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ATLANTIC SHORES OFFSHORE WIND GEOPHYSICAL SURVEY LEASE AREA OCS-A 0499/0549 2022 AND 2023 ANNUAL PROTECTED SPECIES OBSERVER REPORT

Prepared for: Atlantic Shores Offshore Wind on behalf of Fugro and S.T.
Hudson



Annual Report
16 November, 2023

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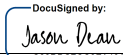
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List of Acronyms

ASOW – Atlantic Shores Offshore Wind
 BOEM – Bureau of Ocean Energy Management
 BMP – Best Management Practices
 CPA – Closest Point of Approach
 COP – Construction and Operations Plan
 CV – Curriculum Vitae
 DMA – Dynamic Management Area
 DSLR – Digital Single Lens Reflex
 ECC – Export Cable Corridor
 EMP- Environmental Management Plan
 EOL – End of Line
 EPU – Electronic Processing Unit
 EZ – Exclusion Zone
 ESA – Endangered Species Act
 GPS – Global Positioning System
 HF – High Frequency
 HRG – High Resolution Geophysical
 Hz - Hertz
 IAC – Inter Array Cable
 ID – Identification
 IHA – Incidental Harassment Authorization
 kHz – Kilohertz
 km – Kilometer
 LED – Light Emitting Diode
 LF – Low Frequency
 LLC- Limited Liability Corporation
 MAG – Magnetometer
 MBES – Multibeam Echo Sounder
 MUHRS – Multi Channel Ultra High Resolution Seismic
 NARW – North Atlantic Right Whale
 NJ – New Jersey
 NY – New York

m – Meter
 mm - Millimeter
 M/V – Marine Vessel
 NMFS – National Marine Fisheries Service
 NOAA – National Oceanographic and Atmospheric Administration
 NVD – Night-Vision Device
 OCS – Outer Continental Shelf
 PAM – Passive Acoustic Monitoring
 PEP – Project Execution Plan
 PDC – Project Design Criteria
 PSO – Protected Species Observer
 R/V – Research Vessel
 SAP – Site Assessment Plan
 SBP – Sub Bottom Profiler
 SOL – Start of Line
 SSS – Side Scan Sonar
 SSDM – Seabed Survey Data Mode
 SUHRS – Single Channel Ultra High Resolution Seismic
 SZ – Shutdown Zone
 TVG – Transverse Gradiometer
 USBL – Ultra Short Baseline
 UTC – Coordinated Universal Time
 VHF – Very High-Frequency
 VSA – Vessel Strike Avoidance

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1 EXECUTIVE SUMMARY

Atlantic Shores Offshore Wind completed geotechnical and geophysical survey campaigns within the Outer Continental Shelf (OCS) Lease Area OCS-A 0499, Lease Area OCS-A 0549, and associated Export Cable Corridors (ECC) in 2022 and in 2023 with the support from Fugro on the R/V *Fugro Enterprise* and S.T. Hudson on the M/V *Bella Marie*. Protected species monitoring was conducted in accordance with Bureau of Ocean Energy Management (BOEM) and National Marine Fisheries Service (NMFS) standards, as well as Geophysical and Benthic Survey Plan Approval Conditions for Lease (Appendix A). Protected species monitoring and mitigation measures were required for equipment operating below 180 kilohertz (kHz). The equipment that required mitigation included; The High Resolution Innomar SES-2000 Medium-100 Parametric Sub-Bottom Profiler (SBP) (2-22 kHz) and the medium penetrating dual seismic sparker (1 Hz -10kHz) utilized on the R/V *Fugro Enterprise*, the Innomar Medium-100 (SBP) (8 kHz), and Geo-Source 200 Lightweight Marine Sparker System SUHRS (0.15 - 2.9 kHz) utilized on the M/V *Bella Marie*.

This 2022 and 2023 Protected Species Observer (PSO) Annual Report summarizes all activities undertaken by RPS employed PSOs deployed on the HRG survey vessels.

NMFS issued an IHA for 2022 authorizing 3,456 IHA Level B takes, and the IHA issued for 2023 authorized 4,190 IHA Level B takes for 15 species of marine mammals, including six whale species, six delphinids, two pinniped species and one porpoise species. No Level A takes were authorized for any species.

Mitigation and monitoring protocols for these surveys included establishment of Pre-start Clearance Observation Zones (CZ) and Exclusion Zones (EZ) around the low-frequency (LF) sound sources, implementation of delay to initiation of and shutdowns of active LF sound sources, and vessel strike avoidance (VSA) maneuvering for marine mammals and other protected species including sea turtles.

The Fugro Research Vessel (R/V) *Fugro Enterprise* acquired geophysical and benthic data within the Lease from 20 April 2022 to 13 September 2022, and again within the Lease Area and associated Export Cable Corridors from 09 August 2023 to 23 August 2023. S.T. Hudson acquired geophysical data within shallow nearshore environments from 21 April 2022 to 24 June 2022 and 20 July 2023 to 28 August 2023 on the marine vessel (M/V) *Bella Marie*. A high-level overview of vessel activity and timeline are outlined in Table 3.

Four PSOs provided by RPS were on board the R/V *Fugro Enterprise* to undertake 24-hour visual monitoring and implement mitigation protocols in accordance with the requirements in the IHA and the BOEM Lease conditions (Appendix B). Survey operations on the M/V *Bella Marie* included two PSOs provided by RPS. Daylight operations were conducted in accordance with the requirements of the associated IHAs for 2022 and 2023 surveys.

Visual and acoustic monitoring was conducted by PSOs for a total of 3,823 hours and 8 minutes combined for the R/V *Fugro Enterprise* and the M/V *Bella Marie*. Visual monitoring was conducted by the PSOs for a total of 2,706 hours and 26 minutes for the R/V *Fugro Enterprise* for 2022 survey operations, and 329 hours and 34 minutes for 2023 survey operations. Acoustic monitoring occurred for a total of 59 hours and 10 minutes on the R/V *Fugro Enterprise* for the 2022 survey. Total visual monitoring conducted on the M/V *Bella Marie* were 418 hours and 14 minutes for operations for 2022 survey, and 368 hours and 54 minutes for survey operations in 2023.

A total of 128 visual detection events of protected species were made during the surveys with a total of 430 animals observed. Visual detections of marine mammals consisted of two whale species, one delphinid species, and one porpoise species. Whale species observed included minke whales (*Balaenoptera acutorostrata*), and humpback whales (*Megaptera novaeangliae*). Delphinids observed included bottlenose dolphins (*Tursiops truncatus*), common dolphins (*Delphinus delphinus*), and long-finned pilot whales (*Globicephala melas*). Porpoise species observed was a harbor porpoise (*Phocoena phocoena*). There were also additional unidentified whales, an unidentified porpoise, and unidentified delphinids observed.

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There were 34 visual detection events made of sea turtles that included a hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's ridely sea turtle (*Lepidochelys kempii*), leatherback sea turtles (*Dermochelys coriacea*), loggerhead sea turtles (*Caretta caretta*), and unidentified sea turtles.

No dead or injured protected species were observed during the surveys.

In accordance with stipulations set forth in BOEM Lease and the NMFS IHA conditions, a total of 23 mitigation actions were implemented for the HRG sound sources including shutdowns of the acoustic sources (18 times) and delays to activation of the acoustic sources (five times). On 18 occasions VSA maneuvers were executed during protected species detections, five times for humpback whales, one time for a minke whale, one time for an unidentified whale, seven times for loggerhead sea turtles, and two times for unidentified sea turtles.

For the surveys conducted within the 2022 IHA, a total of 10 marine mammals from two different species were observed within the predicted 160-decibel radius (where there is a potential for a behavioral response) while an HRG source was active. Potential Level B takes included one humpback whale, and nine bottlenose dolphins. Within the 2023 IHA survey, a total of five marine mammals from two different species were observed within the predicted 160-decibel radius (where there is a potential for a behavioral response) while an HRG source was active. Potential Level B takes included one minke whale, and four bottlenose dolphins.

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2 INTRODUCTION

ASOW selected Fugro and S.T. Hudson to conduct geophysical and benthic surveys in within Lease and along associated ECCs. The geophysical survey was conducted off the coast of NJ/NY on the Outer Continental Shelf in Lease and nearshore landfall areas of interest. This report covers the duration of the Atlantic Shores 2022 Offshore Windfarm High Resolution Geophysical Survey and Benthic Program, and the ASOW 2023 – Near Shore Geophysical Survey (20 April 2022 – 28 August 2023) conducted on the R/V *Fugro Enterprise* and the M/V *Bella Marie* respectively.

The geophysical equipment used were, multibeam echo sounder (MBES) bathymetry and backscatter, side scan sonar (SSS), magnetometer operating in transverse gradiometer configuration (TVG/MAG), sub-bottom profiler (SBP), ultra-short baseline (USBL), and single channel ultra-high-resolution seismic (SUHRS). The purpose of data acquisition was to provide accurate water depths and identification of morphological features, details for identification of hazards and potential archaeological features, sub-seabed conditions with shallow stratigraphy and structure, geological structure information, and structural and stratigraphy information of site within Lease, ECC, and nearshore potential landfall areas.

Protected species monitoring and mitigation measures, as outlined in the NMFS IHA and the BOEM Lease conditions were required for equipment operating below 180 kilohertz (kHz). The equipment that required mitigation included; The High Resolution Innomar SES-2000 Medium-100 Parametric Sub-Bottom Profiler (SBP) (2-22 kHz) and the medium penetrating dual seismic sparker (1 Hz -10kHz) utilized on the R/V *Fugro Enterprise*, the Innomar Medium-100 (SBP) (8 kHz), and Geo-Source 200 Lightweight Marine Sparker System SUHRS (0.15 - 2.9 kHz) utilized on the M/V *Bella Marie*.

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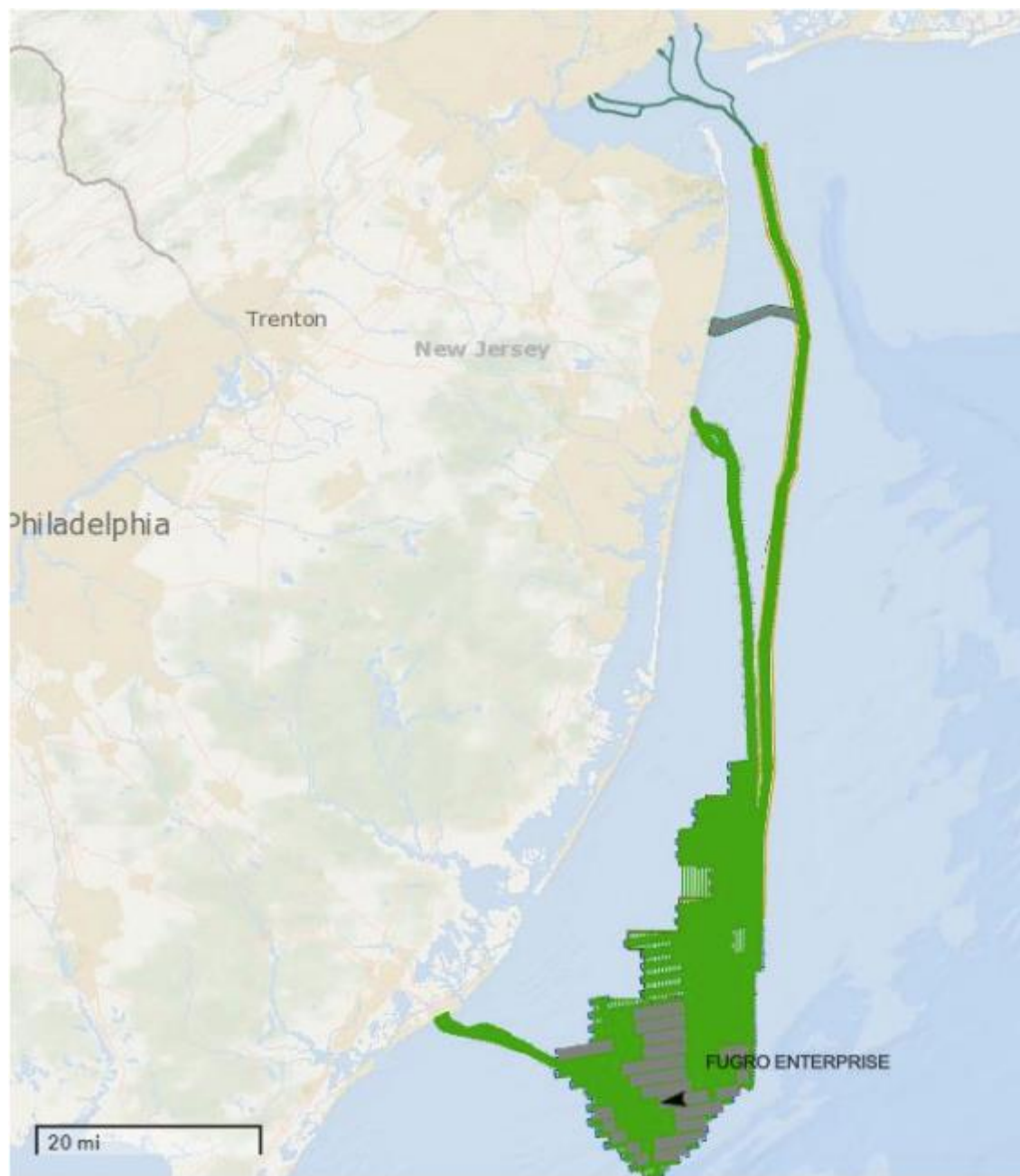


Figure 1: ASOW 2022 survey areas in the BOEM Lease OCS-A 0499 and OCS-A 0549 and associated ECC

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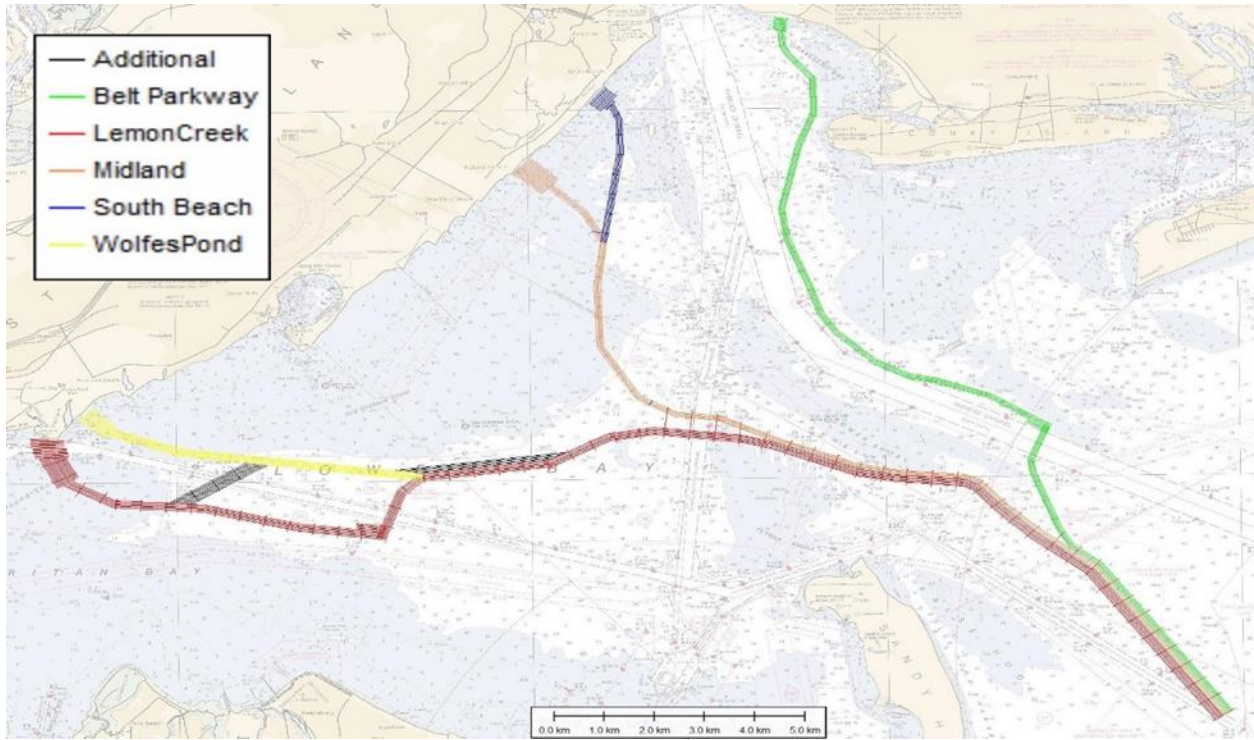


