-6622 within two hours of occurrence, when practicable, or no later than 24 hours after occurrence (IHA 6(d)(i)). Vessel Captains shall inform the United States Coast Guard of the sighting via channel 16.

8.3 Injured/Dead Protected Species, Bird and Bat Reporting

The Lead PSO will report any injured or dead protected species, bird and bat detections using the designated form. The report will be sent to the Vineyard Northeast Environmental Project Manager and the RPS Project Manager immediately. The PSO team will make every effort to photograph and document all relevant information associated with the sighting.

Sighting of Injured or Dead Protected Species:

The Vineyard Northeast Environmental Project Manager will report the injured or dead animal to BOEM, NMFS, and NMFS Northeast Region's Stranding Hotline by phone (866) 755-6622 and email as soon as feasible, but not later than 24 hours after the sighting, regardless of whether the injury or death is caused by a vessel (IHA 6(e)(i)).

Injured or Dead Protected Species- Vessel Strike:

In the event that the injury or death was caused by a collision with a project-related vessel, the vessel must assist in any salvage efforts as requested by NMFS. If the injury or death was caused by a collision with a project-related vessel, Vineyard Northeast must ensure that BOEM and NMFS are notified of the strike within 24 hours. Vineyard Northeast Environmental Project Manager will report the strike to NMFS, the New England/Mid-Atlantic Regional Stranding Coordinator and BOEM as soon as feasible (IHA 6(e)(ii)).

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 and touching the animals in any manner is considered harassment and is punishable by law.

Any deceased birds should not be disposed of until a positive ID has been confirmed unless informed otherwise by your project manager.

8.4 Reporting Potential Takes of Protected Species

RPS will track the exposures from the R/V Bogue a daily basis. Exposure numbers will be calculated and documented in the RPS Data Form and updated/included in the daily report that is distributed to the client, identifying the remaining number of exposures.

The exposures specific to Vineyard Northeast's HRG surveys are outlined in Table 5 per the IHA.

Table 5 Take by Level B Harassment

Common Name	Level B harassment takes
North Atlantic right whale	12
Blue whale	1
Fin whale	20
Sei whale	5
Minke whale	45
Humpback whale	12
Sperm whale	2
Killer whale	4
False killer whale	5
Atlantic white-sided dolphin	126
Atlantic spotted dolphin	29
Common bottlenose dolphin (Offshore)	165
Common bottlenose dolphin (Migratory)	44
Common dolphin (short-beaked)	7,296
Risso's dolphin	9
White-beaked dolphin	30
Long-finned pilot whale	17
Harbor porpoise	339
Gray seal	408
Harbor seal	917

8.5 Reporting Observed Impacts to Protected Species

The Lead PSO/Environmental Team Lead on duty will report any impacts to an ESA species to the RPS Project Manager immediately. In addition, the Lead PSO/Environmental Team Lead on duty will report any observed impacts resulting in injury or mortality of listed marine mammals, sea turtles, Atlantic sturgeon, and giant manta ray to the RPS Project Manager immediately. The RPS Project Manager will inform the Vineyard Northeast Environmental Project Manager.

Vineyard Northeast will report any observed impacts resulting in injury or mortality within 24 hours to BOEM and NMFS (BOEM OCS-A 522 4.4.5).

8.6 Daily Progress Report

A daily progress report will be completed and submitted to the Party Chief, onboard client representative, Vineyard Northeast Environmental Project Manager and RPS Project Manager. If there were no detections that day, the Lead PSO will email the distribution list noting that there were no detections on that day. The Daily Progress Report will not serve as a notification to Vineyard Northeast of any urgent matters such as those listed in Section 8.2, 8.3, and 8.5 above.

8.7 Monthly Reporting

PSO data collection will be collated monthly starting on the 1st and ending on the last day of the month. These datasheets will be submitted to Vineyard Northeast monthly, by the 7th of the following month.

8.8 Final Report

The PSO team will develop a final report summarizing the R/V Bogue survey activities and all PSO observations. The RPS Project Manager will provide the finalized report to the Vineyard Northeast Environmental Project Manager within 30 days of project completion for review.

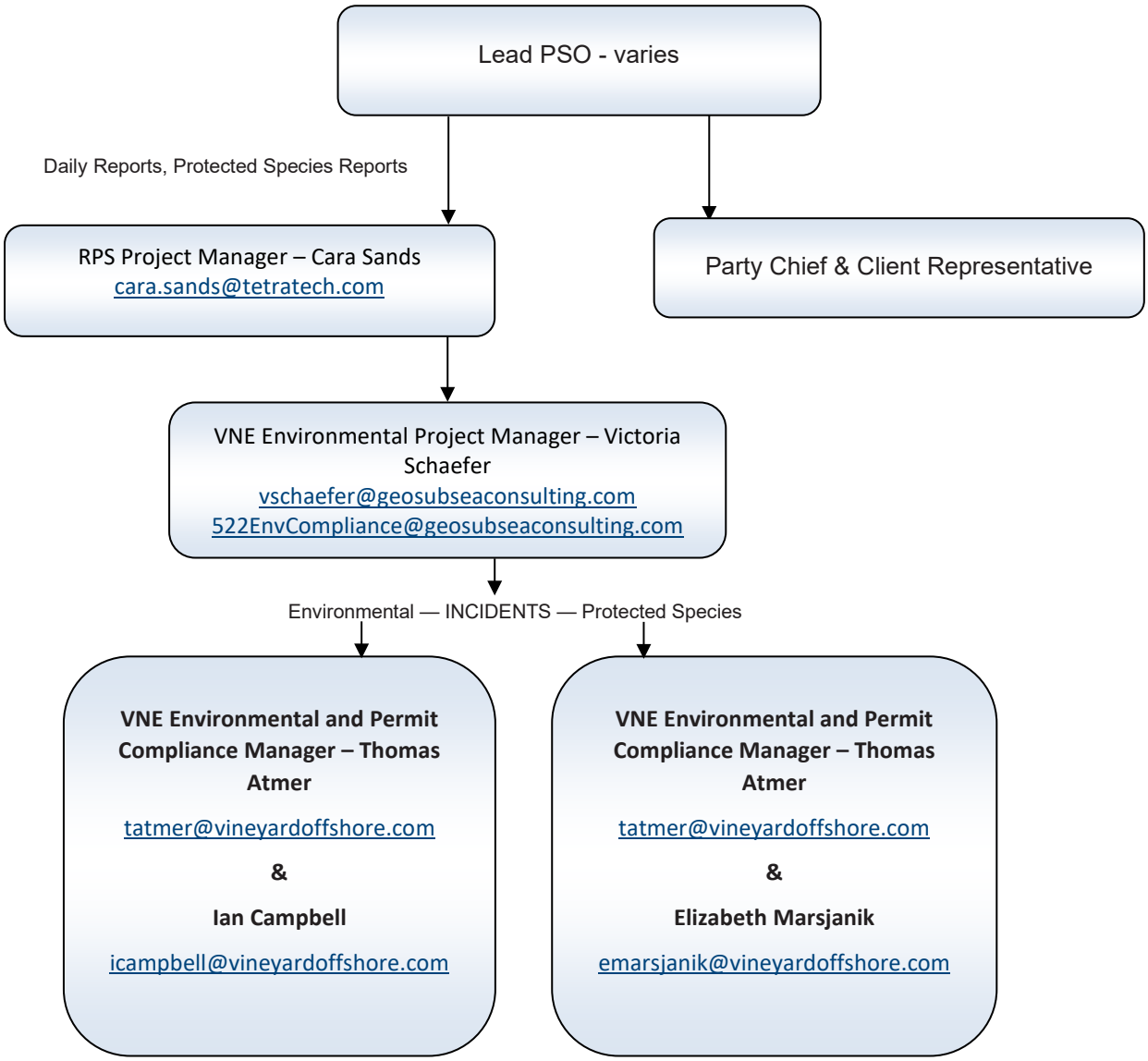
The RPS Project Manager will submit the final report to Vineyard Northeast for review. Vineyard Northeast will be responsible for submitting the final report to BOEM and NMFS or may instruct RPS to make the submittal on their behalf 90 days after completing of survey activities.