Figure 2: ASOW 2022 survey area Raritan Bay, NY routes



Figure 3: ASOW 2022 Asbury Park survey location

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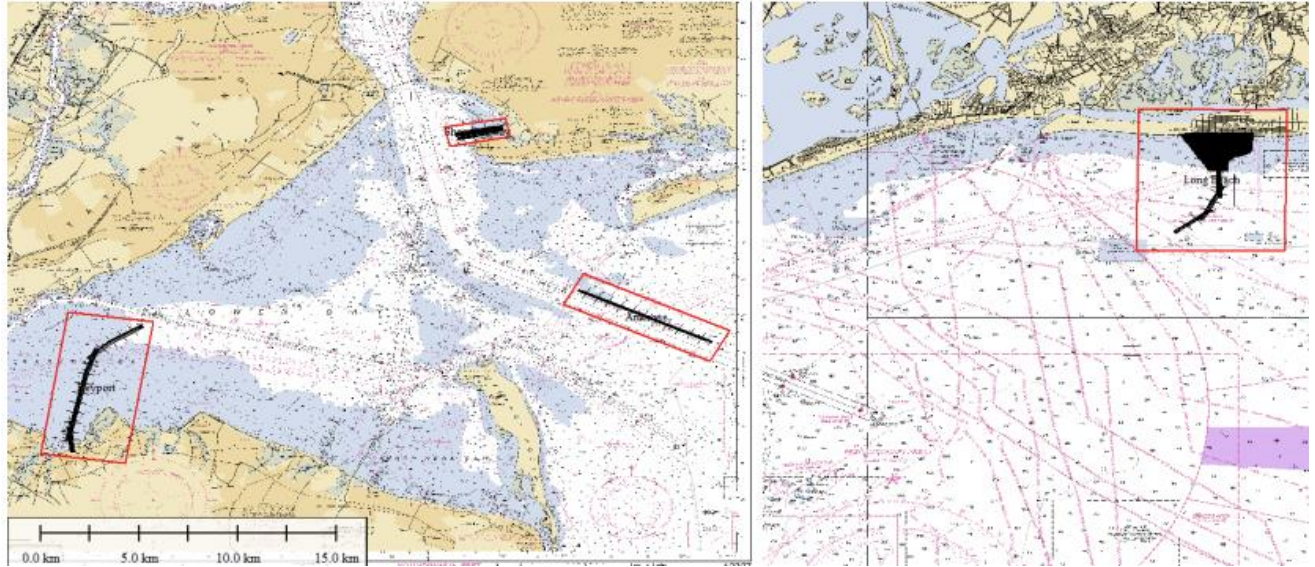
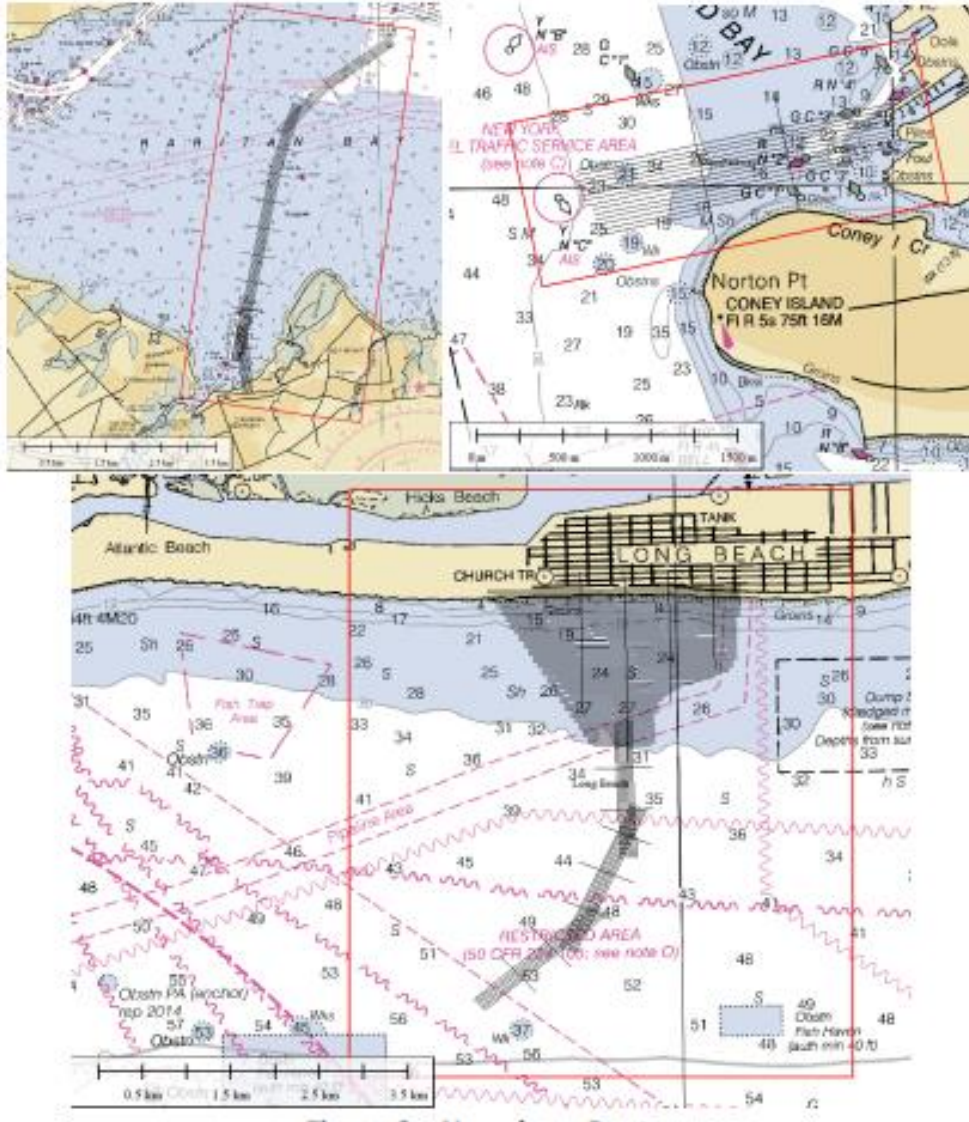


Figure 4: ASOW 2023 nearshore project area 1, Raritan Bay, NY

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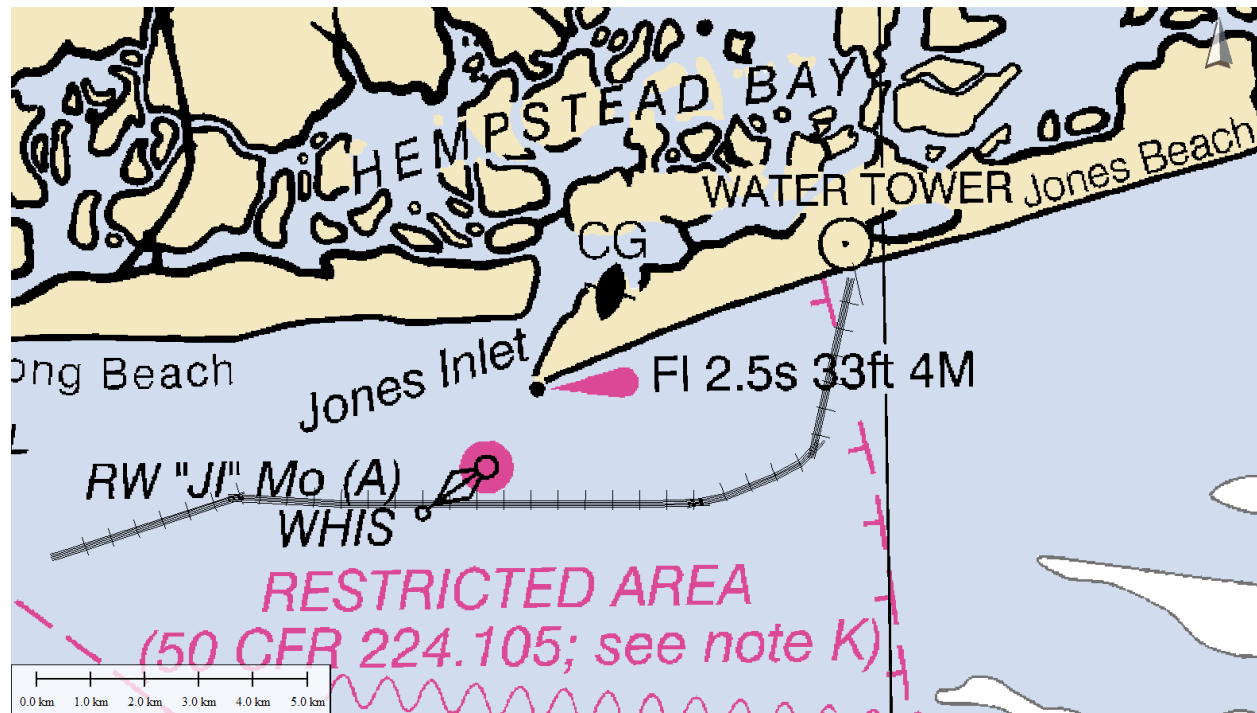


Figure 5: ASOW 2023 nearshore routes Shore Parkway, Jones Beach ECC, and Long Beach ECC

NMFS and BOEM have advised that sound-producing survey equipment operating in the hearing range of marine species (less than 180 kHz) has the potential to cause acoustic harassment to marine mammals. Protected species monitoring was conducted in accordance with BOEM and NMFS standards, the 2022 ASOW Geophysical Survey and Benthic Program PEP, the ASOW 2022 – Nearshore Geophysical PEP, and the ASOW 2023 – Nearshore Geophysical PEP.

Fugro was responsible for contracting PSOs and PAM operators through a third-party provider to conduct monitoring and mitigation for protected species, including marine mammals and sea turtles, during their activities where RPS was contracted to fulfill this scope of work. Monitoring and mitigation procedures that were implemented during the 2022 surveys are described in section 4 of this report.

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2.1 BOEM Reporting Requirements

This report summarizes the information required by BOEM Lease and the IHA identified in Table 1. A copy of the Lease and the NMFS IHA are in Appendix A and Appendix B.

An Environmental Management Plan (EMP) was prepared by RPS, and reviewed by Fugro, S.T. Hudson, ASOW and BOEM. It contains the monitoring, mitigation and reporting procedures that were adhered to throughout the survey (Appendix C).

Table 1: BOEM reporting requirements per Lease and the NMFS IHA location within this technical report

Required Content	Source Reference	Location Addressed in Technical Report
The Lessee must ensure that sightings of any dead or injured protected species (e.g., marine mammals, sea turtles, or sturgeon) are reported to the Lessor, NMFS, and the NMFS Greater Atlantic (Northeast) Region's Stranding Hotline (866-755-6622) within 24 hours of sighting, regardless of whether the injury is caused by a vessel. In addition, if the injury or death was caused by a collision with a project-related vessel, the Lessee notify the Lessor of the strike within 24 hours. The Lessee must use the form included as Appendix A to Addendum "C" to report the sighting or incident. If the Lessee's activity is responsible for the injury or death, the Lessee must ensure the vessel assist in any salvage effort as requested by NMFS.	BOEM Lease Section 4.5.1	Section 4.6.1, 6.4.4
The Lessee must report any observed takes of listed marine mammals, sea turtles, or sturgeon resulting in injury or mortality within 24 hours to the Lessor and NMFS	BOEM Lease Section 4.5.2.1	Section 6.4.2
The Lessee must report any observations concerning any impacts on Endangered Species Act listed marine mammals, sea turtles or sturgeon to the Lessor and NMFS Northeast Region's Stranding Hotline within 48 Hours.	BOEM Lease Section 4.5.2.2	Section 6.4.4, 4.6.3
The Lessee must ensure that the protected species observers record all observations of protected species using standard marine mammal observer data collection protocols. The required elements are Vessel name, Observers' name and affiliations, date, time and latitude/longitude when daily visual survey began, time and latitude/longitude when daily visual survey ended, Average environmental conditions (wind speed, wind direction, sea state, swell, overall visibility), species, certainty of identification, total number of animals, number of juveniles, characteristic description, direction of animal's travel relative to the vessel, behavior of animals, and activity of vessel when sighting occurred.	BOEM Lease Section 4.5.3	Section 6
Each report must include a summary of survey activities.	BOEM Lease Section 4.5.4	Section 6.1

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Required Content	Source Reference	Location Addressed in Technical Report
Each report must include a summary of all protected species observers	BOEM Lease Section 4.5.4	Appendix D
Each report must include an estimate of the number of listed marine mammals and sea turtles observed and/or taken during these activities.	BOEM Lease Section 4.5.4	Section 6.4, 6.4.1, 6.4.2
A monitoring report must be provided to NMFS within 90 days after completion of survey activities. The report must fully document the methods and monitoring protocols, summarizes the data recorded during monitoring, estimates the number of marine mammals that may have been taken during survey activities, describes, assesses, and compares the effectiveness of monitoring and mitigation measures.	NMFS IHA Section 6 (a)	This technical report
PSO datasheets or raw sightings data must also be provided with the draft and final monitoring report.	NMFS IHA Section 6 (a)	Appendix H
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, Atlantic Shores must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System: (866) 755-6622. North Atlantic right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16.	NMFS IHA Section 6 (b) (i)	Section 6.4.3
In the event that personnel involved in the survey activities covered by the authorization discover an injured or dead marine mammal, Atlantic Shores must report the incident to the NOAA Fisheries Office of Protected Resources (OPR) (301-427-8401), and to the NOAA Fisheries New England/Mid-Atlantic Regional Stranding Coordinator (978-282-8478) as soon as feasible. The report must include the following information: Time, date, location, species identification or description of the animal, condition of the animal(s), observed behaviors (if alive), photographs or video footage, and general circumstances under which the animal(s) was discovered.	NMFS IHA Section 6 (c) (i)	Section 4.4.2, 6.4.4
In the event of a vessel strike of a marine mammal by any vessel involved in the activities covered by the authorization, the Atlantic Shores must report the incident to NOAA Fisheries OPR (301-427-8401) and to the NOAA Fisheries New England/Mid-Atlantic Regional Stranding Coordinator (978-282-8478) as soon as feasible. The report must include the following information: Time, date, location, species identification or description of the animal(s), vessel's speed during and leading up to the incident, vessel's course/heading and what operations were being conducted, status of all sound sources in use, description of avoidance measures/requirements that were in place at the time of the strike	NMFS IHA Section 6 (c) (ii)	Section 4.6.3

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Required Content	Source Reference	Location Addressed in Technical Report
and what additional measures were taken to avoid strike, environmental conditions, estimated size and length of animal that was struck, description of behavior of the marine mammal immediately preceding and following the strike, estimated fate of the animal and photographs or video footage.		

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3 PROGRAM OVERVIEW

ASOW contracted Fugro to conduct an HRG survey of renewable energy Lease and proposed ECCs commencing April 2022 off the coast of NJ. Fugro sub-contracted S.T. Hudson to conduct nearshore shallow marine geophysical surveys of the coast of NY/NJ.

Fugro performed geophysical and benthic data acquisition within the Lease and ECC. The geophysical survey acquired was intended to support future installation of windfarm facilities. The data was acquired to be used to characterize site conditions including bathymetry, seafloor morphology, subsurface geology, environmental sites, seafloor obstructions, soil conditions, and any man-made, historical, or archaeological resources. The technical objectives of the geophysical HRG and geotechnical surveys are referenced from the Project Execution Plan (PEP) and are as described below:

- Obtain accurate water depths and identification of morphological features for future comparison of morphological evolution, and aid in the design of facilities,
- Obtain seafloor morphology and identification of seabed features, hazards, and cultural materials,
- Provide detail to determine sub-seabed conditions with shallow stratigraphy and structure, and delineate any geohazards that may impact development of installations,
- Provide information for region main geological structures,
- Provide information on structure condition and stratigraphy of the site and along ECC,
- Process, interpret and produce reports in accordance with OGP 373-18-1 and BOEM Guidelines,
- Perform Benthic Habitat Mapping,
- Deliver final data and maps in the Seabed Survey Data Model (SSDM).

In accordance with BOEM and NMFS guidelines, Fugro conducted characterization of benthic habitats and macrofauna communities, and mapping of essential fish habitat within the potentially impacted area. The benthic survey provided information to support the goals outline by NMFS in their guidance documents (2020 and 2021).

R/V *Fugro Enterprise* and M/V *Bella Marie* dates of HRG operations are summarized in Table 2. A high-level overview of survey events for the vessel is outlined in Table 3.

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Table 2: Summary of R/V *Fugro Enterprise* and M/V *Bella Marie* dates on project for the ASOW HRG Survey Lease

Vessel Name	Days on Survey	Dates on Project in Lease
R/V <i>Fugro Enterprise</i>	138	20 April 2022 - 13 September 2022 09 August 2023 – 23 August 2023
M/V <i>Bella Marie</i>	84	21 April 2022 - 24 June 2022 20 July 2023 - 28 August 2023

Table 3: Summary of key survey events by vessel in Lease

Event	R/V <i>Fugro Enterprise</i> (2022)	R/V <i>Fugro Enterprise</i> (2023)	M/V <i>Bella Marie</i> (2022)	M/V <i>Bella Marie</i> (2023)
PSO team mobilizes	13 April 2022	N/A	15 April 2022	18 July 2023
Vessel departs dock. PSO effort begins.	20 April 2022	N/A	21 April 2022	20 July 2023
Kick-off meetings	22 April 2022	N/A	21 April 2022	20 July 2023
Vessel transits to Lease area and conducts data acquisition	20 April 2022 – 24 May 2022	N/A	N/A	N/A
Benthic Survey (including ECC)	05 May 2022 – 14 June 2022	N/A	N/A	N/A
Data acquisition (IAC modules)	14 June 2022 – 18 August 2022	N/A	N/A	N/A
Data acquisition (IAC modules)	23 August 2022 – 01 September 2022	N/A	N/A	N/A
Data acquisition (including ECC)	10 September 2022 – 13 September 2022	09 August 2023 – 23 August 2023	21 April 2022 – 24 June 2022	20 July 2023 – 28 August 2023
Data acquisition complete	13 September 2022	N/A	24 June 2022	28 August 2023
PSO monitoring complete	Vessel moved to OCS-A 0541- PSOs continued watch through next survey area.	23 August 2023	24 June 2022	28 August 2023

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3.1 Vessel and Geophysical Equipment Specifications

The ASOW HRG Survey was undertaken by the R/V *Fugro Enterprise* within Lease. Specifications for the vessel are provided in Table 4 and photos of the vessel are included in Appendix E.

Table 4: Vessel specifications

Vessel Name	Length (meters)	Speed (knots)	Vessel Configuration Description
R/V <i>Fugro Enterprise</i>	52	10 (transit) 3-5 (survey)	Multi-role survey vessel for coastal and offshore survey areas
M/V <i>Bella Marie</i>	10	10 (transit) 3-5 (survey)	Multi-role survey vessel for coastal and offshore survey areas

3.2 Summary of Geophysical Survey Equipment Used

The survey equipment operated on the R/V *Fugro Enterprises* and M/V *Bella Marie* are summarized in Table 5. Sources (operating below 180 kHz), for which monitoring, and mitigation were conducted to minimize potential impacts to protected species, are hereafter referred to as the regulated sound sources. Other equipment that either did not produce sound or produced sound outside of the hearing range of protected species and, as such, not regulated by BOEM or NMFS, was operated by the survey vessels but it is not considered further in this technical report.

Table 5: Summary of geophysical equipment used during the ASOW Survey.

R/V <i>Fugro Enterprise</i>	
Energy Source	Frequency/Energy Specifications
MBES	400 kHz
SSS	300/600 kHz (600 kHz primary)
SBP	2-22 kHz
SUHRS	0.15 to 2.9 kHz/400 J
M/V <i>Bella Marie</i>	
Energy Source	Frequency/Energy Specifications
MBES	350-390 kHz
SSS	600/900 kHz (600 kHz primary)
SBP	8 kHz
SUHRS	0.15 to 2.9 kHz/400J

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4 MITIGATION AND MONITORING METHODS

The PSO monitoring programs on the vessels were established to meet the standards approved by BOEM in the PEP. Survey mitigation measures were designed to minimize potential impacts of the survey activities on marine mammals, sea turtles, and other protected species of interest. The following monitoring protocols were implemented to meet these objectives.

R/V Fugro Enterprise

- Visual observations were conducted day and night to provide real-time sighting data, allowing for the implementation of mitigation procedures as necessary.
- A PAM system was operated continuously at night and during other periods of reduced visibility to augment visual observations and provide additional marine mammal detection data.
- Species-specific CZs and EZs were established around the regulated HRG sound sources where delays to initiation and shutdowns of active sources were implemented when protected species were detected inside.

M/V Bella Marie

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

4.1 Monitoring: Protected Species Observers and PAM Operators

There were five trained and experienced PSOs and PAM operators on board on the *R/V Fugro Enterprise* (21 April 2022 – 25 April 2022) PAM gear was offloaded on 25 April 2022 and project operations continued with four PSOs. There were two PSOs on the *M/V Bella Marie* during the survey to conduct monitoring for protected species, record and report detections, and request mitigation actions in accordance with the established regulatory requirements and monitoring plan.

RPS, the PSO Provider, was responsible for ensuring that each PSO deployed met the minimum requirements set forth by BOEM in Lease stipulations and by NMFS. NMFS issued approval notifications for each PSO to be deployed on an offshore wind farm and BOEM were required to review and approve each PSO prior to their deployment as an observer on the ASOW Lease. BOEM and NMFS PSO requirements include training in protected species identification and behavior in addition to field experience in protected species observation in the Atlantic Ocean.

RPS was responsible for the provision of training certifications, NMFS approval notifications and curriculum vitae (CV) to be reviewed and approved by ASOW and BOEM prior to deployment on the vessel.

RPS was responsible for providing the PSOs with vessel-specific and survey contractor-specific training, and environmental project inductions specific to ASOW. These were provided by RPS, S.T. Hudson, Fugro and ASOW during project kick-off meetings, conducted prior to the start of survey operations and prior to scheduled crew changes.

All PSOs and PAM operators who were deployed during the ASOW geophysical survey operations are listed in Appendix D.

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4.2 Visual Monitoring: Protocols and Methods

A team of four PSOs were deployed on the R/V *Fugro Enterprise*, and two PSOs on the M/V *Bella Marie* to meet the monitoring requirements of that vessel as outlined in Table 6. PSOs monitored while the vessel was in transit and prior to and during all LF sound source operations conducted by the vessel. Visual monitoring was also conducted during all periods between LF sound source activities and benthic operations to collect additional protected species data. PSOs rotated monitoring shifts as needed to maximize concentration and to meet the watch requirements of the Lease and IHA (watch periods not to exceed four hours without a minimum two-hour break, and a maximum duration of 12 hours in a 24-hour period).

Visual monitoring locations on each vessel were selected to maximize and consideration of the following factors:

1. To afford PSOs a 360-degree viewpoint around the vessel and acoustic sources, such that the CZs and EZs around the sound sources and the VSA 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 equipment operators.

PSOs conducted their visual monitoring by actively scanning with the naked eye out to the furthest observation points visible, methodically sweeping areas closer to the vessel, focusing on the CZs, EZs, 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, footprints, blows, and presence of other marine species (diving seabirds, fish feeding activity).

Table 6: Visual monitoring methodology on the survey vessel

	Vessel	
	R/V <i>Fugro Enterprise</i>	M/V <i>Bella Marie</i>
# of PSOs on watch during day	1	1
Visual monitoring equipment- day	Reticle binoculars 10x50 & 7x50 magnification	Reticle binoculars 7x50 magnification
Low-frequency source operations conducted at night	Yes	No
# of PSOs on watch during night	2	N/A
Visual monitoring equipment during night	Night vision goggles	N/A
Range estimation	Calibrated reticle binoculars	Calibrated reticle binoculars
Primary monitoring location	Bridge wings Bridge	Bridge

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

4.2.1 Daylight Visual

The PSOs on board were equipped with reticle binoculars (7x50 and 10x50 magnification), as well as digital single reflex lens (DSLR) cameras with 200 millimeter (mm) and 300 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 an object of known distance, as well as with reticle binoculars. Reticle binoculars were calibrated whenever possible to ensure accuracy of distance data. These reticle calibration tables are provided in Appendix F.

4.2.2 Nighttime and Reduced Visibility Visual Observations

On the *R/V Fugro Enterprise*, Two PSOs conducted visual monitoring during all nighttime operations, whenever the vessel was not in port or at anchor. If visibility became reduced (largest EZ was not fully visible). PSOs on the *R/V Fugro Enterprise* were equipped with infrared Light Emitting Diode (LED) handheld spotlights and night vision devices (NVD) with head mounts and thermal clip-ons. Night watches were not conducted on the *M/V Bella Marie*. Specifications for the night monitoring equipment can be found in Appendix G.

4.3 Monitoring: Passive Acoustic Monitoring Protocols and Methods

Passive Acoustic Monitoring (PAM) was used to augment visual monitoring efforts in the detection, identification, and locating of marine mammals. Acoustic monitoring was conducted continuously during all reduced visibility geophysical operations and to the maximum extent possible, during periods of reduced visibility, including nighttime, when no operations were being undertaken.

Acoustic monitoring was undertaken by trained PAM Operators each of whom had completed a BOEM accepted PSO training course and an RPS in-house PAM training course, which includes use of the PAM systems on board a vessel offshore. PAM monitoring shifts were no longer than four hours in duration followed by at least a two-hour break.

The PAM system was in the survey lab onboard the *R/V Fugro Enterprise*, which provided space for the system, allowed for quick communication with the visual PSOs and HRG equipment operators, and provided access to the vessel's instrumentation screens. Information about the vessel (e.g. position, heading, and speed), water depth, geotechnical activity, and the PAM system (e.g. cable deployments/retrievals, changes to the system, background noise score) were recorded at least once an hour, or whenever any of the parameters changed.

Acoustic monitoring for marine mammals was conducted aurally, utilizing Sennheiser headphones, and visually with the PAMGuard software program. Low to mid-frequency delphinid whistles, clicks, and burst pulses, as well as sperm whale clicks and baleen whale vocalizations, could be visualized in PAMGuard's spectrogram modules. Odontocete clicks could also be visualized in low frequency (LF) and high frequency (HF) click detector modules. Settings adjustments to amplitude range, amplitude triggers, and spectral content filters, among others, could be made in PAMGuard's spectrogram. Click detector modules to maximize the distinction between cetacean vocalizations and ambient signal were used. The map module within PAMGuard could be utilized to attempt localizing the position and range of vocalizing

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marine mammals. Sound recordings could be made using the HF and LF sound recording modules when potential marine mammal vocalizations were detected, or when the operator noted unknown or unusual sound sources.

4.3.1 Passive Acoustic Monitoring Parameters

A passive acoustic monitoring system designed to detect most species of marine mammals was installed on the *Fugro Enterprise*. The system was developed by Seiche Measurements Limited and consisted of the following main components: a hydrophone cable (configured as a separate steel-reinforced tow cable and detachable hydrophone array section), a deck cable, a rack-mounted electronic processing unit (EPU) that included multiple sound cards, and a computer, two desktop monitors, acoustic analysis software package, and headphones for aural monitoring. A spare of every component was also present on board in the event the main system components became damaged or inoperable. The diagram in Figure 7 is a simplified depiction of the PAM system installed on the vessels.

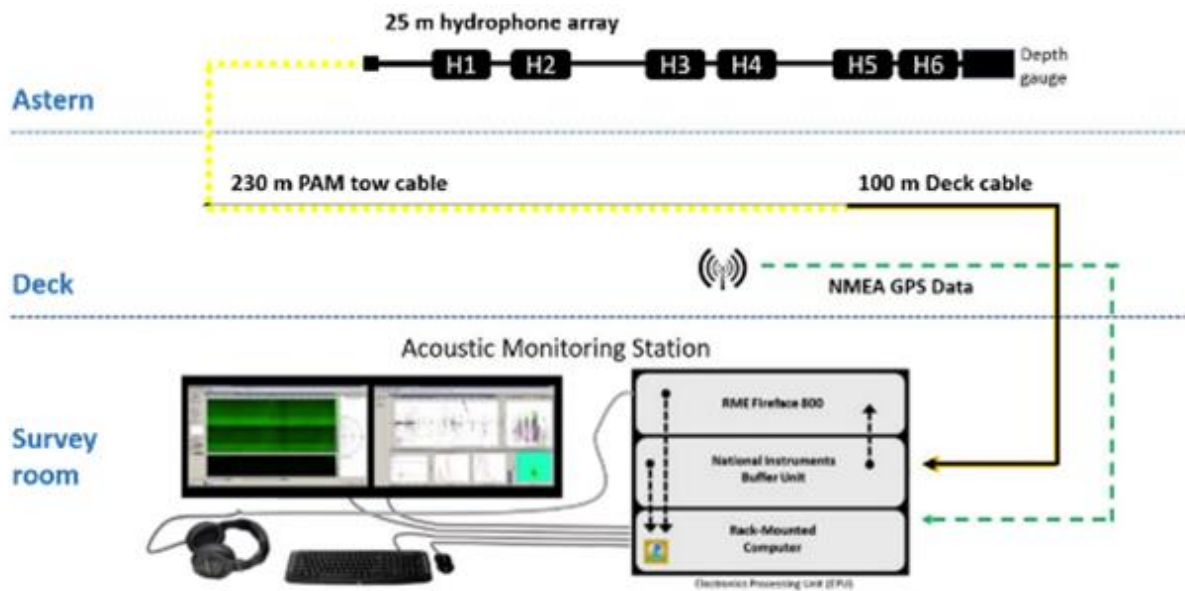


Figure 6: Simplified pathway of data through the PAM system installed

The 25-meter linear hydrophone array attachment cable contained six individual hydrophone elements spaced eight meters, two meters and 0.25 meters apart, as well as a depth transducer (Figure 6). The forward hydrophone pair (H1, H2) was used to analyze and record LF (10 – 24,000 Hz); the middle hydrophone pair (H3, H4) was used to analyze and record middle frequencies (200 – 200,000 Hz), and the trailing hydrophone pair (H5, H6) was used to analyze and record HF sound (2,000 – 200,000 Hz). The hydrophone array cable was attached to the tow cable and manually deployed from the back deck of each vessel.

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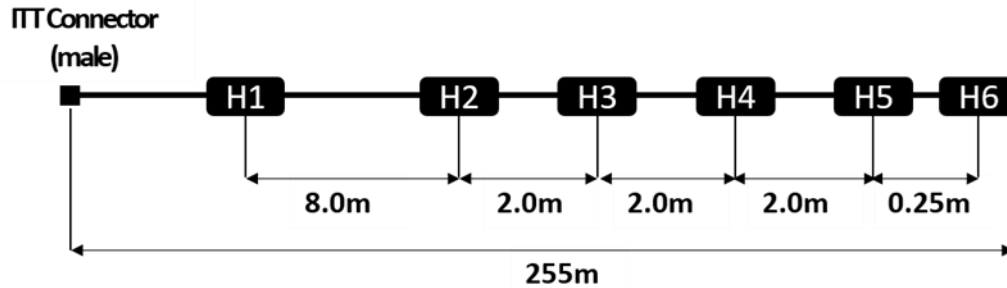


Figure 7: Diagram of hydrophone element separation

The deck cable interfaced between the hydrophone cable and the electronic processing unit (EPU). The EPU contained a low and mid-frequency sound card, a high frequency sound card, and a P.A Global Positioning System (GPS) feed supplied by the vessel was connected to the PAM system using a USB port. Data from the hydrophone cable's depth transducer was routed through the buffer unit to the computer via USB connection. Data from the hydrophones and the GPS and depth transducer were displayed in the acoustic monitoring software, Pamguard.

Raw feed from hydrophone elements H5 and H6 was digitized in the buffer unit using an analogue-digital National Instruments data acquisition (DAQ) soundcard at a sampling rate of 500 kHz. The output was filtered for HF content and visualized using the PAMGuard software. PAMGuard used the difference between the time that a signal arrived at each of the two hydrophones to calculate and display the bearing to the source of the signal. A scrolling bearing/time module displayed the filtered data in real time, allowing for the detection and directional mapping of click trains. Additional components of the HF click detector system in PAMGuard were an amplitude/time display that registered click intensity data in real time, as well as click waveform, click spectrum, and Wigner plot displays, providing the PAM operator immediate review of individual click characteristics in the identification process. One of the two monitors were designated for displaying PAMGuard HF click detector and sound recorder modules.

Raw feed from the mid-frequency and LF hydrophone elements (H1, H2, H3, H4) was routed from the buffer unit to the RME Fireface 800 unit, where it was digitized at a sampling rate of 48 kHz. The relatively LF output was further processed within PAMGuard and filtered LF content was visualized in two spectrograms, one displaying two channel feeds at frequency ranges of three to 24 kHz, and another displaying one channel feed at a frequency range of zero to three kilohertz. LF click detector modules allowed for review of individual click characteristics as well as the detection and tracking of click trains.

A map module on the LF system interfaced with GPS data provided by the vessels to display the vessel location and could be used to determine range and bearing estimates based on vocalizations tracked in the detector modules.

4.3.2 Hydrophone Deployment

On the R/V *Fugro Enterprise*, the hydrophone cable was deployed manually from the port quarter of the vessel. The deck cable was installed along the back deck running from the port quarter to the vessel's workshop where it was fed through a penetration point in the bulkhead and through a floor panel into an office adjacent to the main survey room where the PAM system was installed and monitored. Three foam cylinders were attached to the tow cable to provide additional buoyancy and assist in reducing the risk of entanglement with other towed equipment. When deployed, the array cable was approximately 40 meters astern from the port quarter of the vessel.

PAM system specifications for the R/V *Fugro Enterprise* and a more detailed description of the hydrophone deployment methods on both boats can be found in Appendix K.

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4.4 Monitoring: Data Collection

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

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

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

While acoustic monitoring does not allow assessment of group size with the same level of precision as by visual observation, the low frequency and high frequency click detector modules in PAMGuard allow PAM Operators to identify when multiple animals are vocalizing simultaneously or in very close succession. Click detectors present cetacean click trains on computer displays, spatially differentiated by relative bearings to the hydrophone array, so when multiple click trains occur simultaneously or in close succession, and the click trains come from different bearings, the PAM Operator knows the click trains originate from different animals. While this does not allow the PAM Operator to estimate a total group size, it does provide the PAM Operator an estimate for the minimum group size.

4.4.1 Data Collection Requirements and Methods

Data was collected to meet the BOEM and NMFS requirements as summarized previously 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.

4.4.2 North Atlantic Right Whale (NARW) External Sighting Monitoring Protocol

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

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

4.5 Mitigation Measures

The PSO monitoring and mitigation program implemented on the survey vessels was established to meet the BOEM Lease requirements and to minimize potential impacts of the survey activities on marine mammals and sea turtles. The following mitigation protocols were implemented during the Fugro ASOW Lease HRG survey. All protocols were implemented as described.

- VSA separation distances

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Vessel speed was restricted to 10 knots or less inside any established DMA. Vessel speed will be restricted to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel.

- The survey vessel maintained or enacted actions to maintain a separation distance of 500 meters or greater from any sighted NARW.
- The survey vessel maintained or enacted actions to maintain a separation distance of 500 meters or greater from any ESA-listed species or other unidentified marine mammal visible at the surface.
- The survey vessel maintained or enacted actions to maintain a separation distance of 500 meters or greater from any sighted non-ESA listed baleen whales, including humpback whales and minke whales.
- The survey vessel maintained or enacted actions to maintain a separation distance of 500 meters (as visually feasible with environmental conditions) or greater from any sighted sea turtles or manta rays.
- The survey vessel maintained or enacted actions to maintain a separation distance of 50 meters or greater from any sighted small cetacean (dolphin and porpoise) or pinniped.
- Establishment of CZs

Prior to the initiation of sound sources operating below 180 kHz from silence, a clearance search period of 30 minutes was completed. The 500-meter CZ for ESA-listed species and 200 meter CZ for non-ESA-listed marine mammals was monitored. Note that visual observations for all marine protected species was extended to the furthest observable distances even though the CZs and EZs around the sound sources will apply.
- Establishment of EZs

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

 - 500 meters: NARW
 - 100 meters: All other ESA-listed species and marine mammals with the exception of voluntarily approaching delphinids.
 - 100 meters: Sea turtles
 - 141 meters: Level B harassment zone for marine mammals. (Shutdowns are required at this distance for marine mammals where take has not been granted or where the authorized takes have been met.)
- Following a detection of a protected species within its respective CZ required delays to initiation of sound sources operating below 180 kHz. The delays were implemented until:
 - All marine protected species that were observed inside the CZ were confirmed to have left their relevant CZ
OR
 - An additional time period had lapsed with no further sightings within the relevant CZ
 - 15 minutes for small cetaceans (porpoises and dolphins), pinnipeds, and giant manta rays
 - 30 minutes for all large whales including NARW
 - 30 minutes for sea turtles

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- A shutdown of sound sources operating below 180 kHz was implemented when protected species entered their respective EZ. Shutdown of SBP and sparker were implemented for NARW and sea turtles, while only the sparker was shut down for all other marine mammals.
- An exception was applied to shutdown procedures for some delphinid species and some pinniped species that are observed voluntarily approaching the vessel where the following requirements apply:
 - The exception applies only to delphinids in the genera *Steno*, *Delphinus*, *Lagenorhynchus*, *Stenella* or *Tursiops*.
 - The exception applies only to gray seals or harbor seals.
 - If there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the genera for which shutdown is waived), PSOs used their best professional judgment in making the decision to call for a shutdown.
 - If delphinids from the shut-down exempt genera are observed within or entering the EZ but do not voluntarily approach the vessel or towed survey equipment, shutdown would be required and implemented.
 - The determination of whether the animal has “voluntarily” approached was made by the PSO on watch.
 - Shutdowns are required for marine mammals where take has not been granted or where the authorized takes have been met even if those species fall into the exemption genera.

4.6 Reporting

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

4.6.1 Injured or Dead Protected Species

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

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

4.6.2 NARW Sightings

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

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

1. PSO would report to their onshore Project Manager who would then inform the ASOW permitting team.
2. PSOs would then prepare a sighting report including a description of the detection event including date, time, distance to vessel, vessel and geophysical equipment activity, observed behaviors and any photographs or screenshots taken during the sighting.

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3. RPS would make the notification to the NARW Sightings Hotline.

4.6.3 Vessel Strike of a Protected Species

In the event of a vessel strike of a marine mammal or other protected species by any vessel involved in survey activities are required to be reported under the IHA. Reporting requirements included a phone notification to the NMFS Regional Stranding hotline and by email as soon as feasible. These notifications would be completed by the RPS Project Manager. The Lead PSO would prepare a written report in accordance with NMFS standard reporting guidelines in the IHA.

4.6.4 Final Report

RPS has prepared this Final Report to be consistent with the BOEM Lease and NMFS IHA reporting requirements outlined in Table 1 of this report and a final report in this format will be prepared upon completion of survey activities. Each of the elements required in the final PSO reporting is provided in Table 1 with the section in this report in which the element is addressed.

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5 DATA RECORDS AND ANALYSIS METHODS

5.1 Operation Activity

PSOs and PAM operators collected the regulated HRG equipment's operational status and geotechnical equipment status each day that they were deployed on the vessels.

The geophysical vessel recorded the start of line (SOL) times and the end of line (EOL) times for the 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. These entries were made for each regulated source or for combinations of regulated sources (for example, SBP and sparker).

The vessels recorded deployment and retrieval of equipment times. The vessels also recorded the status of the equipment during operations. These entries were made for each operation and each individual pieces of geophysical and benthic survey equipment.

5.2 Monitoring Effort

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

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

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

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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 (m)	Sea conditions
0	Calm	0	Sea like a mirror
1	Light air	0–0.3	Ripples with appearance of scales are formed, without foam crests
2	Light breeze	0.3–0.6	Small wavelets still short but more pronounced; crests have a glassy appearance but do not break
3	Gentle breeze	0.6–1.2	Large wavelets: crests begin to break; foam of glassy appearance; perhaps scattered white horses
4	Moderate breeze	1–2	Small waves becoming longer; fairly frequent white horses
5	Fresh breeze	2–3	Moderate waves taking a more pronounced long form; many white horses are formed; chance of some spray
6	Strong breeze	3–4	Large waves begin to form; the white foam crests are more extensive everywhere; probably some spray
7	High wind	4–5.5	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	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	High waves; dense streaks of foam along the direction of the wind; sea begins to roll; spray affects visibility
10	Storm	9–12.5	Very high waves with long overhanging crests; resulting foam in great patches is blown in dense white streaks along the direction of the wind; on the whole the surface of the sea takes on a white appearance; rolling of the sea becomes heavy; visibility affected
11	Violent storm	11.5–16	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	The air is filled with foam and spray; sea is completely white with driving spray; visibility very seriously affected

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

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

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5.3 Visual Sightings of Protected Species

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

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

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

5.3.1 Closest Point of Approach (CPA)

PSOs recorded CPA and the sound source status at CPA (active or inactive if deployed) for all marine mammal and sea turtle detections.

5.3.2 Detection Rate

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

5.4 Mitigation Measures Implemented

Mitigation measures were implemented on each survey vessel as previously described in section 4.2. The onboard PSO team communicated requested mitigation in real-time to the survey operators operating the regulated sound sources or to the vessel crew operating the vessel, depending on the action required. Communications were conducted over handheld marine VHF radios or in person.