9 WHATSAPP PROTOCOL

PSOs will report all protected species sightings and incidents, injured or dead bird/bat, and environmental incidents through the 2024-VO Sightings Sharing group.

- **2024-VO Sightings Sharing**
  - Used to report near real-time sightings of protected species throughout the campaign. This includes NARW sightings as well as dead/injured species. The VNE Compliance Team will also use this channel to inform the PSOs of newly established NARW DMAs.
    - **Members**: VNE Permitting Team, Geo SubSea (GSS) Compliance Team, RPS Project Managers, PSOs, vessel captains
    - **Communication flow**: Onboard PSOs > 2024-VO Sightings Sharing channel
      - GSS utilizes this information to begin time-sensitive reporting as it is reported from the field.

10 COMMUNICATION FLOW CHART

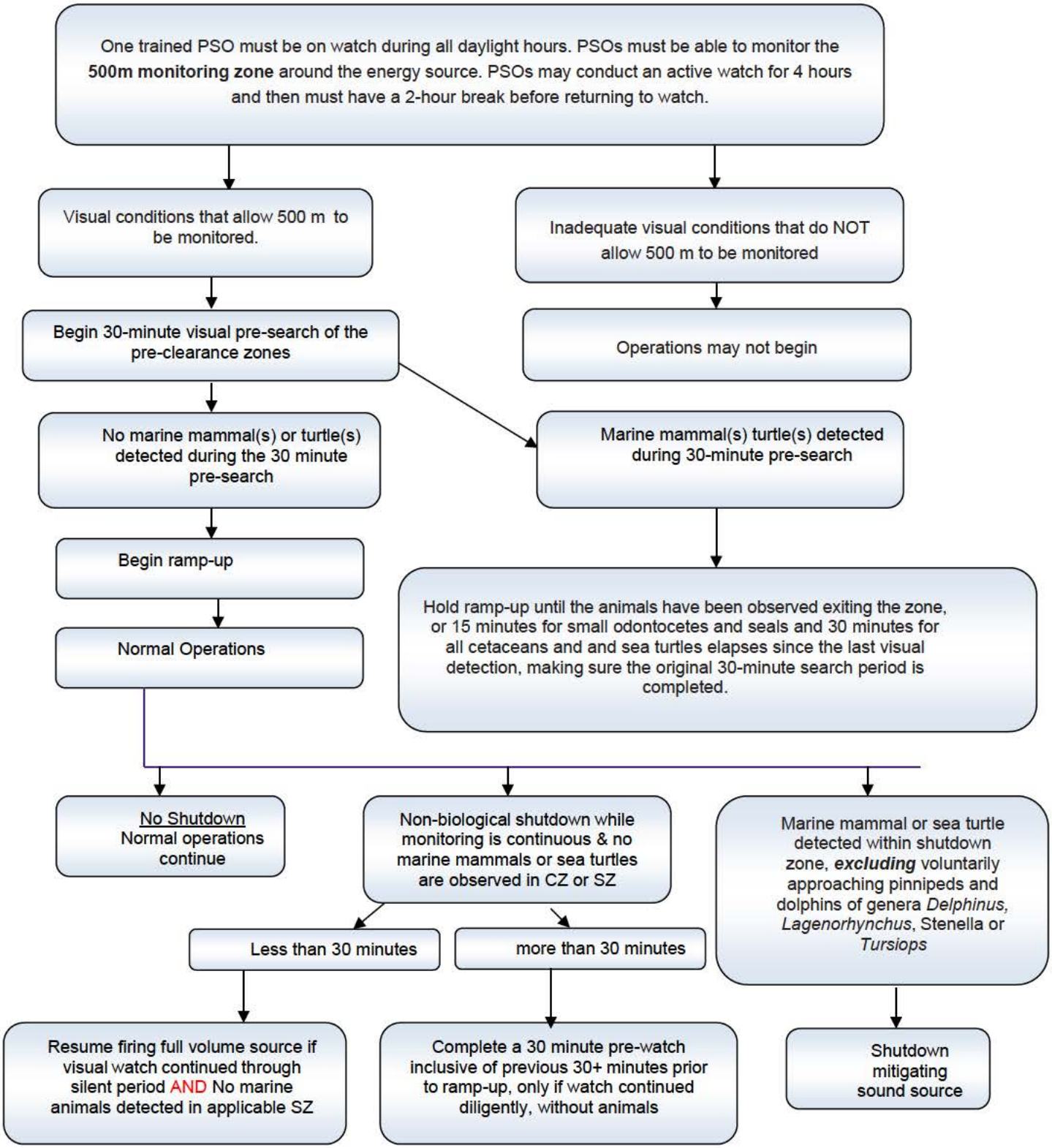


11 RESOURCES

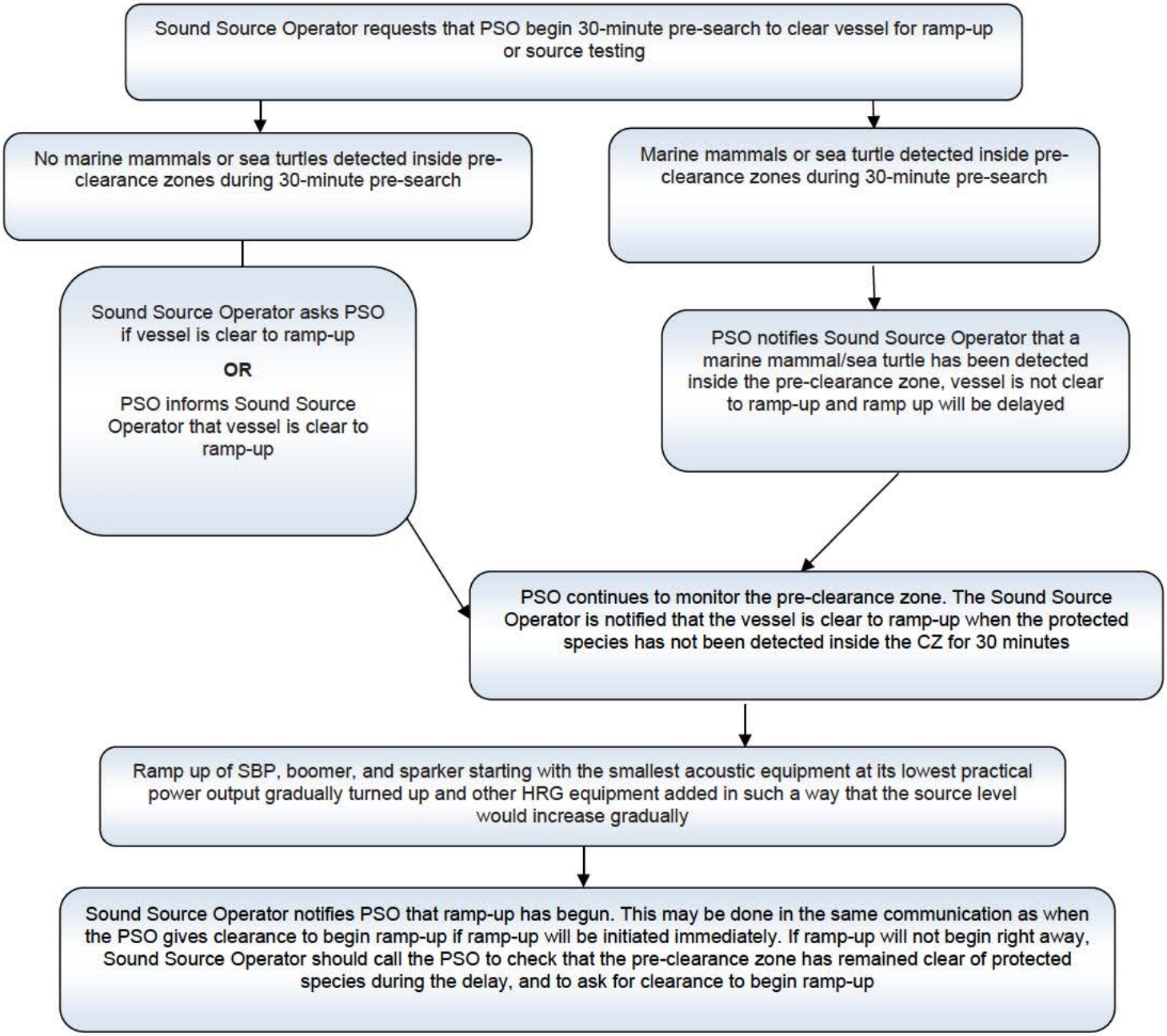
NMFS Programmatic Consultation – Dated June 29, 2021, updated September 30, 2021

Vineyard Northeast IHA – Date July 27, 2024

Appendix A
Mitigation Flow Chart



Appendix B
Communication Flow Charts & Phrasing



Appendix C
Mitigation FAQs

MITIGATION FAQS WITH SITUATIONAL EXAMPLES OF MITIGATION IMPLEMENTATION

When monitoring for protected species during site characterization surveys, there is the potential to encounter certain “Gray Areas”. These scenarios can be a source of debate, given their lower frequency of occurrence, and potentially contentious nature. The following are examples of these “Gray Areas” in mitigation that may require additional discussion with land-based managers:

Fog Scenarios:

In the event of fog encroachment onto the survey site, operations may continue, so long as the visual PSO still have 500 m visibility. If visibility becomes less than 500 m the mitigatable sources should be deactivated until 500 m visibility resumes and a full 30-minute clearance watch has been conducted.

Voluntary Approaching Dolphins* or Pinnipeds (genera specific):

Delphinid species behaviour can be hard to determine depending on various factors. The PSMMP and permit documents contain verbiage allowing for animals determined to be voluntarily approaching the vessel to do so freely without impact to operations. It is suggested that the PSO take up to 10 minutes to determine if any of the animals are breaking their current behaviour to move towards the vessel. If the dolphin species is unidentified or if at any point it appears that the vessel is instead encroaching on the animals, this is not considered voluntary approach and vessel strike avoidance and source mitigation measures are put into place.