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

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5.5 Data Quality Control

The RPS data analysts reviewed all the PSO data sets received from the vessel and conducted Quality Control as described in Table 8.

Table 8: Summary of data quality control protocols

Data type	Data field	Corrections made
Monitoring effort	Start of watch / End of watch	<ul style="list-style-type: none"> • Times were corrected or added where error was evident, typically by inconsistency with adjacent times.
	Day time vs. Nighttime	<ul style="list-style-type: none"> • Failures to adjust time to UTC were corrected. • Times were corrected when end of effort overlapped with start of subsequent effort.
Protected species detections	Position	<ul style="list-style-type: none"> • Positions that plotted out of place were corrected using effort positions of corresponding times, where available • When positions could not be corrected and position was on land, detection was removed from detection plots.

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6 RESULTS

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

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

6.1 Operation Activity

R/V *Fugro Enterprise* did not conduct calibrations or verifications because it moved directly from the ASOW 2021 campaign to the 2022 program. The M/V *Bella Marie* conducted calibrations and verifications in the survey area prior to each survey program (2022, 2023). Survey operations were briefly suspended when necessary for weather, equipment maintenance, or port calls for provisions and crew change.

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

Table 9: Summary of geophysical operations

Vessel	Dates of Operation	Total Hours of LF Source Operations (HH.HH)
R/V <i>Fugro Enterprise</i>	20 April 2022 – 13 September 2022	1813.20
	9 August 2023 – 23 August 2023	
M/V <i>Bella Marie</i>	21 April 2022 – 24 June 2022	328.00
	20 July 2023 – 28 August 2023	

6.2 Monitoring Effort

Visual and acoustic monitoring effort combined for the R/V *Fugro Enterprise* and M/V *Bella Marie* during the ASOW HRG Survey is summarized in Table 10. The total monitoring time combined for all surveys conducted was 3,823 hours and eight minutes. The table provides the breakdown in visual monitoring effort and concurrent acoustic monitoring effort undertaken during day and night with source activity status.

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Table 10: Summary of monitoring effort and source activity status during operations

Monitoring Effort by Source Activity	Visual (HH.HH)
Source active- daytime	1487.84
Source silent- daytime	1178.62
Total	2666.48
Source active- nighttime	604.53
Source silent- nighttime	493.48
Total	1097.48
Source active - PAM	49.33
Source silent - PAM	9.84
Total	59.17

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.

The majority of visual monitoring effort (58% of the overall visual monitoring effort) for the survey was conducted in conditions where visibility extended to 5 km or greater and could be considered to be excellent conditions for the detection of protected species (Table 11). Visibility below 5 km includes visual effort conducted during nighttime as well as daytime hours.

Table 11: Summary of visibility conditions during the survey

Visibility	Duration (HH.HH)	% of Overall Monitoring Effort
Greater than 5 km	2211.18	57.8
2 to 5 km	327.58	8.6
Less than 2 km	1284.37	33.6

Monitoring effort was conducted in Beaufort Sea States ranging from Level 0 through Level 9. Majority of monitoring effort was accumulated at sea states at or below Level 3, which is generally considered to be

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favorable conditions for monitoring for most marine mammal species (Table 12). Visual observations at Level 3 Beaufort Sea States or below accounted for 78% of the total visual monitoring effort.

Table 12: Summary of Beaufort Sea State during visual monitoring during the survey

Beaufort Sea State	Duration (HH.HH)	% of Overall Monitoring Effort
B0	17.93	<1
B1	465.25	12
B2	1116.95	29
B3	1378.42	36
B0 through B3	2978.55	78
B4	684.88	18
B5	133.68	3
B6	19.38	<1
B7	6.18	<1
B8	0.23	<1
B9	0.22	<1
B4 through B9	844.58	22

Glare during visual observations was as follows. 47% percent of monitoring effort occurred during periods with no glare; however, 23% of monitoring occurred under severe glare conditions (Table 13).

Table 13: Summary of glare during visual monitoring during the survey

Glare	Duration (HH.HH)	% of Overall Monitoring Effort
None	1785.52	47
Mild	400.80	10
Moderate	755.12	20
Severe	881.70	23

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

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Table 14: Summary of swell height during visual monitoring during the survey

Swell Height	Duration (HH.HH)	% of Overall Monitoring Effort
Less than 2 meters	3680.05	96
2 to 4 meters	143.08	4
Greater than 4 meters	0.00	-

Precipitation during visual observations varied between clear, rain, fog and haze during monitoring effort. Visibility conditions were clear of precipitation for 80% of the monitoring effort, four percent were conditions with rain, and fog was present for five percent of the survey operations (Table 15).

Table 15: Summary of precipitation during visual monitoring during the survey

Precipitation	Duration (HH.HH)	% of Overall Monitoring Effort
Clear	3046.85	80
Heavy Rain	15.08	<1
Light Rain	138.03	4
Heavy Fog	90.72	2
Thin Fog	71.35	2
Haze	461.10	12

6.4 Visual Sightings

This section of the report summarizes visual sightings of protected species (marine mammals and sea turtles) made during the ASOW HRG survey. There were a total 128 protected species detection events: 94 marine mammal detections and 34 sea turtle sightings. Marine mammal sightings consisted of delphinids and whales (43 delphinid detections, and 51 whale detections). Detections consisted of six different marine mammal species (four delphinid species and two whale species). There were nine detections of unidentified whales, one detection of an unidentified porpoise and 10 detections of unidentified dolphins.

The 34 sea turtle detection events consisted of four species: hawksbill sea turtles, leatherback sea turtles, loggerhead sea turtles, and Kemp's Ridley sea turtles. There were eight unidentified sea turtles.

No Atlantic sturgeon or giant manta rays were sighted during any of the survey activities.

Of the 128 detection events, 78% (100 events) were of animals that were identified to the species level while the remaining animals (28 detection events) were identified to family level or a higher taxonomic level (classified as unidentified delphinids, unidentified whales, and unidentified sea turtles). Table 16 shows the total number of detection records and the number of individuals detected for each protected species during the survey program.

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A table of all protected species detections is provided as part of an excel datasheet in Appendix H.

The distribution of protected species detections both inside and outside the Lease Area is provided in the maps below (Figure 8–Figure 11).

Photographs of the identified protected species visually detected during the survey are provided in Appendix I.

Table 16: Number of detection records collected for each protected species during the survey

Species	Total Number of Detection Records	Total Number of Detected Animals Recorded
Whales		
Humpback whale	39	60
Minke whale	3	3
Unidentified whale	9	9
Dolphins		
Bottlenose dolphin	29	254
Common dolphin	1	20
Harbor porpoise	1	1
Long-finned pilot whale	1	1
Unidentified dolphins	10	45
Unidentified porpoise	1	1
Sea turtles		
Hawksbill sea turtle	1	1
Kemp's ridley sea turtle	1	1
Leatherback sea turtle	2	2
Loggerhead sea turtle	22	24
Unidentified sea turtle	8	8
Total	128	430

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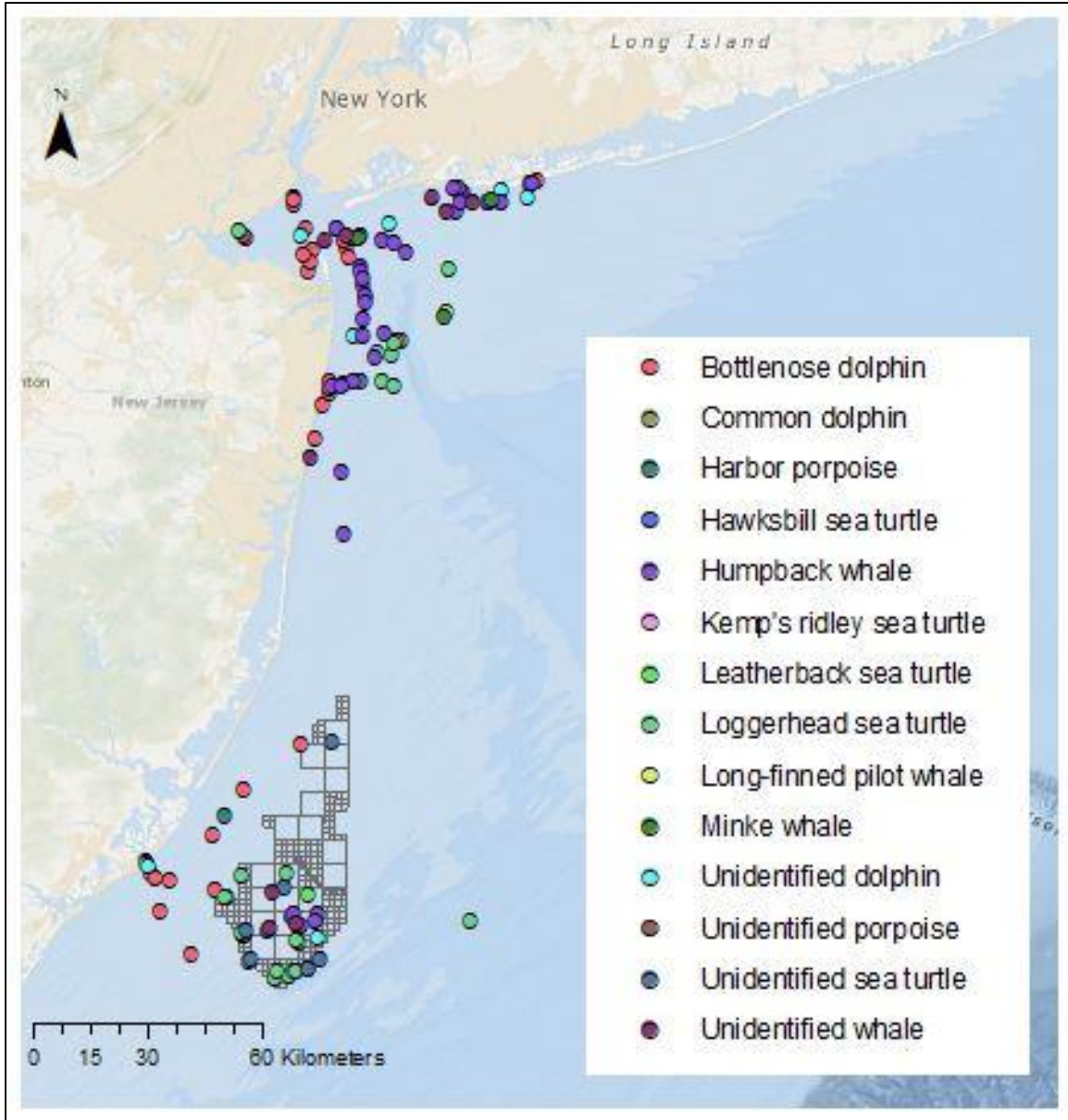


Figure 8: Distribution of all protected species detections during the survey

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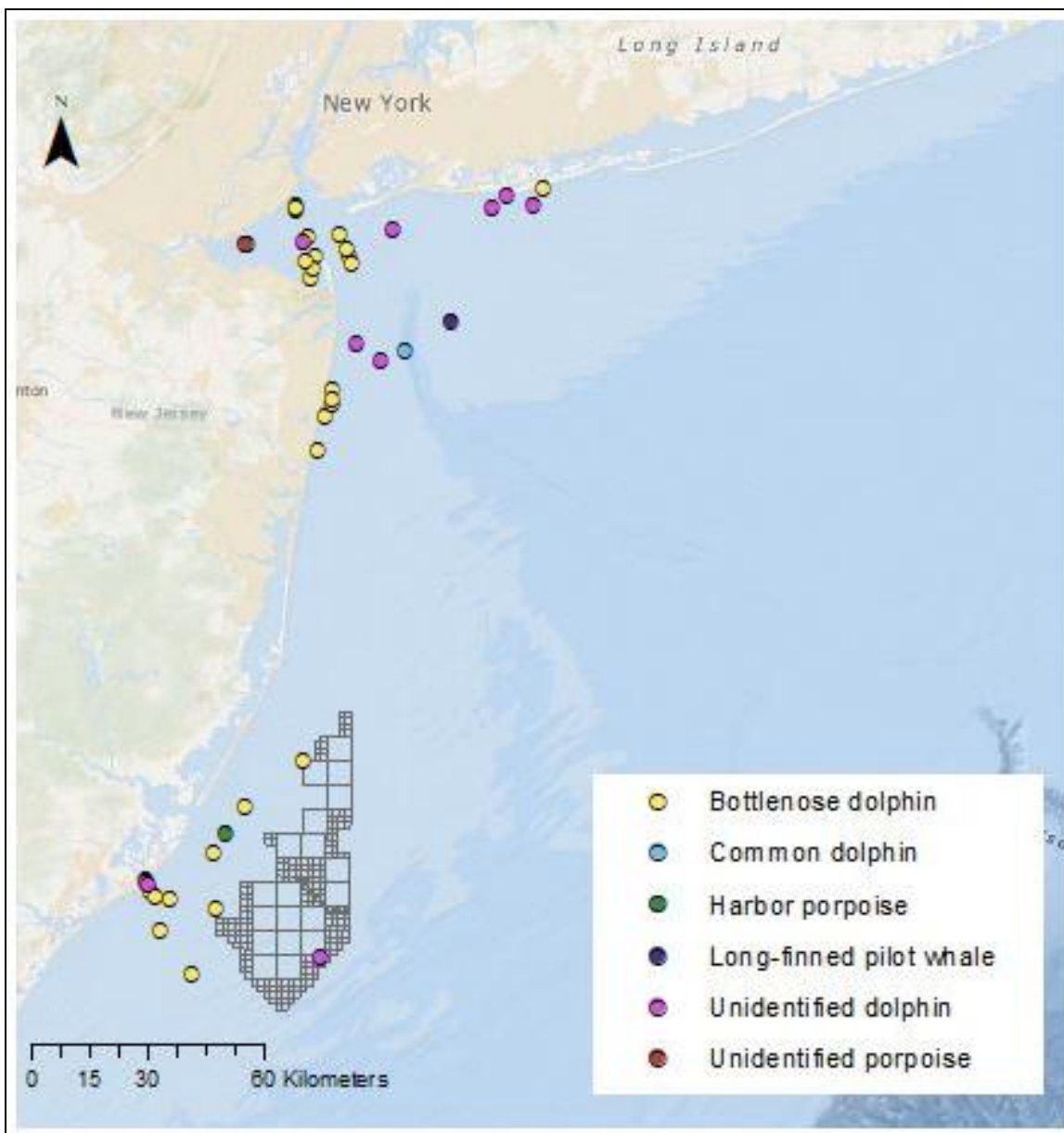


Figure 9: Distribution of dolphins detected during the survey

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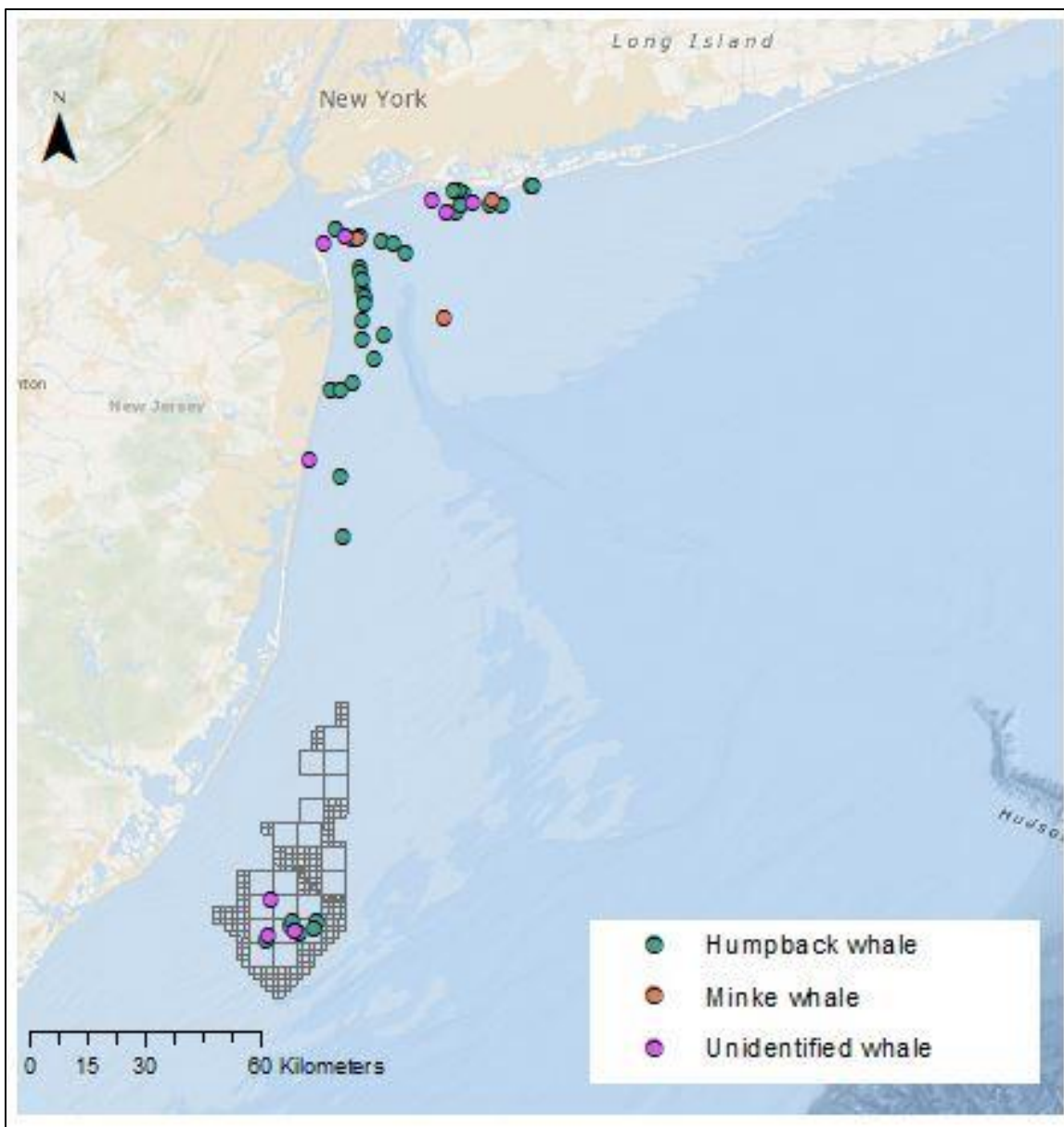


Figure 10: Distribution of whales during the survey

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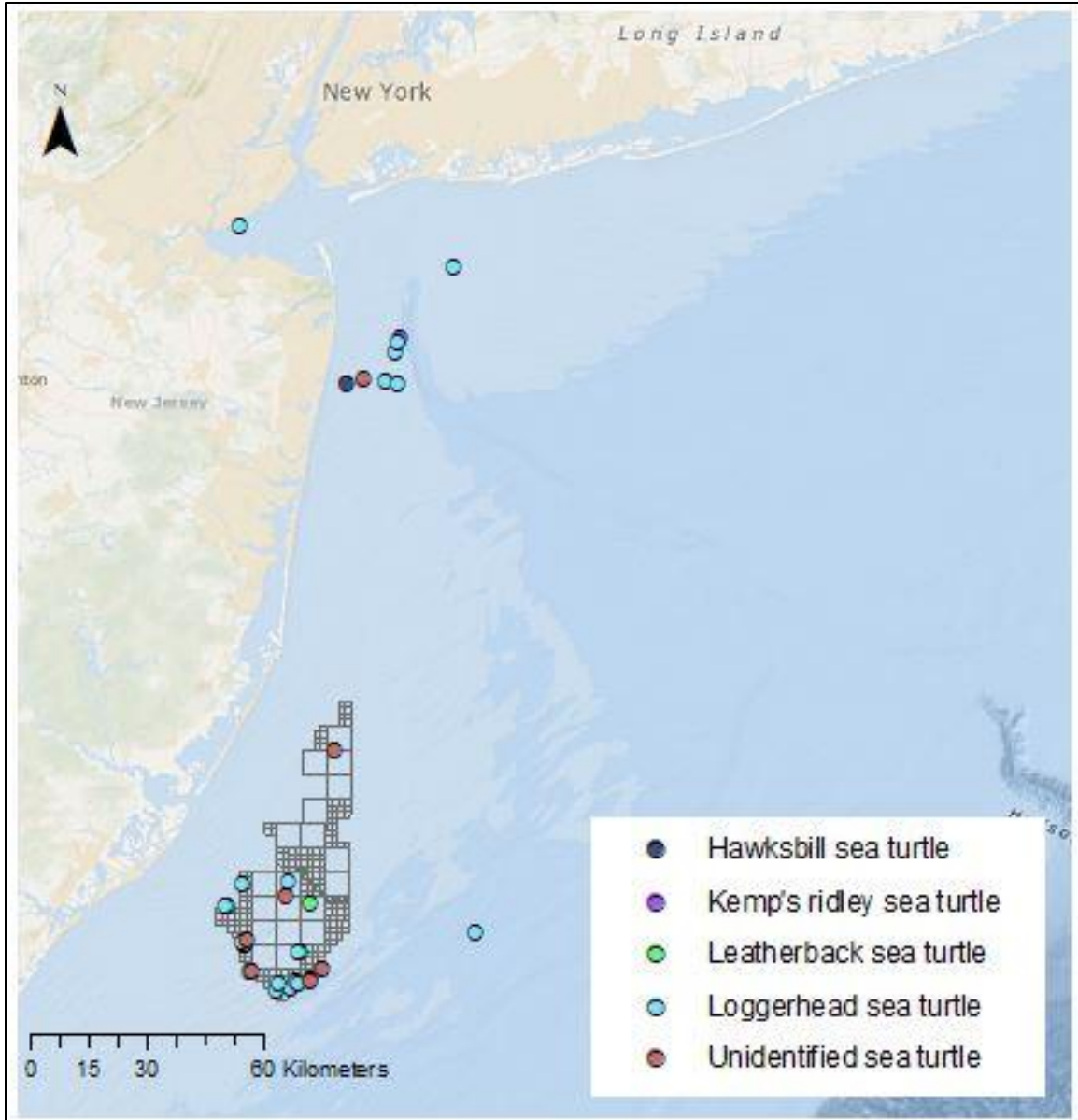


Figure 11: Distribution of sea turtles during the survey

6.4.1 Detection and Distance Summaries

Common dolphins had a larger mean group size than any other species (20) followed by bottlenose dolphins (8.8). Humpback whales were the most frequently sighted species during the survey (39) and were observed more often than the next most observed identified species, bottlenose dolphins (29) (Table 17). The number of detection events, approximate number of animals observed, mean group size and detection rate for each species detected over the course of the survey is provided in Table 17 through Table 19.

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Among delphinids, harbor porpoise detections had the closest mean distance at first detection of 15 meters at first sighting, followed by bottlenose dolphins at 246 meters. The unidentified dolphins had the greatest mean distance at first detection at 503 meters.

Table 17: Detection summary of dolphins

Dolphins	Bottlenose dolphin	Common dolphin	Harbor porpoise	Long-finned pilot whale	Unidentified dolphin	Unidentified porpoise
# of Detection Records	29	1	1	1	10	1
Estimated # of individuals detected	254	20	1	1	45	1
Mean Group Size	8.8	20	1	1	4.5	1
Mean Distance (m) at first detection	246	2000	15	1800	503	450
Detection rate (detection per visual effort hours of survey)	0.007585	0.000262	0.000262	0.000262	0.002616	0.000262

Humpback whales had a largest mean group size of the whale species (1.5) and had the highest number of detection records (39) and detected individuals (60) (Table 18). Minke whales had the closest mean distance at first detection of 333 meters. The minke whales and unidentified whales both had a mean group size of one animal.

Table 18: Detection summary for whales

Whales	Humpback whale	Minke whale	Unidentified whale
# of Detection Records	39	3	9
Estimated # of individuals detected	60	3	9
Mean Group Size	1.5	1	1
Mean Distance (m) at first detection	1396	333	722
Detection rate (detection per visual effort hours of survey)	0.010201	0.000785	0.002354

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The loggerhead sea turtle was the most frequently detected sea turtle (24). The hawksbill sea turtle had the closest mean distance at first detection (15 meters) (Table 19).

Table 19: Visual detection summary for sea turtles

Turtles	Hawksbill sea turtle	Kemp's ridley sea turtle	Leatherback sea turtle	Loggerhead sea turtle	Unidentified sea turtle
# of Detection Records	1	1	2	22	8
Estimated # of individuals detected	1	1	2	24	8
Mean Group Size	1	1	1	1.1	1
Mean distance (m) at first detection	15	20	325	206	116
Detection rate (detection per visual effort hours of survey)	0.000262	0.000262	0.000523	0.005754	0.002093

The mean CPA to the active and inactive HRG sources was calculated for all species groups (Table 20). All marine mammal groups had closer mean CPA when the HRG sources were not active.

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

Species Detected	Regulated Source Active		Regulated Source Inactive	
	Number of detections	Mean CPA to source (meters)	Number of detections	Mean CPA to source (meters)
Bottlenose dolphin	8	117	10	128
Long-finned pilot whale	1	1166	0	-
Unidentified dolphin	2	390	4	725
All dolphin species	11	262	14	299
Humpback whale	35	1060	7	734
Minke whale	2	150	1	80
Unidentified whale	4	448	2	650
All whale species	41	956	10	652
Hawksbill sea turtle	0	-	1	20
Kemp's ridley sea turtle	1	25	1	25
Leatherback sea turtle	2	310	1	40
Loggerhead sea turtle	16	104	14	54
Unidentified sea turtle	5	138	6	23
All turtle species	24	125	23	43

6.4.2 Incidental Harassment Authorization (IHA) Level B Exposures

NMFS authorized a total of 2,345 level B takes in 2022 and in 2023 a total of 4,190 level B takes for 15 marine mammal species. Within the 2022 IHA survey period, 10 marine mammals from two species were observed within 370 m of the active LF sound sources (160 decibel radius) (Table 21). Within the 2023 IHA survey period, a total of five marine mammals from two different species were observed within the predicted 160-decibel radius (where there is a potential for a behavioral response) while an HRG source was active. Potential Level B takes included one minke whale, and four bottlenose dolphins.

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Table 21: IHA authorized Level B takes and takes from the survey

Species common name	2022 IHA		2023 IHA	
	IHA Authorized Level B Takes	Total Number of Animals Observed Inside the IHA-defined Level B Harassment Zones	IHA Authorized Level B Takes	Total Number of Animals Observed Inside the IHA-defined Level B Harassment Zones
North Atlantic right whale	17	0	3	0
Fin whale	5	0	6	0
Sei whale	2	0	2	0
Minke whale	2	0	24	1
Humpback whale	8	1	5	0
Sperm whale	1	0	2	0
Atlantic white-sided dolphin	17	0	17	0
Atlantic spotted dolphin	100	0	50	0
Bottlenose dolphin	1560	9	2317	4
Long finned pilot whale	20	0	20	0
Risso's dolphin	30	0	30	0
Common dolphin	560	0	100	0
Harbor porpoise	282	0	142	0
Harbor seal	426	0	736	0
Gray Seal	426	0	736	0
Unidentified seal	N/A	0	N/A	0
Unidentified dolphin	N/A	0	N/A	0
Unidentified whale	N/A	0	N/A	0

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6.4.3 NARW Sightings Reporting

There were no observations of NARWs made during survey operations.

6.4.4 Protected Species Incident Reporting

There were no observed dead or injured protected species during the 2022 and 2023 survey efforts.

6.4.5 Summary of DMAs

No DMAs were created in the ASOW survey region during the surveys.

6.1 Acoustic Detections

There were no acoustic detections of protected species (marine mammals and sea turtles) made during the ASOW HRG survey.

6.2 Summary of Mitigation Measures Implemented

Mitigation was implemented as described in previous sections of this report to minimize potential adverse impacts to protected species including physical interactions with vessels and / or towed equipment (strike avoidance mitigation) or from exposure to potentially harmful levels and frequencies of sound (delays to initiation of and shutdowns of active LF HRG sound sources).

There were 23 mitigation actions implemented for the HRG sound sources during the survey period (Table 22). These mitigation actions resulted in 12 hours and six minutes of mitigation downtime. Mitigation downtime accounts only for the period of time during which survey operations were delayed or shut down for the presence of a protected species inside a CZ or EZ and the additional regulatory-required time period that must pass before sound source operations can resume. Additional downtime is frequently incurred for necessary operational activities such as gear deployment and/or repositioning the vessel.

Table 22: Number and duration of mitigation actions by species groups implemented during the survey

Mitigation Action	Dolphins		Whales		Sea turtles		All Species	
	Number	Mitigation Downtime (HH.HH)	Number	Mitigation Downtime (HH.HH)	Number	Mitigation Downtime (HH.HH)	Number	Mitigation Downtime (HH.HH)
Delay to initiation of source	0	0.00	0	0.00	5	2.95	5	2.95
Shutdown of active source	1	0.03	3	1.22	14	7.90	18	9.15
All mitigation actions	1	0.03	3	1.22	19	10.85	23	12.10

Strike avoidance maneuvering was conducted 18 times during the survey where each event consisted of a vessel maneuver to maintain or achieve a separation distance (Table 23).

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Table 23: Summary of strike avoidance maneuvers undertaken during the survey

Vessel	Date	Detection number	Species	Number of animals	CPA Distance (M)	Strike avoidance maneuver
<i>R/V Fugro Enterprise</i>	2022-05-02	5	Humpback whale	5	800	Alter course
<i>R/V Bella Marie</i>	2022-06-15	16	Loggerhead sea turtle	1	3	Speed reduction, alter course
<i>R/V Fugro Enterprise</i>	2022-07-04	33	Unidentified sea turtle	1	15	Kept course
<i>R/V Fugro Enterprise</i>	2022-07-08	37	Loggerhead sea turtle	1	30	Kept course
<i>R/V Fugro Enterprise</i>	2022-07-12	39	Loggerhead sea turtle	1	5	Kept course
<i>R/V Fugro Enterprise</i>	2022-07-14	41	Unidentified sea turtle	1	45	Kept course
<i>R/V Fugro Enterprise</i>	2022-07-22	47	Loggerhead sea turtle	1	10	Kept course
<i>R/V Fugro Enterprise</i>	2022-07-22	48	Loggerhead sea turtle	1	80	Kept course
<i>R/V Fugro Enterprise</i>	2022-07-22	49	Loggerhead sea turtle	1	125	Kept course
<i>R/V Fugro Enterprise</i>	2022-08-23	59	Humpback whale	1	250	Speed reduction
<i>R/V Fugro Enterprise</i>	2022-09-11	65	Humpback whale	1	295	Alter course
<i>R/V Fugro Enterprise</i>	2023-08-09	1	Common dolphin	20	5	Kept course, maintain speed
<i>R/V Fugro Enterprise</i>	2023-08-11	4	Humpback whale	3	300	Alter course
<i>R/V Fugro Enterprise</i>	2023-08-14	6	Minke whale	1	50	Kept course, maintain speed
<i>R/V Fugro Enterprise</i>	2023-08-15	8	Loggerhead sea turtle	1	50	Kept course, maintain speed

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Vessel	Date	Detection number	Species	Number of animals	CPA Distance (M)	Strike avoidance maneuver
<i>R/V Fugro Enterprise</i>	2023-08-20	11	Kemp's ridley sea turtle	1	20	Kept course, maintain speed
<i>R/V Fugro Enterprise</i>	2023-08-22	12	Unidentified whale	1	250	Kept course, maintain speed
<i>R/V Fugro Enterprise</i>	2023-08-23	13	Humpback whale	1	200	Speed reduction, alter course

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7 SUMMARY

7.1 Interpretation of the Results

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

For all the marine mammal species groups, the mean distance at initial detection and at CPA was greater when the regulated sound sources were active and during many detection events animals were observed to change their direction of travel. However, it is not possible from this data to determine whether the animals were reacting to the vessel, to the sound source or to another environmental or behavioral factor. No behaviors were observed during any encounter that suggested that a protected species was exhibiting an adverse reaction to survey activities.

7.2 Effectiveness of all Monitoring Tasks

To minimize the potential impacts to marine mammals and sea turtles, PSOs onboard all the survey vessels were prepared to implement mitigation measures whenever protected species were detected approaching, entering, or within the designated mitigation zones. Mitigation actions for regulated sound sources were implemented successfully during 23 detection events. PSOs searched the mitigation zones prior to activation of regulated sound sources or deployment / retrieval of sources and survey crew confirmed that applicable zones were clear prior to source operations.

Strike avoidance maneuvering was conducted 18 times to prevent potential physical interactions between the survey vessels and marine mammals or sea turtles. In each case the maneuvers were executed as necessary - PSOs detected the animals in sufficient time to alert the vessel of the need for maneuvering and maneuvering was carried out successfully to avoid physical impacts to the animals. There were three detections where the vessel altered course, seven detections where the vessel kept course, five detections where the vessel kept course and maintained speed, one detection where the vessel reduced speed, and two detections where the vessel reduced speed and altered course.

If a dead protected species was discovered during the survey program, and the lead visual observer determined that the cause of death was unknown or unrelated to the activities of the vessel, the incident was to be immediately reported.

Visual observations yielded a total 128 protected species detections both inside and outside the survey areas and included marine mammals and sea turtles. While it is likely that PSOs did not identify all the animals present in the area around the vessel, it is unlikely that protected species were not detected inside the mitigation zones since the radii were relatively small and PSOs were equipped with multiple tools to augment the efficacy of the monitoring. The environmental conditions present during visual and acoustic monitoring were generally good for detecting protected species, especially inside the mitigation zones.

For the ASOW 2022 survey within the 2022 IHA, a total of 10 individual marine mammals from two species were identified to the family level. For the 2023 IHA, a total of five individual marine mammals were identified as belonging to one species. All of which were authorized for takes in the IHA. During the survey activities within the 2022 IHA, a total of ten individual protected species were observed within the predicted Level B harassment radius (radius). This total represents <1% of the authorized Level B takes for the survey program. Within the 2023 IHA, a total of five individual protected species were observed within the radius, representing <1% of the authorized takes. Although PSOs likely did not detect all the marine mammals present; it is highly unlikely that the actual number of animals present during survey operations reached anywhere near the fully authorized levels for all species.

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Appendix A : BOEM Lease OCS-A 0499 and OCS-A 0549

Appendix B : NMFS 2022 and 2023 IHAs

Appendix C : Environmental Management Plans

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Appendix D : Protected Species Observers Onboard (R/V *Fugro Enterprise*, M/V *Bella Marie*)



Appendix E : Vessel Photos



Appendix F : Reticle Binoculars Calibration Tables



Appendix G : Night Vision Equipment Specifications



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



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



Appendix J: Vessel Strike Avoidance Actions Table



Appendix K : Passive Acoustic Monitoring (PAM) Deployment for R/V *Fugro Enterprise*

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF OCEAN ENERGY MANAGEMENT COMMERCIAL LEASE OF SUBMERGED LANDS FOR RENEWABLE ENERGY DEVELOPMENT ON THE OUTER CONTINENTAL SHELF <i>Paperwork Reduction Act of 1995 statement: This form does not constitute an information collection as defined by 44 U.S.C. § 3501 et seq. and therefore does not require approval by the Office of Management and Budget.</i>	Office Sterling, VA	Renewable Energy Lease Number OCS-A 0499
	Cash Bonus and/or Acquisition Fee \$1,006,240	Resource Type Wind
	Effective Date March 1, 2016	Block Number(s) See Addendum A

This lease, which includes any addenda hereto, is hereby entered into by and between the United States of America, ("Lessor"), acting through the Bureau of Ocean Energy Management ("BOEM"), its authorized officer, and

Lessee	Interest Held
US Wind Inc.	100%

("Lessee"). This lease is effective on the date written above ("Effective Date") and will continue in effect until the lease terminates as set forth in Addendum "B." In consideration of any cash payment heretofore made by the Lessee to the Lessor and in consideration of the promises, terms, conditions, covenants, and stipulations contained herein and attached hereto, the Lessee and the Lessor agree as follows:

Section 1: Statutes and Regulations.

This lease is issued pursuant to subsection 8(p) of the Outer Continental Shelf Lands Act ("the Act"), 43 U.S.C. §§ 1331 *et seq.* This lease is subject to the Act and regulations promulgated pursuant to the Act, including but not limited to, offshore renewable energy and alternate use regulations at 30 CFR Part 585 as well as other applicable statutes and regulations in existence on the Effective Date of this lease. This lease is also subject to those statutes enacted (including amendments to the Act or other statutes) and regulations promulgated thereafter, except to the extent that they explicitly conflict with an express provision of this lease. It is expressly understood that amendments to existing statutes, including but not limited to the Act, and regulations may be made, and/or new statutes may be enacted or new regulations promulgated, which do not explicitly conflict with an express provision of this lease, and that the Lessee bears the risk that such amendments, regulations, and statutes may increase or decrease the Lessee's obligations under the lease.

Section 2: Rights of the Lessee.

- (a) The Lessor hereby grants and leases to the Lessee the exclusive right and privilege, subject to the terms and conditions of this lease and applicable regulations, to: (1) submit to the Lessor for approval a Site Assessment Plan (SAP) and Construction and Operations Plan (COP) for the project identified in Addendum “A” of this lease; and (2) conduct activities in the area identified in Addendum “A” of this lease (“leased area”) that are described in a SAP or COP that has been approved by the Lessor. This lease does not, by itself, authorize any activity within the leased area.
- (b) The rights granted to the Lessee herein are limited to those activities described in any SAP or COP approved by the Lessor. The rights granted to the Lessee are limited by the lease-specific terms, conditions, and stipulations required by the Lessor per Addendum “C.”
- (c) This lease does not authorize the Lessee to conduct activities on the Outer Continental Shelf (OCS) relating to or associated with the exploration for, or development or production of, oil, gas, other seabed minerals, or renewable energy resources other than those renewable energy resources identified in Addendum “A.”

Section 3: Reservations to the Lessor.