Multiple HRG Equipment Ramp-up (non-impulsive, non-parametric SBP, Boomer, Sparker):

The different pieces of HRG equipment used during survey operations operate at various frequencies and have varying operational engagements. Acoustic sources operating below 180 kHz should be “ramped up” as feasible; this means, starting the equipment at the lowest frequency and slowly increasing it over a set period in steps not exceeding 6 dB per 7-minute period at half power, until all the sound producing equipment is activated to full power. Any equipment that does not have the ability to be turned on in an incremental manner should be turned on, one at a time, from the lowest to the highest operating frequency, after the incremental equipment has been brought to full power.

More than one species group detected at the same time:

Each of the detected species should be monitored on an individual timeline. If a whale and sea turtle were detected in the shutdown zone during the same timeframe, the clearance time would be 30 minutes from the time either animal was last spotted.

Ex 1. whale last sighted at 15:30, sea turtle last sighted at 15:49, clearance provided at 16:19.

* Applies to the genera ***Delphinus, Lagenorhynchus, Stenella or Tursiops.*** All other species of dolphin, including unidentified dolphins will not be considered under this example and will result in a shutdown.

Appendix D: Protected Species Observers

Tetra Tech RPS Visual Protected Species Observers *R/V Bogue*
[redacted]
[redacted]

Appendix E: Excel Data Sheets of Project Information, Effort, Operations, and Detections of Protected Species During the Survey

Project Information

Lease Number (OCS-A XXXX)	Vessel Name	Vessel Size (m)	Maximum Vessel Speed (kts)	Other Vessels on Project	Survey Equipment Specifications			Reporting Start Date (YYYY-MM-DD)	Reporting End Date (YYYY-MM-DD)	Visual Monitoring Equipment Used (e.g., Reticle binoculars, night vision devices, etc.)	PSO Information		Date of PSO Briefing (YYYY-MM-DD)	Observation Height Above Sea Surface (m)
					Power Level	Source Depth (m)	Frequency (kHz)				PSO/PAM Names (Last, First)	Position (e.g., Lead PSO, PAM, etc.)		
OCS-A 0522	*Bogue*	17.6	27	*N/A*	226 dB re 1µ Pa at 1 meter	0.30	0.3 to 1.2kHz	2025-02-04	2025-02-15	Reticle binoculars	[redacted]	Lead PSO	2025-02-02	3.9
										Reticle binoculars	[redacted]	PSO	2025-02-02	