- (a) All rights in the leased area not expressly granted to the Lessee by the Act, applicable regulations, this lease, or any approved SAP or COP, are hereby reserved to the Lessor.
- (b) The Lessor will decide whether to approve a SAP or COP in accordance with the applicable regulations in 30 CFR Part 585. The Lessor retains the right to disapprove a SAP or COP based on the Lessor’s determination that the proposed activities would have unacceptable environmental consequences, would conflict with one or more of the requirements set forth in subsection 8(p)(4) of the Act (43 U.S.C. § 1337(p)(4)), or for other reasons provided by the Lessor pursuant to 30 CFR 585.613(e)(2) or 30 CFR 585.628(f)(2). Disapproval of plans will not subject the Lessor to liability. The Lessor also retains the right to approve with modifications a SAP or COP, as provided in applicable regulations.
- (c) The Lessor reserves the right to suspend the Lessee’s operations in accordance with the national security and defense provisions of section 12 of the Act and applicable regulations.
- (d) The Lessor reserves the right to authorize other uses within the leased area that will not unreasonably interfere with activities described in Addendum “A.”

Section 4: Payments.

- (a) The Lessee must make all rent payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, unless otherwise specified in Addendum “B.”
- (b) The Lessee must make all operating fee payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, as specified in Addendum “B.”

Section 5: Plans.

The Lessee may conduct those activities described in Addendum “A” only in accordance with a SAP or COP approved by the Lessor. The Lessee may not deviate from an approved SAP or COP except as provided in applicable regulations in 30 CFR Part 585.

Section 6: Associated Project Easements.

Pursuant to 30 CFR 585.200(b), the Lessee has the right to one or more project easements, without further competition, for the purpose of installing gathering, transmission, and distribution cables, pipelines, and appurtenances on the OCS, as necessary for the full enjoyment of the lease, and under applicable regulations in 30 CFR Part 585. As part of submitting a COP for approval, the Lessee may request that one or more easement(s) be granted by the Lessor. If the Lessee requests that one or more easement(s) be granted when submitting a COP for approval, such project easements will be granted by the Lessor in accordance with the Act and applicable regulations in 30 CFR Part 585 upon approval of the COP in which the Lessee has demonstrated a need for such easements. Such easements must be in a location acceptable to the Lessor, and will be subject to such conditions as the Lessor may require. The project easement(s) that would be issued in conjunction with an approved COP under this lease will be described in Addendum “D” to this lease, which will be updated as necessary.

Section 7: Conduct of Activities.

The Lessee must conduct, and agrees to conduct, all activities in the leased area in accordance with an approved SAP or COP, and with all applicable laws and regulations.

The Lessee further agrees that no activities authorized by this lease will be carried out in a manner that:

- (a) could unreasonably interfere with or endanger activities or operations carried out under any lease or grant issued or maintained pursuant to the Act, or under any other license or approval from any Federal agency;
- (b) could cause any undue harm or damage to the environment;
- (c) could create hazardous or unsafe conditions; or
- (d) could adversely affect sites, structures, or objects of historical, cultural, or archaeological significance, without notice to and direction from the Lessor on how to proceed.

Section 8: Violations, Suspensions, Cancellations, and Remedies.

If the Lessee fails to comply with (1) any of the applicable provisions of the Act or regulations, (2) the approved SAP or COP, or (3) the terms of this lease, including associated Addenda, the Lessor may exercise any of the remedies that are provided under the Act and applicable regulations, including, without limitation, issuance of cessation of

operations orders, suspension or cancellation of the lease, and/or the imposition of penalties, in accordance with the Act and applicable regulations.

The Lessor may also cancel this lease for reasons set forth in subsection 5(a)(2) of the Act (43 U.S.C. § 1334(a)(2)), or for other reasons provided by the Lessor pursuant to 30 CFR 585.437.

Non-enforcement by the Lessor of a remedy for any particular violation of the applicable provisions of the Act or regulations, or the terms of this lease, will not prevent the Lessor from exercising any remedy, including cancellation of this lease, for any other violation or for the same violation occurring at any other time.

Section 9: Indemnification.

The Lessee hereby agrees to indemnify the Lessor for, and hold the Lessor harmless from, any claim caused by or resulting from any of the Lessee's operations or activities on the leased area or project easements or arising out of any activities conducted by or on behalf of the Lessee or its employees, contractors (including Operator, if applicable), subcontractors, or their employees, under this lease, including claims for:

- a. loss or damage to natural resources,
- b. the release of any petroleum or any Hazardous Materials,
- c. other environmental injury of any kind,
- d. damage to property,
- e. injury to persons, and/or
- f. costs or expenses incurred by the Lessor.

Except as provided in any addenda to this lease, the Lessee will not be liable for any losses or damages proximately caused by the activities of the Lessor or the Lessor's employees, contractors, subcontractors, or their employees. The Lessee must pay the Lessor for damage, cost, or expense due and pursuant to this section within 90 days after written demand by the Lessor. Nothing in this lease will be construed to waive any liability or relieve the Lessee from any penalties, sanctions, or claims that would otherwise apply by statute, regulation, operation of law, or could be imposed by the Lessor or other government agency acting under such laws.

"Hazardous Material" means

1. Any substance or material defined as hazardous, a pollutant, or a contaminant under the *Comprehensive Environmental Response, Compensation, and Liability Act* at 42 U.S.C. §§ 9601(14) and (33);
2. Any regulated substance as defined by the Resource Conservation and Recovery Act ("RCRA") at 42 U.S.C. § 6991 (7), whether or not contained in or released from underground storage tanks, and any hazardous waste regulated under RCRA pursuant to 42 U.S.C. §§ 6921 *et seq.*;
3. Oil, as defined by the Clean Water Act at 33 U.S.C. § 1321(a)(1) and the Oil Pollution Act at 33 U.S.C. § 2701(23); or

4. Other substances that applicable Federal, state, tribal, or local laws define and regulate as “hazardous.”

Section 10: Financial Assurance.

The Lessee must provide and maintain at all times a surety bond(s) or other form(s) of financial assurance approved by the Lessor in the amount specified in Addendum “B.” As required by the applicable regulations in 30 CFR Part 585, if, at any time during the term of this lease, the Lessor requires additional financial assurance, then the Lessee must furnish the additional financial assurance required by the Lessor in a form acceptable to the Lessor within 90 days after receipt of the Lessor’s notice of such adjustment.

Section 11: Assignment or Transfer of Lease.

This lease may not be assigned or transferred in whole or in part without written approval of the Lessor. The Lessor reserves the right, in its sole discretion, to deny approval of the Lessee’s application to transfer or assign all or part of this lease. Any assignment will be effective on the date the Lessor approves the Lessee’s application. Any assignment made in contravention of this section is void.

Section 12: Relinquishment of Lease.

The Lessee may relinquish this entire lease, or any officially designated subdivision thereof by filing with the appropriate office of the Lessor a written relinquishment application, in accordance with applicable regulations in 30 CFR Part 585. No relinquishment of this lease or any portion thereof will relieve the Lessee or its surety of the obligations accrued hereunder, including but not limited to, the responsibility to remove property and restore the leased area pursuant to section 13 of this lease and applicable regulations.

Section 13: Removal of Property and Restoration of the Leased Area on Termination of Lease.

Unless otherwise authorized by the Lessor, pursuant to the applicable regulations in 30 CFR Part 585, the Lessee must remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seafloor of all obstructions created by activities on the leased area, including any project easements within two years following lease termination, whether by expiration, cancellation, contraction, or relinquishment, in accordance with any approved SAP, COP, or approved Decommissioning Application, and applicable regulations in 30 CFR Part 585.

Section 14: Safety Requirements.

The Lessee must:

- a. maintain all places of employment for activities authorized under this lease in compliance with occupational safety and health standards and, in addition, free

from recognized hazards to employees of the Lessee or of any contractor or subcontractor operating under this lease;

- b. maintain all operations within the leased area in compliance with regulations in 30 CFR Part 585 and orders from the Lessor and other Federal agencies with jurisdiction, intended to protect persons, property and the environment on the OCS; and
- c. provide any requested documents and records, which are pertinent to occupational or public health, safety, or environmental protection, and allow prompt access, at the site of any operation or activity conducted under this lease, to any inspector authorized by the Lessor or other Federal agency with jurisdiction.

Section 15: Debarment Compliance.

The Lessee must comply with the Department of the Interior's non-procurement debarment and suspension regulations set forth in 2 CFR Parts 180 and 1400 and must communicate the requirement to comply with these regulations to persons with whom it does business related to this lease by including this requirement in all relevant contracts and transactions.

Section 16: Equal Opportunity Clause.

During the performance of this lease, the Lessee must fully comply with paragraphs (1) through (7) of section 202 of Executive Order 11246, as amended (reprinted in 41 CFR 60-1.4(a)), and the implementing regulations, which are for the purpose of preventing employment discrimination against persons on the basis of race, color, religion, sex, or national origin. Paragraphs (1) through (7) of section 202 of Executive Order 11246, as amended, are incorporated in this lease by reference.

Section 17: Certification of Nonsegregated Facilities.

By entering into this lease, the Lessee certifies, as specified in 41 CFR 60-1.8, that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. As used in this certification, the term "facilities" means, but is not limited to, any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees. Segregated facilities include those that are segregated by explicit directive or those that are in fact segregated on the basis of race, color, religion, sex, or national origin, because of habit, local custom, or otherwise; provided, that separate or single-user restrooms and necessary dressing or sleeping areas must be provided to assure privacy as appropriate. The Lessee further agrees that it will obtain identical certifications from proposed contractors and subcontractors prior to awarding contracts or subcontracts unless they are exempt under 41 CFR 60-1.5.

Section 18: Notices.

All notices or reports provided from one party to the other under the terms of this lease must be in writing, except as provided herein and in the applicable regulations in 30 CFR Part 585. Written notices must be delivered to the party's Lease Representative, as specifically listed in Addendum "A," either electronically, by hand, by facsimile, or by United States first class mail, adequate postage prepaid. Either party may notify the other of a change of address by doing so in writing. Until notice of any change of address is delivered as provided in this section, the last recorded address of either party will be deemed the address for all notices required under this lease. For all operational matters, notices must be provided to the party's Operations Representative, as specifically listed in Addendum "A," as well as the Lease Representative.

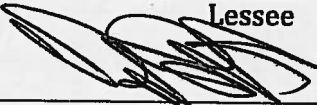
Section 19: Severability Clause.

If any provision of this lease is held unenforceable, all remaining provisions of this lease will remain in full force and effect.

Section 20: Modification.

Unless otherwise authorized by the applicable regulations in 30 CFR Part 585, this lease may be modified or amended only by mutual agreement of the Lessor and the Lessee. No such modification or amendment will be binding unless it is in writing and signed by duly authorized signatories of the Lessor and the Lessee.

US Wind Inc.

Lessee


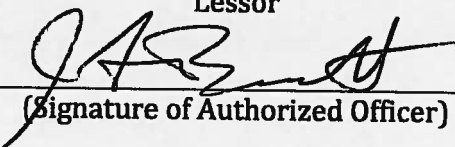
(Signature of Authorized Officer)
RICCARDO TOTO

(Name of Signatory)
Sole Director

(Title)
January 12th, 2016

(Date)

The United States of America

Lessor


(Signature of Authorized Officer)
James F. Bennett

(Name of Signatory)
Program Manager, Office of
Renewable Energy Programs

(Title)
February 4, 2016

(Date)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

ADDENDUM "A"

DESCRIPTION OF LEASED AREA AND LEASE ACTIVITIES

Lease Number OCS-A 0499

I. Lessor and Lessee Contact Information

Lessee Company Number: 15023

(a) Lessor's Contact Information

	Lease Representative	Operations Representative
Title	Program Manager	<i>SAME AS LEASE REPRESENTATIVE</i>
Address	U.S. Department of the Interior Bureau of Ocean Energy Management 45600 Woodland Road Mail Stop VAM-OREP Sterling, VA 20166	
Phone	(703) 787-1300	
Fax	(703) 787-1708	
Email	renewableenergy@boem.gov	

(b) Lessee's Contact Information

	Lease Representative	Operations Representative
Name	<i>SALVATORE VITALE</i>	<i>PAOLO SAMMARTINO</i>
Title	<i>LEGAL COUNSEL</i>	<i>CHIEF OPERATING OFFICER</i>
Address	<i>US WIND INC, 1 N CHARLES ST 21202 BALTIMORE, MD SUITE 2310</i>	<i>US WIND INC, 1 N CHARLES ST 21202 BALTIMORE, MD SUITE 2310</i>
Phone	<i>410 727 4020</i>	<i>410 727 4020</i>
Fax	<i>410 727 4026</i>	<i>410 727 4026</i>
Email	<i>s.vitale@venexia.ut</i>	<i>p.sammartino@venexia.ut</i>

II. Description of Leased Area

The total acreage of the lease area is approximately hectares 74,160 hectares (183,353 acres)

This area is subject to later adjustment, in accordance with applicable regulations (e.g., contraction, relinquishment, etc.).

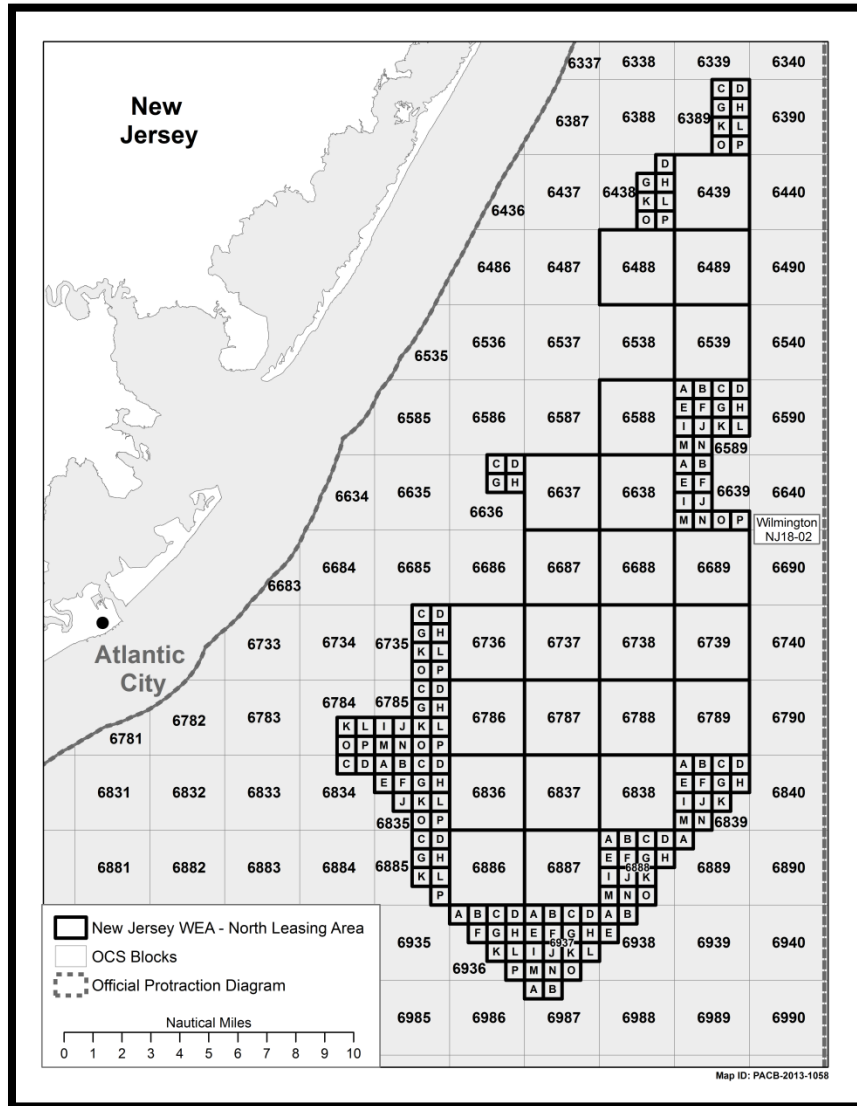
Lease OCS-A 0499

The following Blocks or portions of Blocks lying within Official Protraction Diagram Wilmington NJ18-02 are depicted on the map below and comprise 74,160 hectares (183,353 acres), more or less.

- 1) Block 6389, E1/2
- 2) Block 6438, NE1/4 of NE1/4, S1/2 of NE1/4, SE1/4
- 3) Block 6439, All of Block
- 4) Block 6488, All of Block
- 5) Block 6489, All of Block
- 6) Block 6539, All of Block
- 7) Block 6588, All of Block
- 8) Block 6589, N1/2, SW1/4, N1/2 of SE1/4
- 9) Block 6636, NE1/4
- 10) Block 6637, All of Block
- 11) Block 6638, All of Block
- 12) Block 6639, W1/2, S1/2 of SE1/4
- 13) Block 6687, All of Block
- 14) Block 6688 All of Block
- 15) Block 6689, All of Block
- 16) Block 6735, E1/2
- 17) Block 6736, All of Block
- 18) Block 6737, All of Block
- 19) Block 6738, All of Block
- 20) Block 6739, All of Block
- 21) Block 6784, SE1/4
- 22) Block 6785, E1/2, SW1/4
- 23) Block 6786, All of Block
- 24) Block 6787, All of Block
- 25) Block 6788, All of Block
- 26) Block 6789, All of Block
- 27) Block 6834, N1/2 of NE1/4
- 28) Block 6835, E1/2, NW1/4, NE1/4 of SW1/4
- 29) Block 6836, All of Block
- 30) Block 6837, All of Block
- 31) Block 6838, All of Block
- 32) Block 6839, NE1/4, W1/2, NW1/4 of SE1/4
- 33) Block 6885, NE1/4, N1/2 of SE1/4, SE1/4 of SE1/4
- 34) Block 6886, All of Block
- 35) Block 6887, All of Block
- 36) Block 6888, NE1/4, W1/2, W1/2 of SE1/4
- 37) Block 6889, NW1/4 of NW1/4
- 38) Block 6936, NE1/4, N1/2 of NW1/4, SE1/4 of NW1/4, N1/2 of SE1/4, SE1/4 of SE1/4

- 39) Block 6937, N1/2, SW1/4, N1/2 of SE1/4, SW1/4 of SE1/4
- 40) Block 6938, N1/2 of NW1/4, SW1/4 of NW1/4
- 41) Block 6987, N1/2 of NW1/4

For the purposes of these calculations, a full Block is 2,304 hectares. The acreage of a hectare is 2.471043930.



Map of Lease OCS-A 0499

III. Renewable Energy Resource

Wind

IV. Description of the Project

A project to generate energy using wind turbine generators and any associated resource assessment activities, located on the OCS in the leased area, as well as associated offshore substation platforms, inner array cables, and subsea export cables.

V. Description of Project Easement(s)

Once approved, the Lessor will incorporate Lessee's project easement(s) in this lease as Addendum "D."

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

ADDENDUM “B”

LEASE TERM AND FINANCIAL SCHEDULE

Lease Number OCS-A 0499

I. Lease Term

The duration of each term of the lease is described below. The terms may be extended or otherwise modified in accordance with applicable regulations in 30 CFR Part 585.

Lease Term	Duration
Preliminary Term	1 year
Site Assessment Term	5 years
Operations Term	25 years

Schedule: Addendum C includes a schedule and reporting requirements for conducting site characterization activities.

Renewal: The Lessee may request renewal of the operations term of this lease, in accordance with applicable regulations in 30 CFR Part 585. The Lessor, at its discretion, may approve a renewal request to conduct substantially similar activities as were originally authorized under this lease or in an approved plan. The Lessor will not approve a renewal request that involves development of a type of renewable energy not originally authorized in the lease. The Lessor may revise or adjust payment terms of the original lease as a condition of lease renewal.

Unless otherwise described below, the Preliminary Term begins on the Effective Date of this lease for leases issued competitively. Unless otherwise described below, for noncompetitively issued leases, the Site Assessment Term begins on the Effective Date of this lease. The Operations Term begins on the date that the Lessor approves the Lessee’s Construction and Operations Plan (COP).

II. Definitions

“Available for Commercial Operations” means the status of an individual wind generation turbine on or after the first day that it engages in Commercial Operations on the lease until the day when it is permanently decommissioned. These dates are determined by the COP.

“Commercial Operations” means the generation of electricity or other energy product for

commercial use, sale, or distribution.

“Commercial Operation Date,” or “COD,” refers to the date on which the Lessee first begins Commercial Operations on the lease.

“Delivery Point” is the meter identified in the COP where the Lessee’s facility interconnects with the electric grid to deliver electricity for sale.

“Lease Issuance Date” refers to the date on which this lease has been signed by *both* the Lessee and the Lessor.

“Effective Date” has the same meaning as “effective date” in BOEM regulations provided in 30 CFR 585.237.

“End Date” refers to the earlier of a) the last calendar day of the last month of the Operations Term; or b) the date on which the lease terminates in the event of a lease termination.

“Lease Anniversary” refers to the anniversary of the Effective Date of the lease. where the Lessee’s facility interconnects with the electric grid to deliver electricity for sale.

III. Payments

Unless otherwise authorized by the Lessor in accordance with the applicable regulations in 30 CFR Part 585, the Lessee must make payments as described below.

(a) **Rent.** The Lessee must pay rent as described below:

Rent payments prior to the COD, or prior to the lease End Date in the event that the lease terminates prior to the COD, are calculated by multiplying the acres in the leased area by the rental rate per acre as follows:

Lease OCS-A 0499

- Acres in Project Area: 183,353
- Annual Rental Rate: \$3.00 per acre or fraction thereof
- Rental Fee for Entire Project Area: \$3.00 x 183,353 = \$550,059

The first year’s rent payment of \$550,059 is due within 45 days of the date that the lease is received by the Lessee for execution, in accordance with 30 CFR 585.503. Rent for the entire leased area for the next year and for each subsequent year is due on or before each Lease Anniversary through the year in which the COD occurs. The rent for each year subsequent to the COD on the imputed portion of the lease not authorized for Commercial Operations is due on or before each Lease Anniversary. The imputed portion of the lease that is not authorized for Commercial Operations at each Lease Anniversary in year t , S_t , and the corresponding Adjusted Annual Rent Payment will be determined as follows:

$$(A) S_t = \left(1 - \frac{M'_t}{MAX(M'_t: \text{for all } t \geq 2)} \right)$$

(B) *Adjusted Annual Rent Payment* = S_t * *Rental Fee for Entire Leased Area*

Where:

S_t = Portion of the lease not authorized for Commercial Operations in year t based on the definition of t in Section III (b) (4) below.

M'_t = Actual Nameplate capacity expressed in megawatts (MW) rounded to the nearest second decimal in year t of Commercial Operations on the lease as defined in Section III (b) (4) below, prior to any adjustments as specified in the most recent approved COP for turbine maintenance, replacements, repowering, or decommissioning. For our purposes nameplate capacity is the maximum rated electric output the turbines of the wind farm facility under commercial operations can produce at their rated wind speed designated by the turbine's manufacturer.

$MAX(M'_t)$ = Highest value of M'_t projected in the most recent approved version of the COP to be achieved in any year of Commercial Operations on the lease.

The Adjusted Annual Rent Payment calculated in Equation (A) herein, will be rounded up to the nearest dollar. The annual rent payments will be set forth in Addendum "E" when the COP is initially approved or subsequently revised.

Consider an example of a 1,000 MW project on a lease with an Effective Date of January 1, 2014 and a COD of January 1, 2022 on a lease area consisting of 100,000 acres as follows:

Payment (Jan. 1 st)	M'_t (MW)	$MAX(M'_t)$ (MW)	$\left(1 - \frac{M'_t}{MAX(M'_t)} \right)$	Rental Fee for Entire Area	Payment Amount
2014	0	1,000	1.0	\$300,000	\$300,000
...
2021	0		1.0		\$300,000
2022	500		0.5		\$150,000
2023	500		0.5		\$150,000
2024	500		0.5		\$150,000
2025	800		0.2		\$60,000
2026	800		0.2		\$60,000
2027	800		0.2		\$60,000
2028	1,000		0.0		\$0

In the event a revised COP is approved by BOEM with an alternative installation schedule that differs from the previously-approved COP, the Lessee must make subsequent payments based on the revised installation schedule. In addition, the Lessee must make a payment equal to the sum of any incremental annual rent payments that would have been due at the Lease Anniversary of prior years based on the differences between the Initial Installation Schedules specified in the previously-approved COP and the revised COP, plus interest on the annual balances, in accordance with 30 CFR 1218.54.

Consider an example whereby the initial COP specified an installation schedule with all 1,000 MW online at the COD, i.e., M'_t is 1,000 MW at COD. The following table demonstrates how the back rent payments would be calculated if the project was initially scheduled as a single phase, but then later determined to be the three-phase project as shown in the previous example in a revised COP approved prior to the payment due on January 1, 2023.

Payment (Jan. 1 st)	Initial M'_t (MW)	Revised M'_t (MW)	Single-Phase Payment Amount	Three-Phase Payment Amount	Back Rent Payment Amount	Subsequent Rent Payment Amount
2014	0	0	\$300,000	\$300,000	\$0	\$0
...
2021	0	0	\$300,000	\$300,000	\$0	\$0
2022	1,000	500	\$0	\$150,000	\$150,000	\$0
2023	1,000	500	\$0	\$150,000	\$0	\$150,000
2024	1,000	500	\$0	\$150,000	\$0	\$150,000
2025	1,000	800	\$0	\$60,000	\$0	\$60,000
2026	1,000	800	\$0	\$60,000	\$0	\$60,000
2027	1,000	800	\$0	\$60,000	\$0	\$60,000
2028	1,000	1,000	\$0	0	\$0	\$0

The last rent payment prior to Commercial Operations being authorized on the entire lease area, i.e., the year in which the value of S_t is equal to zero, or prior to the lease End Date, in the event that the lease terminates prior to Commercial Operations being authorized on the entire lease area, will represent the final rent payment, unless a revised COP identifying an alternative maximum initial capacity is approved by BOEM. All rent payments, including the last rent payment, are payable for the full year and will not be prorated to the COD or other installation milestones. The COD is equivalent to the authorization date for the first phase of development on the lease, to be updated based on the initial or revised approved COP documentation. The schedule of rent payments on the lease is defined in Addendum "E". All rent payments must be made as required in 30 CFR 1218.51. Late rent payments will be charged interest in accordance with 30 CFR 1218.54.

(1) Project Easement.

Rent for any project easement(s) is described in Addendum "D".

(2) Relinquishment.

If the Lessee submits an application for relinquishment of a portion of the leased area within the first 45 calendar days following the date that the lease is received by the Lessee for execution, and the Lessor approves that application, no rent payment will be due on that relinquished portion of the leased area. Later relinquishments of any leased area will reduce the Lessee's rent payments due the year following the Lessor's approval of the

relinquishment, through a reduction in the Acres in Leased Area, the corresponding Rental Fee for the Entire Leased Area, and any related Adjusted Annual Rent Payments.

(b) **Operating Fee.** The Lessee must pay an operating fee as described below:

(1) Initial Operating Fee Payment.

The Lessee must pay an initial prorated operating fee within 45 calendar days after the COD. The initial operating fee payment covers the first year of Commercial Operations on the lease and will be calculated in accordance with the following subsection (4), using an operating fee rate of 0.02 and a capacity factor of 0.4.

(2) Annual Operating Fee Payments.

The Lessee must pay the operating fee for each subsequent year of Commercial Operations on or before each Lease Anniversary following the formula in subsection (4). The Lessee must calculate each operating fee annually subsequent to the initial operating fee payment using an operating fee rate of 0.02 through the twenty-five year operations term of the lease. The capacity factor of 0.4 will remain in effect until the Lease Anniversary of the year in which the Lessor adjusts the capacity factor.

(3) Final Operating Fee Payment.

The final operating fee payment is due on the Lease Anniversary prior to the End Date. The final operating fee payment covers the last year of Commercial Operations on the lease and will be calculated in accordance with the formula in subsection (4) as follows.

(4) The formula for calculating the operating fee in year *t*.

F_t	=	M_t	*	H	*	C_p	*	P_t	*	r_t
(annual operating fee)		(nameplate capacity)		(hours per year)		(capacity factor)		(power price)		(operating fee rate)

Where:

t =	the year of Commercial Operations on the lease starting from each Lease Anniversary, where t equals 1 represents the year beginning on the Lease Anniversary prior to, or on, the COD.
F_t =	the dollar amount of the annual operating fee in year t .
M_t =	the nameplate capacity expressed in megawatts (MW) rounded to the nearest second decimal place in year t of Commercial Operations on the lease. The value of M_t , reflecting the availability of turbines, will be determined based on the COP. This value will be adjusted to reflect any modifications to the COP approved by BOEM as of the date each operating fee payment is due, in accordance with the calculation in Equation 1, for each year of Commercial Operations on the lease.

$$(1) M_t = \sum_{w=1}^{W_t} \left(N_w * \left[\frac{\left(\sum_{d=1}^D E_{w,t,d} \right)}{D} \right] \right)$$

Where:

W_t = Number of individual wind generation turbines, w , that will be available for Commercial Operations during any day of the year, t , per the COP.

N_w = Nameplate capacity of individual wind generation turbine, w , per the COP expressed in MW.

$E_{w,t,d}$ = Indicates whether individual wind generation turbine, w , will be available for Commercial Operations on day d of year t . The value is set to 1 for any day in year t for which the condition is true, i.e., the wind turbine will be available for Commercial Operations, and zero for any day in year t for which the condition is false, i.e., the wind turbine will not be available for Commercial Operations. The month of February is always assumed to have 28 days for purposes of this calculation, where March 1st will be counted as the first day of Commercial Operations if Commercial Operations commence on February 29th of a leap year.

D = Days in the year set equal to 365 in all years for purposes of this calculation.

M_t may be reduced only in the event that installed capacity is permanently decommissioned per the COP. M_t will not be changed in response to routine or unplanned maintenance of units, including the temporary removal of a nacelle for off-site repair or replacement with a similar unit.

EXAMPLE: Assume that the Lease Anniversary is January 1st, the COD is July 1, 2018, that the facility will ultimately have 100 individual wind generation turbines with a nameplate capacity of 5.0 MW each, and that the COP specifies the following, cumulative installation schedule for wind turbines to become available for Commercial Operations:

- July 1, 2018 (COD): 20 turbines (20 new units);
- October 1, 2018: 45 turbines (25 new units);
- January 1, 2019: 50 turbines (5 new units);
- July 1, 2019: 65 turbines (15 new units);
- January 1, 2020: 95 turbines (30 new units);
- February 29, 2020: 100 turbines (5 new units).

Further assume that the COP calls for 50 of the turbines to be decommissioned after September 30, 2039 ($t = 22$), and that the remaining turbines are decommissioned at

the End Date of March 15, 2040 ($t = 23$).

The value of M_t would be estimated as demonstrated in Table 1a for each year of Commercial Operations on the lease in this example.

Table 1a: Example of M_t Calculations for Installation and Decommissioning

t	Turbines	MW	Commercial Operations Period	Comm. Ops. Days	Days in Year	Share of Days	MW	M_t
1	20	100	Jul. 1 st to Dec. 31 st	184	365	50.41%	50.41	81.92
	25	125	Oct. 1 st to Dec. 31 st	92		25.21%	31.51	
2	50	250	Jan. 1 st to Dec. 31 st	365		100.00%	250.00	287.81
	15	75	Jul. 1 st to Dec. 31 st	184		50.41%	37.81	
3	95	475	Jan. 1 st to Dec. 31 st	365		100.00%	475.00	495.96
	5	25	Mar. 1 st to Dec. 31 st	306		83.84%	20.96	
4	100	500	Jan. 1 st to Dec. 31 st	365		100.00%	500.00	500.00
...
21	100	500	Jan. 1 st to Dec. 31 st	365		100.00%	500.00	500.00
22	50	250	Jan. 1 st to Dec. 31 st	365		100.00%	250.00	436.98
	50	250	Jan. 1 st to Sep. 30 th	273		74.79%	186.98	
23	50	250	Jan. 1 st to Mar. 15 th	74	20.27%	50.68	50.68	

To illustrate the impact of decommissioning a portion of the individual wind generation turbines and replacing them with units of greater capacity on the calculation of M_t , assume that at the end of March 31, 2022, 10 units are to be made unavailable due to decommissioning, and that the incremental units have a capacity of 7.0 MW and are expected to be made available for Commercial Operations on September 15, 2022. The impact on M_t in 2022 and in subsequent years starting in 2023 and continuing until decommissioning is illustrated in Table 1b.

Table 1b: Example of M_t Calculations for Repowering

t	Turbines	MW	Commercial Operations Period	Comm. Ops. Days	Days in Year	Share of Days	MW	M_t
5	90 (5.0)	450	Jan. 1 st to Dec. 31 st	365	365	100.00%	450.00	483.04
	10 (5.0)	50	Jan. 1 st to Mar. 31 st	90		24.66%	12.33	
	10 (7.0)	70	Sep. 15 th to Dec. 31 st	108		29.59%	20.71	
6	90 (5.0)	450	Jan. 1 st to Dec. 31 st	365		100.00%	450.00	520.00
	10 (7.0)	70	Jan. 1 st to Dec. 31 st	365		100.00%	70.00	

$H =$ the number of hours in the year for billing purposes which is equal to 8,760 for all years of Commercial Operations on the lease.

$c_p =$ the “Capacity Factor” in Performance Period p , which represents the share of anticipated generation of the facility that is delivered to where the Lessee’s facility interconnects with the electric grid (i.e. the Delivery Point) relative to its generation at continuous full power operation at the nameplate capacity, expressed as a decimal between zero and one.

The initial Capacity Factor (C_0) will be set to 0.4.

The Capacity Factor will be subject to adjustment at the end of each Performance Period. After the sixth year of Commercial Operations on the lease has concluded, the Lessee will utilize data gathered from years two through six of Commercial Operations on the lease and propose a revised Capacity Factor to be used to calculate subsequent annual payments, as provided for in Table 2 below. A similar process will be conducted at the conclusion of each five-year Performance Period, thereafter.

Table 2: Definition of Performance Periods

Performance Period (<i>p</i>)	Commercial Operation Years (<i>t</i>)	Payments Affected by Adjustment	Capacity Factor (<i>c</i>)	Date End Year (<i>n</i>)
0 (COD)	Not Applicable	Payments 1 to 7	$c_0=0.4$	--
1	$t = 2$ to 6	Payments 8 to 12	c_1	$n_1=6$
2	$t = 7$ to 11	Payments 13 to 17	c_2	$n_2=11$
3	$t = 12$ to 16	Payments 18 to 22	c_3	$n_3=16$
4	$t = 17$ to 21	Payments 23 to End Date	c_4	$n_4=21$

Adjustments to the Capacity Factor

The Actual 5-year Average Capacity Factor (X_p) is calculated for each Performance Period after COD ($p > 0$) per Equation 2 below. X_p represents the sum of actual, metered electricity generation in megawatt-hours (MWh) at the Delivery Point to the electric grid (A_t) divided by the amount of electricity generation in MWh that would have been produced if the facility operated continuously at its full, stated capacity (M_t) in all of the hours (h_t) in each year, t , of the corresponding five-year period.

$$(2) X_p = \frac{\sum_{t=n-4}^n A_t}{\left(\sum_{t=n-4}^n M_t * h_t \right)}$$

Where:

M_t = Nameplate Capacity as defined above.

n = “Date End Year” value for the Performance Period, p , as defined in Table 2.

p = Performance Period as defined in Table 2.

A_t = Actual generation in MWh associated with each year of Commercial Operations, t , on the lease that is transferred at the Delivery Point; Delivery Point meter data supporting the values submitted for annual actual generation must be recorded, preserved, and timely provided to the Lessor upon request. In the event the Lessor requires the assistance of the Lessee in obtaining information useful in verifying such information, for example by waiving confidentiality with respect to data held by a third party, such assistance must be timely provided.

h_t = Hours in the year on which the Actual Generation associated with each year of

	<p>Commercial Operations, t, on the lease is based; this definition of “hours in the year” differs from the definition of H in the operating fee equation above. The hours in the year for purposes of calculating the capacity factor must take into account the actual number of hours, including those in leap years.</p> <p>The value of the Capacity Factor at the outset of Commercial Operations ($p = 0$) is set to 0.4 as stated in equation 3:</p> <p>(3) $c_0 = 0.4$</p> <p>The value of the Capacity Factor corresponding to each Performance Period (c_p) is set according to equations 4A, 4B, and 4C as follows for each value of p greater than zero. The Capacity Factor is set equal to the Actual 5-Year Average Capacity Factor provided that the value falls within a range of plus or minus 10 percent of the previous Performance Period’s capacity factor.</p> <p>(4A) $c_p = X_p$ for $c_{p-1} * 0.90 \leq X_p \leq c_{p-1} * 1.10$</p> <p>(4B) $c_p = c_{p-1} * 0.90$ for $X_p < c_{p-1} * 0.90$</p> <p>(4C) $c_p = c_{p-1} * 1.10$ for $X_p > c_{p-1} * 1.10$</p> <p>All values for c_p must be rounded to the nearest third decimal place.</p>
<p>$P_t =$</p>	<p>a measure of the annual average wholesale electric power price expressed in dollars per MW hour.</p> <p>The Lessee must calculate P_t at the time each operating fee payment is due, subject to approval by the Lessor. The Base Price (P_b) must equal the weighted average of the peak and off-peak spot price indices for the PJM West power market for the most recent year of data available as reported by the Federal Energy Regulatory Commission (FERC) as part of its annual <u>State of the Markets Report</u> with specific reference to the summary entitled “Electric Market Overview: Regional Spot Prices.” The latest version of this report is available at http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-3yr-regional-elec-pr.pdf. If FERC stops publishing its annual <u>State of the Markets Report</u> required for this calculation or the specified location of the data changes over time, the Lessor must specify an alternate source of data and methodology that is approximately equivalent.</p> <p>The peak and off-peak price indices must be weighted 52.0% and 48.0%, respectively, for purposes of estimating the weighted index value for the Base Price. For example, in the March 12, 2012 State of the Markets Report the peak price index for 2011 was \$51.99/MWh and the corresponding off-peak price index for 2011 was \$33.94/MWh, resulting in a weighted index value for the Base Price for 2011 (P_{2011}) of \$43.33/MWh ($=52.0\% * \\$51.99 / \text{MWh} + 48.0\% * \\$33.94 / \text{MWh}$). The calculation of P_b must be rounded up to the nearest, second decimal place.</p>

The Base Price must be adjusted for inflation from the year associated with the published spot prices to the year in which the operating fee is to be paid as shown in equations (5A) and (5B):

$$(5A) P_t = P_b * \left(\frac{GDP_g}{GDP_{g-1}} \right)^{y-g} * \left(\frac{GDP_g}{GDP_b} \right) \text{ for } g \geq b$$

$$(5B) P_t = P_b * \left(\frac{GDP_g}{GDP_{g-1}} \right)^{y-b} \text{ for } g < b$$

Where:

GDP = Annual Implicit Price Deflators for Gross Domestic Product (GDP deflator index) from Table 1.1.9, line 1, in the Survey of Current Business published by the U.S. Bureau of Economic Analysis (BEA) in the specified period; the latest version of this data is currently available at:

<http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1>

If BEA stops publishing the data required for this calculation, or the specified location of the data changes over time, the Lessor will specify an alternative source of data and methodology that it considers approximately equivalent.

b = The most recent year for which FERC reports the appropriate electricity spot price data expressed as the year, e.g., 2009, as in the illustrative example below.

g = The most recent year for which GDP deflator indices are available from BEA expressed as the year, e.g., 2011, as in the illustrative example below.

y = The year the annual payment is due expressed as the year corresponding to the value of *t* described above, e.g., 2013, as in the illustrative example below.