Protected Species Observer Effort

Date (YYYY-MM-DD)	Vessel Name	Lease Area (OCS-A XXXX)	Vessel Type (HRG, Geotechnical, UXO, Environmental)	Observer's Name (Last, First)	PSO Location (Physical observation location on vessel)	PSO Affiliation	Start of Watch (UTC; HH:MM)	End of Watch (UTC; HH:MM)	Watch Occurred (Day, Night)	Duration of Visual Observations (HH:MM)	Start of Observations		End of Observations		Water Depth (m)	Wind		Sea Conditions			Visibility (<0.05, 0.05-0.1, 0.1-0.3, 0.3-0.5, 0.5-1, 1-2, 2-5, >5 km)	Weather Condition (Clear, Cloudy, Precipitation, Fog)	Precipitation (Light, Medium, Heavy; Rain, Fog, Snow; None)	Glare Strength (None, Slight, Moderate, Severe)	Cloud Cover (%)	Vessel Info				Time Shutdown Called For (UTC; HH:MM)	Time Equipment was Shutdown (UTC; HH:MM)	Inhibiting Factors to Observations
											Latitude	Longitude	Latitude	Longitude		Speed (kts)	Direction	Swell Height (m)	Swell Angle (Direction from which a wave or swell is coming)	Beaufort (B0 - B12)							Speed (kts)	Heading (Degrees)	Vessel activity (Transit, Soft Start, Testing, Full Power, Deploying/Retrieving, Silent, Standby, Reduced Power)	Source Effort (ON=source on; OFF=source off)			
2025-02-04	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:36	16:00	Day	00:24	[redacted]	[redacted]	[redacted]	[redacted]	5	17	N	<2	W	B2	>5	Cloudy	None	Severe	50	5.2	208	Transit	OFF	NA	NA	none
2025-02-04	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	16:00	16:45	Day	00:45	[redacted]	[redacted]	[redacted]	[redacted]	15	18	N	<2	W	B5	>5	Clear	None	Severe	40	7.7	190	Transit	OFF	NA	NA	none
2025-02-04	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	16:45	17:40	Day	00:55	[redacted]	[redacted]	[redacted]	[redacted]	15	23	N	<2	W	B5	>5	Clear	None	Severe	40	1.8	185	Transit	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:40	12:00	Day	00:20	[redacted]	[redacted]	[redacted]	[redacted]	3	6	N	<2	NA	B1	0.5-1	Cloudy	None	None	90	0.0	117	Transit	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:00	12:34	Day	00:34	[redacted]	[redacted]	[redacted]	[redacted]	5	5	NW	<2	NA	B1	>5	Cloudy	None	None	90	4.6	216	Transit	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:44	13:00	Day	00:16	[redacted]	[redacted]	[redacted]	[redacted]	12	15	NW	<2	N	B4	>5	Cloudy	None	Moderate	90	1.1	288	Deploying/Retrieving	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:00	14:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	12	15	NW	<2	N	B4	>5	Cloudy	None	Moderate	90	1.1	288	Transit	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:00	14:32	Day	00:32	[redacted]	[redacted]	[redacted]	[redacted]	12	17	NW	<2	N	B5	>5	Cloudy	None	Slight	70	0.1	312	Transit	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:32	15:00	Day	00:28	[redacted]	[redacted]	[redacted]	[redacted]	12	15	NW	<2	N	B5	>5	Clear	None	Severe	30	3.0	72	Deploying/Retrieving	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:00	15:01	Day	00:01	[redacted]	[redacted]	[redacted]	[redacted]	18	15	NW	<2	N	B5	>5	Clear	None	Severe	30	3.0	72	Standby	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:01	15:02	Day	00:01	[redacted]	[redacted]	[redacted]	[redacted]	18	15	NW	<2	N	B5	>5	Clear	None	Severe	30	3.0	72	Soft-start	ON	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:02	15:26	Day	00:24	[redacted]	[redacted]	[redacted]	[redacted]	18	15	NW	<2	N	B5	>5	Clear	None	Severe	30	3.0	72	Silent	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:26	15:56	Day	00:30	[redacted]	[redacted]	[redacted]	[redacted]	13	15	NW	<2	N	B5	>5	Clear	None	Severe	30	2.1	21	Soft-start	ON	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:56	17:00	Day	01:04	[redacted]	[redacted]	[redacted]	[redacted]	9	11	NW	<2	N	B4	>5	Clear	None	Severe	20	4.5	201	Full power	ON	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	17:00	18:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	8	9	NW	<2	N	B4	>5	Clear	None	Severe	30	5.2	177	Full power	ON	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	18:00	18:37	Day	00:37	[redacted]	[redacted]	[redacted]	[redacted]	11	10	NW	<2	N	B3	>5	Clear	None	Severe	20	4.1	130	Full power	ON	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	18:37	18:45	Day	00:08	[redacted]	[redacted]	[redacted]	[redacted]	11	9	NW	<2	N	B3	>5	Clear	None	Severe	20	0.4	39	Deploying/Retrieving	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	18:45	19:00	Day	00:15	[redacted]	[redacted]	[redacted]	[redacted]	10	9	NW	<2	N	B3	>5	Clear	None	Severe	20	5.1	310	Transit	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	19:00	19:13	Day	00:13	[redacted]	[redacted]	[redacted]	[redacted]	11	17	NW	<2	N	B4	>5	Clear	None	Severe	20	2.2	236	Deploying/Retrieving	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	19:13	20:00	Day	00:43	[redacted]	[redacted]	[redacted]	[redacted]	12	15	NW	<2	N	B4	>5	Clear	None	Severe	30	8.7	86	Transit	OFF	NA	NA	none
2025-02-05	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:00	20:09	Day	00:09	[redacted]	[redacted]	[redacted]	[redacted]	5	7	NW	<2	NA	B2	>5	Clear	None	Severe	40	5.8	30	Transit	OFF	NA	NA	none
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:54	12:00	Day	00:06	[redacted]	[redacted]	[redacted]	[redacted]	3	8	SE	<2	NA	B2	0.5-1	Precipitation	Light Snow	None	100	0.0	97	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:00	12:28	Day	00:28	[redacted]	[redacted]	[redacted]	[redacted]	5	9	SE	<2	NA	B2	1-2	Precipitation	Light Snow	None	100	5.4	110	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:28	12:45	Day	00:17	[redacted]	[redacted]	[redacted]	[redacted]	11	15	SE	<2	S	B3	2-5	Precipitation	Light Snow	None	100	9.2	52	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:45	12:49	Day	00:04	[redacted]	[redacted]	[redacted]	[redacted]	11	14	SE	<2	S	B3	1-2	Precipitation	Light Snow	None	100	9.5	38	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:49	13:00	Day	00:11	[redacted]	[redacted]	[redacted]	[redacted]	11	14	SE	<2	S	B3	1-2	Precipitation	Light Snow	None	100	0.7	94	Deploying/Retrieving	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:00	13:18	Day	00:18	[redacted]	[redacted]	[redacted]	[redacted]	12	12	SE	<2	S	B3	0.5-1	Precipitation	Light Snow	None	100	0.6	359	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:18	13:51	Day	00:33	[redacted]	[redacted]	[redacted]	[redacted]	9	17	SE	<2	S	B4	0.3-0.5	Precipitation	Medium Snow	None	100	4.4	27	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:51	14:00	Day	00:09	[redacted]	[redacted]	[redacted]	[redacted]	9	19	SE	<2	S	B4	0.5-1	Precipitation	Light Snow	None	100	4.9	45	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:00	14:13	Day	00:13	[redacted]	[redacted]	[redacted]	[redacted]	9	17	SE	<2	S	B4	1-2	Precipitation	Light Snow	None	100	4.7	9	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:13	14:20	Day	00:07	[redacted]	[redacted]	[redacted]	[redacted]	11	15	SE	<2	S	B4	2-5	Precipitation	Light Snow	None	100	3.7	126	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:20	14:29	Day	00:09	[redacted]	[redacted]	[redacted]	[redacted]	12	18	SE	<2	S	B4	2-5	Precipitation	Light Snow	None	100	2.7	128	Deploying/Retrieving	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:29	15:00	Day	00:31	[redacted]	[redacted]	[redacted]	[redacted]	12	20	SE	<2	S	B4	2-5	Precipitation	Light Snow	None	100	2.3	39	Transit	OFF	NA	NA	snow, haze
2025-02-06	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:00	15:24	Day	00:24	[redacted]	[redacted]	[redacted]	[redacted]	5	19	SE	<2	S	B4	1-2	Precipitation	Light Rain	None	100	6.2	355	Transit	OFF	NA	NA	haze
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:36	11:42	Day	00:06	[redacted]	[redacted]	[redacted]	[redacted]	3	1	NW	<2	NA	B1	0.5-1	Cloudy	None	None	70	0.0	66	Transit	OFF	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:42	12:00	Day	00:18	[redacted]	[redacted]	[redacted]	[redacted]	3	1	NW	<2	NA	B1	1-2	Cloudy	None	None	70	5.4	196	Transit	OFF	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:00	12:37	Day	00:37	[redacted]	[redacted]	[redacted]	[redacted]	5	6	NW	<2	NA	B2	>5	Cloudy	None	None	70	5.0	203	Transit	OFF	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:37	13:00	Day	00:23	[redacted]	[redacted]	[redacted]	[redacted]	15	10	NW	<2	W	B2	>5	Cloudy	None	Slight	90	1.3	90	Deploying/Retrieving	OFF	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:00	13:16	Day	00:16	[redacted]	[redacted]	[redacted]	[redacted]	14	12	NW	<2	W	B3	>5	Cloudy	None	Slight	90	1.1	190	Deploying/Retrieving	OFF	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:16	13:46	Day	00:30	[redacted]	[redacted]	[redacted]	[redacted]	17	12	NW	<2	W	B3	>5	Cloudy	None	Slight	90	2.1	56	Soft-start	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:46	14:00	Day	00:14	[redacted]	[redacted]	[redacted]	[redacted]	13	11	NW	<2	W	B3	>5	Cloudy	None	Slight	90	3.8	337	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:00	15:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	13	11	NW	<2	W	B3	>5	Cloudy	None	Slight	90	4.0	335	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:00	16:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	12	13	NW	<2	W	B3	>5	Cloudy	None	Slight	90	3.7	220	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	16:00	17:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	11	13	NW	<2	W	B3	>5	Cloudy	None	Slight	90	4.2	308	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	17:00	18:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	13	10	NW	<2	W	B3	>5	Cloudy	None	Moderate	90	4.5	156	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	18:00	19:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	13	10	NW	<2	W	B3	>5	Cloudy	None	Moderate	90	4.3	334	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	19:00	20:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	12	6	NW	<2	W	B2	>5	Cloudy	None	Moderate	85	4.7	323	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:00	21:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	13	14	NW	<2	W	B3	>5	Cloudy	None	Slight	100	3.8	155	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:00	21:01	Day	00:01	[redacted]	[redacted]	[redacted]	[redacted]	14	13	NW	<2	W	B3	>5	Cloudy	None	Slight	80	3.8	157	Full power	ON	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:01	21:03	Day	00:02	[redacted]	[redacted]	[redacted]	[redacted]	15	7	NW	<2	W	B3	>5	Cloudy	None	Slight	80	1.1	14	Silent	OFF	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:03	21:46	Day	00:43	[redacted]	[redacted]	[redacted]	[redacted]	15	9	NW	<2	W	B3	>5	Cloudy	None	Slight	80	2.1	58	Deploying/Retrieving	OFF	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:46	22:00	Day	00:14	[redacted]	[redacted]	[redacted]	[redacted]	15	5	NW	<2	W	B3	>5	Cloudy	None	None	95	5.8	74	Transit	OFF	NA	NA	none
2025-02-08	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	22:00	22:18	Day	00:18	[redacted]	[redacted]	[redacted]	[redacted]	5	3	NW	<2	W	B2	>5	Cloudy	None	None	100	5.8	8	Transit	OFF	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:32	11:42	Day	00:10	[redacted]	[redacted]	[redacted]	[redacted]	4	2	N	<2	NA	B1	1-2	Cloudy	None	None	70	0.0	177	Transit	OFF	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:42	12:00	Day	00:18	[redacted]	[redacted]	[redacted]	[redacted]	4	2	NW	<2	NA	B1	2-5	Cloudy	None	None	70	6.4	181	Transit	OFF	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:00	12:18	Day	00:18	[redacted]	[redacted]	[redacted]	[redacted]	7	10	NW	<2	NA	B2	>5	Cloudy	None	None	80	7.2	209	Transit	OFF	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:18	12:46	Day	00:28	[redacted]	[redacted]	[redacted]	[redacted]	29	9	NW	<2	NW	B2	>5	Cloudy	None	None	80	2.3	244	Deploying/Retrieving	OFF	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:46	13:00	Day	00:14	[redacted]	[redacted]	[redacted]	[redacted]	15	10	NW	<2	NW	B2	>5	Cloudy	None	None	90	2.9	246	Soft-start	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:00	13:16	Day	00:16	[redacted]	[redacted]	[redacted]	[redacted]	15	9	NW	<2	NW	B2	>5	Cloudy	None	None	90	4.6	335	Soft-start	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:16	14:00	Day	00:44	[redacted]	[redacted]	[redacted]	[redacted]	15	13	NW	<2	NW	B2	>5	Cloudy	None	None	90	4.4	334	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:00	15:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	13	NW	<2	NW	B2	>5	Cloudy	None	None	95	4.0	347	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:00	16:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	15	NW	<2	NW	B3	>5	Cloudy	None	None	90	3.8	339	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	16:00	17:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	14	14	NW	<2	NW	B3	>5	Clear	None	Severe	20	4.1	335	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	17:00	18:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	13	15	NW	<2	NW	B4	>5	Clear	None	Severe	20	3.7	154	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	18:00	19:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	13	NW	<2	NW	B4	>5	Clear	None	Severe	20	4.1	333	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	19:00	20:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	14	18	NW	<2	NW	B4	>5	Clear	None	Severe	25	4.1	333	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:00	21:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	13	22	NW	<2	NW	B4	>5	Cloudy	None	Severe	50	4.0	156	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:00	21:08	Day	00:08	[redacted]	[redacted]	[redacted]	[redacted]	14	13	NW	<2	NW	B4	>5	Clear	None	Severe	40	4.0	337	Full power	ON	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:08	21:09	Day	00:01	[redacted]	[redacted]	[redacted]	[redacted]	12	13	NW	<2	NW	B4	>5	Clear	None	Severe	40	3.7	117	Silent	OFF	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:09	21:33	Day	00:24	[redacted]	[redacted]	[redacted]	[redacted]	12	13	NW	<2	NW	B4	>5	Clear	None	Severe	40	3.7	116	Deploying/Retrieving	OFF	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:33	22:00	Day	00:27	[redacted]	[redacted]	[redacted]	[redacted]	12	12	NW	<2	NW	B4	>5	Clear	None	Severe	40	9.7	98	Transit	OFF	NA	NA	none
2025-02-10	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	22:00	22:26	Day	00:26	[redacted]	[redacted]	[redacted]	[redacted]	5	7	NW	<2	NW	B2	>5	Clear	None	None	10	6.3	27	Transit	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:26	11:35	Day	00:09	[redacted]	[redacted]	[redacted]	[redacted]	5	2	WNW	<2	NA	B1	0.5-1	Cloudy	None	None	90	5.9	323	Transit	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:35	11:50	Day	00:15	[redacted]	[redacted]	[redacted]	[redacted]	5	3	WNW	<2	NA	B1	1-2	Cloudy	None	None	80	5.7	222	Transit	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:50	12:00	Day	00:10	[redacted]	[redacted]	[redacted]	[redacted]	3	13	WNW	<2	NA	B1	>5	Cloudy	None	Slight	50	9.3	196	Transit	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:00	12:06	Day	00:06	[redacted]	[redacted]	[redacted]	[redacted]	21	10	W	<2	NA	B2	>5	Cloudy	None	Slight	50	9.3	247	Transit	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:06	12:25	Day	00:19	[redacted]	[redacted]	[redacted]	[redacted]	21	12	W	<2	NA	B2	>5	Cloudy	None	Slight	50	0.8	262	Deploying/Retrieving	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:25	12:42	Day	00:17	[redacted]	[redacted]	[redacted]	[redacted]	11	7	NW	<2	WNW	B2	>5	Cloudy	None	Slight	50	3.9	239	Standby	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:42	13:00	Day	00:18	[redacted]	[redacted]	[redacted]	[redacted]	16	10	NW	<2	W	B2	>5	Cloudy	None	Slight	60	3.7	337	Soft-start	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:00	13:12	Day	00:12	[redacted]	[redacted]	[redacted]	[redacted]	17	5	NNW	<2	W	B2	>5	Cloudy	None	Slight	90	4.4	187	Soft-start	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:12	14:00	Day	00:48	[redacted]	[redacted]	[redacted]	[redacted]	16	7	NNW	<2	W	B2	>5	Cloudy	None	Moderate	90	3.9	335	Full power	ON	NA	NA	none

Protected Species Observer Effort

Date (YYYY-MM-DD)	Vessel Name	Lease Area (OCS-A XXXX)	Vessel Type (HRG, Geotechnical, UXO, Environmental)	Observer's Name (Last, First)	PSO Location (Physical observation location on vessel)	PSO Affiliation	Start of Watch (UTC; HH:MM)	End of Watch (UTC; HH:MM)	Watch Occurred (Day, Night)	Duration of Visual Observations (HH:MM)	Start of Observations		End of Observations		Water Depth (m)	Wind		Sea Conditions			Visibility (<0.05, 0.05-0.1, 0.1-0.3, 0.3-0.5, 0.5-1, 1-2, 2-5, >5 km)	Weather Condition (Clear, Cloudy, Precipitation, Fog)	Precipitation (Light, Medium, Heavy) Rain, Fog, Snow; None)	Glare Strength (None, Slight, Moderate, Severe)	Cloud Cover (%)	Vessel Info				Time Shutdown Called For (UTC; HH:MM)	Time Equipment was Shutdown (UTC; HH:MM)	Inhibiting Factors to Observations
											Latitude	Longitude	Latitude	Longitude		Speed (kts)	Direction	Swell Height (m)	Swell Angle (Direction from which a wave or swell is coming)	Beaufort (B0 - B12)							Speed (kts)	Heading (Degrees)	Vessel activity (Transit, Soft Start, Testing, Full Power, Deploying/Retrieving, Silent, Standby, Reduced Power)	Source Effort (ON=source on; OFF=source off)			
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:00	15:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	16	6	NW	<2	W	B2	>5	Cloudy	None	Moderate	90	4.0	338	Full power	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:00	16:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	14	13	W	<2	W	B3	>5	Cloudy	None	None	100	3.5	331	Full power	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	16:00	17:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	16	W	<2	W	B3	>5	Cloudy	None	None	100	4.2	148	Full power	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	17:00	18:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	13	W	<2	W	B3	>5	Cloudy	None	None	100	4.4	338	Full power	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	18:00	19:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	21	W	<2	W	B4	>5	Cloudy	None	Moderate	90	4.2	153	Full power	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	19:00	20:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	12	16	W	<2	W	B4	>5	Cloudy	None	None	100	4.3	335	Full power	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:00	21:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	18	W	<2	W	B4	>5	Cloudy	None	None	100	3.9	309	Full power	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:00	21:08	Day	00:08	[redacted]	[redacted]	[redacted]	[redacted]	13	18	WSW	<2	W	B3	>5	Cloudy	None	None	100	4.0	160	Full power	ON	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:08	21:11	Day	00:03	[redacted]	[redacted]	[redacted]	[redacted]	14	11	WSW	<2	W	B3	>5	Cloudy	None	None	100	4.5	96	Silent	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:11	21:32	Day	00:21	[redacted]	[redacted]	[redacted]	[redacted]	14	11	WSW	<2	W	B3	>5	Cloudy	None	None	100	2.1	62	Deploying/Retrieving	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:32	22:00	Day	00:28	[redacted]	[redacted]	[redacted]	[redacted]	13	11	SW	<2	W	B3	>5	Cloudy	None	None	100	4.6	34	Transit	OFF	NA	NA	none
2025-02-11	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	22:00	22:20	Day	00:20	[redacted]	[redacted]	[redacted]	[redacted]	4	11	SW	<2	W	B3	>5	Cloudy	None	None	100	6.1	35	Transit	OFF	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:34	13:00	Day	00:26	[redacted]	[redacted]	[redacted]	[redacted]	3	5	N	<2	NA	B2	>5	Cloudy	None	None	100	0.0	0	Transit	OFF	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:00	13:17	Day	00:17	[redacted]	[redacted]	[redacted]	[redacted]	6	10	N	<2	NA	B2	>5	Cloudy	None	None	100	7.1	233	Transit	OFF	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:17	13:38	Day	00:21	[redacted]	[redacted]	[redacted]	[redacted]	18	11	NE	<2	E	B2	>5	Cloudy	None	None	100	1.3	240	Deploying/Retrieving	OFF	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:38	14:08	Day	00:30	[redacted]	[redacted]	[redacted]	[redacted]	13	12	NE	<2	E	B2	>5	Cloudy	None	None	100	4.3	239	Soft-start	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:08	15:00	Day	00:52	[redacted]	[redacted]	[redacted]	[redacted]	16	19	NE	<2	E	B3	>5	Cloudy	None	None	100	3.9	4	Full power	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:00	16:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	15	NE	<2	E	B3	>5	Cloudy	None	None	100	4.2	157	Full power	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	16:00	17:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	16	NE	<2	E	B3	>5	Cloudy	None	None	100	4.3	153	Full power	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	17:00	18:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	15	NE	<2	E	B3	>5	Cloudy	None	None	100	4.3	156	Full power	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	18:00	19:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	14	25	NE	<2	E	B4	>5	Cloudy	None	None	100	4.0	304	Full power	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	19:00	20:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	12	13	NE	<2	E	B3	>5	Cloudy	None	None	100	4.7	200	Full power	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:00	21:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	13	11	NE	<2	E	B3	>5	Cloudy	None	None	100	4.2	111	Full power	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:00	21:15	Day	00:15	[redacted]	[redacted]	[redacted]	[redacted]	14	16	NE	<2	E	B4	>5	Cloudy	None	None	100	4.7	274	Full power	ON	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:15	21:34	Day	00:19	[redacted]	[redacted]	[redacted]	[redacted]	13	19	NE	<2	E	B4	>5	Cloudy	None	None	100	1.9	95	Deploying/Retrieving	OFF	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:34	22:10	Day	00:36	[redacted]	[redacted]	[redacted]	[redacted]	13	15	NE	<2	E	B4	>5	Cloudy	None	None	100	8.4	100	Transit	OFF	NA	NA	none
2025-02-12	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	22:10	22:26	Day	00:16	[redacted]	[redacted]	[redacted]	[redacted]	6	8	NE	<2	E	B4	>5	Cloudy	None	None	100	7.0	20	Transit	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:24	11:32	Day	00:08	[redacted]	[redacted]	[redacted]	[redacted]	3	5	N	<2	NA	B1	0.5-1	Cloudy	None	None	65	0.0	0	Transit	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:32	11:42	Day	00:10	[redacted]	[redacted]	[redacted]	[redacted]	3	10	N	<2	NA	B1	2-5	Cloudy	None	None	65	5.8	207	Transit	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	11:42	12:00	Day	00:18	[redacted]	[redacted]	[redacted]	[redacted]	4	5	NW	<2	NA	B1	>5	Cloudy	None	None	60	6.4	197	Transit	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:00	12:04	Day	00:04	[redacted]	[redacted]	[redacted]	[redacted]	19	18	NNW	<2	NA	B2	>5	Cloudy	None	None	60	9.7	259	Transit	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:04	12:23	Day	00:19	[redacted]	[redacted]	[redacted]	[redacted]	25	10	NW	<2	NA	B2	>5	Cloudy	None	None	60	4.2	241	Deploying/Retrieving	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:23	12:34	Day	00:11	[redacted]	[redacted]	[redacted]	[redacted]	15	11	NNW	<2	NA	B2	>5	Cloudy	None	Moderate	60	2.9	240	Standby	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	12:34	13:00	Day	00:26	[redacted]	[redacted]	[redacted]	[redacted]	13	22	N	<2	NA	B2	>5	Cloudy	None	Severe	60	4.4	273	Soft-start	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:00	13:04	Day	00:04	[redacted]	[redacted]	[redacted]	[redacted]	15	9	NNW	<2	N	B2	>5	Cloudy	None	Severe	65	4.7	239	Soft-start	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	13:04	14:00	Day	00:56	[redacted]	[redacted]	[redacted]	[redacted]	13	10	N	<2	N	B2	>5	Cloudy	None	Severe	70	3.8	350	Full power	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	14:00	15:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	6	NE	<2	N	B2	>5	Cloudy	None	Slight	90	3.8	146	Full power	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	15:00	16:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	14	NW	<2	N	B2	>5	Cloudy	None	None	100	3.8	344	Full power	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	16:00	17:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	7	SE	<2	N	B2	>5	Cloudy	None	None	100	3.9	159	Full power	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	17:00	18:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	6	SE	<2	N	B2	>5	Cloudy	None	None	100	4.3	157	Full power	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	18:00	19:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	13	7	S	<2	N	B2	>5	Cloudy	None	None	100	4.1	167	Full power	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	19:00	20:00	Day	01:00	[redacted]	[redacted]	[redacted]	[redacted]	15	6	SE	<2	NA	B1	>5	Cloudy	None	None	100	5.0	162	Full power	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:00	20:13	Day	00:13	[redacted]	[redacted]	[redacted]	[redacted]	15	6	S	<2	NA	B1	>5	Cloudy	None	None	100	5.6	64	Full power	ON	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:13	20:18	Day	00:05	[redacted]	[redacted]	[redacted]	[redacted]	15	11	SE	<2	NA	B2	>5	Cloudy	None	None	100	5.0	82	Silent	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:18	20:37	Day	00:19	[redacted]	[redacted]	[redacted]	[redacted]	13	12	SE	<2	NA	B2	>5	Cloudy	None	None	100	1.9	62	Deploying/Retrieving	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	20:37	21:00	Day	00:23	[redacted]	[redacted]	[redacted]	[redacted]	13	9	SE	<2	NA	B2	>5	Cloudy	None	None	100	9.2	100	Transit	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:00	21:12	Day	00:12	[redacted]	[redacted]	[redacted]	[redacted]	6	18	SE	<2	NA	B2	>5	Cloudy	None	None	100	6.4	60	Transit	OFF	NA	NA	none
2025-02-13	Bogue	OCS-A 0522	HRG	[redacted]	Bridge	RPS	21:12	21:30	Day	00:18	[redacted]	[redacted]	[redacted]	[redacted]	4	11	SE	<2	NA	B2	2-5	Precipitation	Light Snow	None	100	5.4	70	Transit	OFF	NA	NA	none

Date (YYYY-MM-DD)	**Vessel Name**	**Lease Area** (OCS-A XXXX)	**Time Pre-Clearance Visual Monitoring Began** (UTC; HH:MM)	**Time Pre-Clearance Visual Monitoring Ended** (UTC; HH:MM)	**Duration of Pre-Clearance Visual Monitoring** (HH:MM)	**Pre-Clearance Conducted** (Day / Night)	**Time Power-up / Ramp-up Began** (UTC; HH:MM)	**Time Equipment Reached Full Power** (UTC; HH:MM)	**Duration of Power-up / Ramp-up** (UTC; HH:MM)	**Time Survey Activity Began** (Equipment on) (UTC; HH:MM)	**Time Survey Activity Ended** (Equipment off) (UTC; HH:MM)	**Duration of Survey Activity** (HH:MM)	**Did Shutdown / Powerdown Occur?** (Y/N)	**Time Shutdown Called For** (UTC; HH:MM)	**Time Equipment was Shutdown** (UTC; HH:MM)
2025-02-05	Bogue	OCS-A 0522	14:31	15:01	00:30	Day	15:01		00:00		15:02	00:01	N	NA	NA
2025-02-05	Bogue	OCS-A 0522	14:56	15:26	00:30	Day	15:26	15:56	00:30	15:56	18:37	02:41	N	NA	NA
2025-02-08	Bogue	OCS-A 0522	12:46	13:16	00:30	Day	13:16	13:46	00:30	13:46	20:01	07:15	N	NA	NA
2025-02-10	Bogue	OCS-A 0522	12:16	12:46	00:30	Day	12:46	13:16	00:30	13:16	21:08	07:52	N	NA	NA
2025-02-11	Bogue	OCS-A 0522	12:12	12:42	00:30	Day	13:42	13:12	00:30	13:12	21:08	07:56	N	NA	NA
2025-02-12	Bogue	OCS-A 0522	13:08	13:38	00:30	Day	13:38	14:08	00:30	14:08	21:15	07:07	N	NA	NA
2025-02-15	Bogue	OCS-A 0522	12:04	12:34	00:30	Day	12:34	13:04	00:30	13:04	20:13	07:09	N	NA	NA

Protected Species Detection Data Form

Sighting ID #	Vessel Name	Lease Area (OCS-A XXXX)	Vessel Type (PSO, Geotechnical, USO, Environmental)	Observer's Name (Last, First)	Date (YYYY-MM-DD)	Sighting Type (Acoustic, Visual, Both)	Initial Detection Method (Naked eye, Reticle Binoculars, NVD, IR)	First Time of Sighting (UTC) HH:MM	First Time of Sighting (EST) HH:MM	Last Time of Sighting (UTC) HH:MM	Last Time of Sighting (EST) HH:MM	Sighting Occurred (Day, Night)	Sighting Location (Decimal Degrees)		Vessel Heading (Degrees)	Species or Species Group (Common - (Scientific))	Species ID Certainty (Possible, Probable, Definite)	Animal Description (Include features such as overall size; shape of head; color and pattern; size, shape, and position of dorsal fin; height, direction, and shape of blow; etc.)	Detection Narrative (Note behavior, especially changes in relation to survey activity and distance from source)	Animal Behavior (Behaviors and behavioral changes observed in sequential order)					Behavior Change (Yes / No, If Yes, note what changes occurred in Detection Narrative column)	Group Composition		Estimated Total Number of Animals			Mixed Species Sighting (Y/N)	If Mixed Species - List Associated Sighting Numbers	Relative Bearing to Animal at First Detection (Degrees)	Animal's Initial Direction of Travel (Degrees, ? stationary, u unknown, var variable relative to vessel)	Animal's Final Direction of Travel (Degrees, ? stationary, u unknown, var variable relative to vessel)	Animal's Direction of Travel (Relative to vessel)	Animal Pace (Stationary, Sedate, Moderate, Vigorous)	Distance at Initial Sighting (m)	Distance Estimation Method	Closest Point of Approach to the Center of the Source (m)	Closest Point of Approach to Vessel (m)	Time At Closest Approach (UTC) HH:MM	Exclusion Zone Size (m)	Animal Inside EZ? (Y/N)	Time Animal Entered EZ (UTC) HH:MM	Time Animal Left EZ (UTC) HH:MM	Duration Inside EZ (HH:MM)	Duration of Bow Riding - If Occurred (HH:MM)	Vessel Activity at First Sighting (Transit, Soft Start, Testing, Reduced Power, Full Power, Deploying/Retrieving, Standby)	Equipment Operating During Sighting (Non-Parametric SBP (SBP) Only, SBP & Boomer, SBP & Sparker, Sparker Only, Boomer Only, None)	Source Activity at First Sighting (ON / OFF)	Vessel Activity at Last Sighting (Transit, Soft Start, Testing, Reduced Power, Full Power, Deploying/Retrieving, Standby)	Source Activity at Last Sighting (ON / OFF)	Animal Within 141m of Active Survey Equipment (Y/N)	Source Mitigation Action (Delay, Shutdown, None)	Time Shutdown Called For (UTC; HH:MM)	Time Equipment was Shutdown (UTC; HH:MM)	Vessel Strike Avoidance (Yes/No. If Yes, RP = Remained Parallel, SR = Speed Reduction, CC = Change Course, MD = Maintained Separation Distance, MS = Maintain Speed, MC = Maintain Course, EN = Shifted Engines to Neutral, PVSA = Precautionary; If No, UP = Unable to Perform, VS = Vessel Stationary, NR = Not Required)	Observation Conditions								Watch Status (On Watch, Off Watch / Incidental Sighting)
													Latitude	Longitude						Animal Behavior #1	Animal Behavior #2	Animal Behavior #3	Animal Behavior #4	Animal Behavior #5		# Adults (Visual sightings only)	# Juveniles (Visual sightings only)	High	Low	Best (Total # observed)																													Water Depth (m)	Swell Height (m)	Swell Angle (Direction from which a wave or swell is coming)	Beaufort Scale (B0 - B12)	Visibility (<0.05, 0.05-0.1, 0.1-0.5, 0.5-0.8, 0.8-1, 1-2, 2-5, >5 km)	Precipitation (Light, Medium, Heavy) Rain, Fog, Snow, None)	Glare (Slight, Moderate, Severe, None)	Cloud Cover (%)	

Appendix F: Vessel Port Calls

Date (YYYY-MM-DD)	Vessel	Time (UTC; HH:MM)	Depart / Arrival	Port Name	Reason (i.e., Repairs, Bunkering, Crew Change)
2025-02-04	R/V *Bogue*	15:36	Depart	Safe Harbor Mystic, Mystic CT	transit to survey area
2025-02-04	R/V *Bogue*	17:40	Arrival	Safe Harbor Mystic, Mystic CT	transit to port
2025-02-05	R/V *Bogue*	11:40	Depart	Safe Harbor Mystic, Mystic CT	transit to survey area
2025-02-05	R/V *Bogue*	20:09	Arrival	Safe Harbor Mystic, Mystic CT	transit to port
2025-02-06	R/V *Bogue*	11:54	Depart	Safe Harbor Mystic, Mystic CT	transit to survey area
2025-02-06	R/V *Bogue*	15:24	Arrival	Safe Harbor Mystic, Mystic CT	transit to port
2025-02-08	R/V *Bogue*	11:36	Depart	Safe Harbor Mystic, Mystic CT	transit to survey area
2025-02-08	R/V *Bogue*	22:18	Arrival	Safe Harbor Mystic, Mystic CT	transit to port
2025-02-10	R/V *Bogue*	11:32	Depart	Safe Harbor Mystic, Mystic CT	transit to survey area
2025-02-10	R/V *Bogue*	22:26	Arrival	Safe Harbor Mystic, Mystic CT	transit to port
2025-02-11	R/V *Bogue*	11:26	Depart	Safe Harbor Mystic, Mystic CT	transit to survey area
2025-02-11	R/V *Bogue*	22:20	Arrival	Safe Harbor Mystic, Mystic CT	transit to port
2025-02-12	R/V *Bogue*	12:34	Depart	Safe Harbor Mystic, Mystic CT	transit to survey area
2025-02-12	R/V *Bogue*	22:26	Arrival	Safe Harbor Mystic, Mystic CT	transit to port
2025-02-15	R/V *Bogue*	11:24	Depart	Safe Harbor Mystic, Mystic CT	transit to survey area
2025-02-15	R/V *Bogue*	21:30	Arrival	Safe Harbor Mystic, Mystic CT	transit to port

Appendix G: Vessel Tracklines

***Note:** Business Confidential GIS Tracklines with Source Activity found in companion submission