The second term on the right-hand side of equation (5A) represents a projected annual change in the index of inflation employing the last year of data available from BEA, while the third term represents the cumulative change in the index of inflation up to the previous year.

Example:

The following hypothetical example is provided to illustrate the methodology using Equation (5A) and the illustrative values provided for *b*, *g*, and *y* above, applied to historical GDP deflator data. If the actual FERC price indices are based on 2009 data and the GDP deflator indices are available for 2011, the inflation-adjusted price index value would be determined from equation (5A) as follows for a payment occurring in

$r_t =$	<p>$y = 2013:$</p> $P_{t(2013)} = P_{2009} * \left(\frac{GDP_{2011}}{GDP_{2010}} \right)^{2013-2011} * \left(\frac{GDP_{2011}}{GDP_{2009}} \right) = \frac{\$40.69}{\text{MWh}} * \left(\frac{113.361}{110.992} \right)^2 * \left(\frac{113.361}{109.729} \right) = \frac{\$43.85}{\text{MWh}}$ <p>Note: The current GDP deflator index is 113.361 for 2011, 110.992 for 2010, and 109.729 for 2009 (last revised by BEA on April 27, 2012); the FERC index price for the year 2009 is \$38.40/MWh (On-peak: \$44.60/MWh; Off-peak: \$31.68/MWh; last revised March 12, 2012). Although 2011 FERC prices are available, the 2009 prices are used in the example to illustrate the concept.</p> <p>The Lessor and the Lessee will use the latest FERC price indices and revised BEA GDP deflator index values at the time the pricing adjustments are made. The source of data used in the calculations must be noted in the Lessee's documentation supporting their estimate of the value of P_t each year for review and approval by the Lessor.</p>
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(c) **Reporting, Validation, Audits, and Late Payments.**

The Lessee must submit the values used in the operating fee formula to the Lessor at the time the annual payment based on these values is made. Submission of this and other reporting, validation, audit and late payment information as requested by the Lessor must be sent to the Lessor using the contact information indicated in Addendum "A", unless the Lessor directs otherwise. Failure to submit the estimated values and the associated documentation on time to the Lessor may result in penalties as specified in applicable regulations.

Within 60 days of the submission by the Lessee of the annual payment, the Lessor will review the data submitted and validate that the operating fee formula was applied correctly. If the Lessor validation results in a different operating fee amount, the amount of the annual operating fee payment will be revised to the amount determined by the Lessor.

The Lessor also reserves the right to audit the meter data upon which the Actual 5-year Average Capacity Factor is based at any time during the lease term. If, as a result of such audit, the Lessor determines that any annual operating fee payment was calculated incorrectly, the Lessor has the right to correct any errors and collect the correct annual operating fee payment amount.

If the annual operating fee is revised downward as a result of the Lessee's calculations, as validated by the Lessor, or an audit of meter data conducted by the Lessee or Lessor, the Lessee will be refunded the difference between the amount of the payment received and

the amount of the revised annual operating fee, without interest. Similarly, if the payment amount is revised upward, the Lessee is required to pay the difference between the amount of the payment received and the amount of the revised annual operating fee, plus interest on the balance, in accordance with 30 CFR § 1218.54.

Late operating fee payments will be charged interest in accordance with 30 CFR § 1218.54.

III. Financial Assurance

The Lessor will base the determination for the amounts of all SAP, COP, and decommissioning financial assurance requirements on estimates of the cost to meet all accrued lease obligations. The Lessor determines the amount of supplemental and decommissioning financial assurance requirements on a case-by-case basis. The amount of financial assurance required to meet all lease obligations includes:

(a) **Initial Financial Assurance.** Prior to the Lease Issuance date and in accordance with 30 CFR 585.515, the Lessee must provide an initial lease-specific bond, or other approved means of meeting the Lessor's initial financial assurance requirements in an amount equal to \$100,000.

(b) **Additional Financial Assurance.** In addition to the initial lease-specific financial assurance previously discussed and as set forth in 30 CFR 585.516-.517, the Lessee is also required to provide additional supplemental bonds associated with the SAP and COP, or other form of financial assurances and a decommissioning bond or other approved means of meeting the Lessee's decommissioning obligations.

(1) Prior to the Lessor's approval of a SAP, the Lessor will require an additional supplemental bond or other form of financial assurance in an amount determined by the Lessor based on the complexity, number, and location of all facilities involved in the site assessment activities planned in the SAP, and estimates of the costs to meet all accrued obligations, in accordance with applicable BOEM regulations (30 CFR 585.515-537). The supplemental financial assurance requirement is in addition to the initial lease-specific financial assurance in the amount of \$100,000. The Lessee may meet these obligations by providing a new bond or other acceptable form of financial assurance, or increasing the amount of its existing bond or other form of financial assurance.

(2) Prior to the Lessor's approval of a COP, the Lessor may require an additional supplemental bond or other form of financial assurance in an amount determined by the Lessor based on the complexity, number, location of all facilities, activities and Commercial Operations planned in the COP, and estimates of the costs to meet all accrued obligations, in accordance with applicable BOEM regulations (30 CFR 585.515-537). The supplemental financial assurance requirement is in addition to the initial lease-specific financial assurance in the amount of \$100,000, and any additional supplemental bond or other form of financial assurance required

with the SAP. The Lessee may meet these obligations by providing a new bond or other acceptable form of financial assurance, or increasing the amount of its existing bond or other form of financial assurance.

(3) The Lessor will require a decommissioning bond or other form of financial assurance based on the anticipated decommissioning costs in accordance with applicable BOEM regulations (30 CFR 585.515-537). The decommissioning obligation must be guaranteed through an acceptable form of financial assurance and will be due on a schedule to be approved by BOEM in accordance with the number of facilities installed or being installed.

(c) **Adjustments to Financial Assurance Amounts.** The Lessor reserves the right to adjust the amount of any financial assurance requirement (initial, supplemental or decommissioning) associated with this lease and/or reassess the Lessee's cumulative lease obligations, including decommissioning obligations, at any time. If the Lessee's cumulative lease obligations and/or liabilities increase or decrease, the Lessor will notify the Lessee of any intended adjustment to the financial assurance requirements and provide the Lessee an opportunity to comment in accordance with applicable BOEM regulations.

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

ADDENDUM “C”

LEASE-SPECIFIC TERMS, CONDITIONS, AND STIPULATIONS

Lease Number OCS-A 0499

The Lessee’s rights to conduct activities on the leased area are subject to the following terms, conditions, and stipulations. The Lessor reserves the right to impose additional terms, and conditions incident to the future approval or approval with modifications of plans, such as a Site Assessment Plan (SAP) or Construction and Operations Plan (COP).

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1 DEFINITIONS

- 1.1 Definition of “Archaeological Resource”: The term “archaeological resource” has the same meaning as “archaeological resource” in BOEM regulations provided in 30 CFR 585.112.
- 1.2 Definition of “Dynamic Management Area (DMA)”: The term “DMA” refers to a temporary area designated by the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and a circle around a confirmed North Atlantic right whale sighting. The radius of this circle expands incrementally with the number of whales sighted, and a buffer is included beyond the core area, as designated by NMFS, to allow for whale movement. NOAA NMFS may apply mandatory or voluntary speed restrictions. Information regarding the location and status of applicable DMAs is available from the NMFS Office of Protected Resources.
- 1.3 Definition of “Effective Date”: The term “Effective Date” has the same meaning as “effective date” in BOEM regulations provided in 30 CFR 585.237.
- 1.4 Definition of “Geological and Geophysical Survey (G&G Survey)”: The term “G&G Survey” serves as a collective term for surveys that collect data on the geology of the seafloor and landforms below the seafloor. High resolution geophysical surveys and geotechnical (sub-bottom) exploration are components of G&G surveys.
- 1.5 Definition of “Geotechnical Exploration”: The term “Geotechnical Exploration” is used to refer to the process by which site-specific sediment and underlying geologic data are acquired from the seafloor and the sub-bottom and includes geotechnical surveys utilizing borings, vibracores, and cone penetration tests.
- 1.6 Definition of “High Resolution Geophysical Survey (HRG Survey)”: The term “HRG Survey” means a marine remote-sensing survey using, but not limited to, such equipment as side-scan sonar, magnetometer, shallow and medium (seismic) penetration sub-bottom profiler systems, narrow beam or multibeam echo sounder, or other such equipment employed for the purposes of providing data on geological conditions, identifying shallow hazards, identifying archaeological resources, charting bathymetry, and gathering other site characterization information.
- 1.7 Definition of “Listed Species”: The term “listed species,” also referred to in adjective form as “listed,” means any species of fish, wildlife, or plant that has been determined to be endangered or threatened under Section 4 of the Endangered Species Act. Listed species are provided in 50 CFR 17.11-17.12.
- 1.8 Definition of “Plan”: The term “plan” means a Site Assessment Plan (SAP) and/or a Construction and Operations Plan (COP).

- 1.9 Definition of “Protected-Species Observer”: The term “protected-species observer,” or “observer,” means an individual who is trained in the shipboard identification and behavior of protected species. Protected species include marine mammals (those protected under the Endangered Species Act and those protected under the Marine Mammal Protection Act) and sea turtles.
- 1.10 Definition of “Ramp-up”: The term “ramp-up” means the process of incrementally increasing the acoustic source level of the survey equipment when conducting HRG surveys until it reaches the operational setting.
- 1.11 Definition of “Site Assessment Activities”: The term “site assessment activities” or “site assessment,” has the same meaning as “site assessment activities” in 30 CFR 585.112.
- 1.12 Definition of “Qualified Marine Archaeologist”: The term “qualified marine archaeologist” means a person retained by the Lessee who meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology (48 FR 44738-44739), and has experience analyzing marine geophysical data.
- 1.13 Definition of “Take”: The terms “Takes,” “Taken,” and “Taking” have the same meaning as the term “take” as defined in 16 U.S.C. § 1532(19).

2 SCHEDULE

2.1 Site Characterization

2.1.1 Survey Plan(s).

- 2.1.1.1 SAP Survey Plan. If the Lessee proposes to conduct site assessment activities during the site assessment term, then the Lessee must submit to the Lessor a complete SAP survey plan. This SAP survey plan must include details and timelines of the surveys to be conducted on this lease necessary to support the submission of a SAP (i.e., necessary to satisfy the information requirements in the applicable regulations, including but not limited to 30 CFR 585.606, 610, 611).

The Lessee must submit the SAP survey plan to the Lessor at least 30 calendar days prior to the date of the required pre-survey meeting with the Lessor (See 2.1.2). The Lessor may require that the Lessee modify the SAP survey plan to address any comments the Lessor submits to the Lessee on the contents of the SAP survey plan in a manner deemed satisfactory to the Lessor prior to the commencement of any survey activities described in the SAP survey plan.

- 2.1.1.2 COP Survey Plan. The Lessee must submit to the Lessor a complete COP survey plan providing details and timelines of the surveys to be conducted on this lease that are necessary to support the submission of a COP (i.e., necessary to satisfy the information requirements in the applicable regulations, including but not limited to 30 CFR 585.621, 626, 627). The Lessee must submit the COP survey plan to the Lessor at least 30 calendar days prior to the date of the pre-survey meeting with the Lessor (see 2.1.2). The Lessee must modify the COP survey plan to address any comments the Lessor submits to the Lessee on the contents of the COP survey plan in a manner deemed satisfactory to the Lessor prior to the commencement of these survey activities.
- 2.1.2 Pre-Survey Meeting(s) with the Lessor. At least 60 days prior to the initiation of survey activities in support of the submission of a plan (i.e., SAP and/or COP), the Lessee must hold a pre-survey meeting with the Lessor to discuss the applicable proposed survey plan and timelines. The Lessee must ensure the presence at this meeting of a Qualified Marine Archaeologist (see 4.2.2). The Lessor may request the presence of other relevant subject matter experts at this meeting.

2.2 Progress Reporting

- 2.2.1 Semi-Annual Progress Report. The Lessee must submit to the Lessor a semi-annual (i.e., every six months) progress report through the duration of the site assessment term that includes a brief narrative of the overall progress since the last progress report, or – in the case of the first report – since the Effective Date. The progress report must include an update regarding progress in executing the activities included in the survey plan(s), and include as an enclosure an updated survey plan(s) accounting for any modifications in schedule.

3 NATIONAL SECURITY AND MILITARY OPERATIONS

The Lessee must comply with the requirements specified in stipulations 3.1, 3.2, and 3.3 when conducting site characterization activities in support of plan submittal.

3.1 Hold and Save Harmless

The Lessee assumes all risks of damage or injury to persons or property that occurs in, on, or above the OCS, to any persons or to any property of any person or persons in connection with any activities being performed by the Lessee in, on, or above the OCS, if such injury or damage to such person or property occurs by reason of the activities of any agency of the United States Government, its contractors, or subcontractors, or any of its officers, agents or employees, being conducted as a part of, or in connection with, the programs or activities of the individual military command headquarters (hereinafter “the appropriate command headquarters”) listed in the contact information provided as an Enclosure to this lease, whether compensation for such damage or injury might be due under a theory of strict or absolute liability or otherwise.

Notwithstanding any limitation of the Lessee's liability in Section 9 of the lease, the Lessee assumes this risk whether such injury or damage is caused in whole or in part by any act or omission, regardless of negligence or fault, of the United States, its contractors or subcontractors, or any of its officers, agents, or employees. The Lessee further agrees to indemnify and save harmless the United States against all claims for loss, damage, or injury in connection with the programs or activities of the command headquarters, whether the same be caused in whole or in part by the negligence or fault of the United States, its contractors, or subcontractors, or any of its officers, agents, or employees and whether such claims might be sustained under a theory of strict or absolute liability or otherwise.

3.2 Evacuation or Suspension of Activities

3.2.1 General. The Lessee hereby recognizes and agrees that the United States reserves and has the right to temporarily suspend operations and/or require evacuation on this lease in the interest of national security pursuant to Section 3(c) of this lease.

3.2.2 Notification. Every effort will be made by the appropriate military agency to provide as much advance notice as possible of the need to suspend operations and/or evacuate. Advance notice will normally be given before requiring a suspension or evacuation. Temporary suspension of operations may include but is not limited to the evacuation of personnel and appropriate sheltering of personnel not evacuated.

“Appropriate sheltering” means the protection of all Lessee personnel for the entire duration of any Department of Defense activity from flying or falling objects or substances, and will be implemented by an order (oral and/or written) from the BOEM Office of Renewable Energy Programs (OREP) Program Manager, after consultation with the appropriate command headquarters or other appropriate military agency or higher Federal authority. The appropriate command headquarters, military agency or higher authority will provide information to allow the Lessee to assess the degree of risk to, and provide sufficient protection for, the Lessee's personnel and property.

3.2.3 Duration. Suspensions or evacuations for national security reasons will not generally exceed 72 hours; however, any such suspension may be extended by order of the OREP Program Manager. During such periods, equipment may remain in place, but all operations, if any, must cease for the duration of the temporary suspension if so directed by the OREP Program Manager. Upon cessation of any temporary suspension, the OREP Program Manager will immediately notify the Lessee that such suspension has terminated and operations on the leased area can resume.

- 3.2.4 Lessee Point-of-Contact for Evacuation/Suspension Notifications. The Lessee must inform the Lessor of the persons/offices to be notified to implement the terms of 3.2.2 and 3.2.3.
- 3.2.5 Coordination with Command Headquarters. The Lessee must establish and maintain early contact and coordination with the appropriate command headquarters (see Contact Information for Reporting Requirements Sheet), in order to avoid or minimize the potential to conflict with and minimize the potential effects of conflicts with military operations.
- 3.2.6 Reimbursement. The Lessee is not entitled to reimbursement for any costs or expenses associated with the suspension of operations or activities or the evacuation of property or personnel in fulfillment of the military mission in accordance with 3.2.1 through 3.2.5 above.

3.3 Electromagnetic Emissions

Prior to entry into any designated defense operating area, warning area, or water test area for the purpose of commencing survey activities undertaken to support SAP or COP submittal, the Lessee must enter into an agreement with the commander of the appropriate command headquarters to coordinate the electromagnetic emissions associated with such survey activities. The Lessee must ensure that all electromagnetic emissions associated with such survey activities are controlled as directed by the commander of the appropriate command headquarters.

4 STANDARD OPERATING CONDITIONS

4.1 General Requirements

- 4.1.1 Prior to the start of operations, the Lessee must hold a briefing to establish responsibilities of each involved party, define the chains of command, discuss communication procedures, provide an overview of monitoring procedures, and review operational procedures. This briefing must include all relevant personnel, crew members and protected species observers (PSO). New personnel must be briefed as they join the work in progress.
- 4.1.2 The Lessee must ensure that all vessel operators and crew members, including PSOs, are familiar with, and understand, the requirements specified in Addendum C.
- 4.1.3 The Lessee must ensure that a copy of the standard operating conditions (Addendum C) is made available on every project-related vessel.

4.1.4 Marine Trash and Debris Prevention. The Lessee must ensure that vessel operators, employees, and contractors actively engaged in activity in support of plan (i.e., SAP and COP) submittal are briefed on marine trash and debris awareness and elimination, as described in the Bureau of Safety and Environmental Enforcement (BSEE) Notice to Lessees and Operators (NTL) No. 2012-G01 (“Marine Trash and Debris Awareness and Elimination”) or any NTL that supersedes this NTL, except that the Lessor will not require the Lessee, vessel operators, employees, and contractors to undergo formal training or post placards. The Lessee must ensure that these vessel operator employees and contractors are made aware of the environmental and socioeconomic impacts associated with marine trash and debris and their responsibilities for ensuring that trash and debris are not intentionally or accidentally discharged into the marine environment. The above-referenced NTL provides information the Lessee may use for this awareness briefing.

4.2 Vessel Strike Avoidance Measures

- 4.2.1 The Lessee must ensure that all vessels conducting activities in support of plan submittal comply with the vessel-strike avoidance measures specified in stipulations 4.2.1 through 4.2.9.1, except under extraordinary circumstances when complying with these requirements would put the safety of the vessel or crew at risk.
- 4.2.2 The Lessee must ensure that vessel operators and crews maintain a vigilant watch for cetaceans, pinnipeds, and sea turtles and slow down or stop their vessel to avoid striking these protected species.
- 4.2.3 The Lessee must ensure that all vessel operators comply with 10 knot (18.5 km/hr) speed restrictions in any Dynamic Management Area (DMA).
- 4.2.4 The Lessee must ensure that vessels 65 feet in length or greater, operating from November 1 through July 31, operate at speeds of 10 knots (18.5 km/hr) or less.
- 4.2.5 The Lessee must ensure that all vessel operators reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of non-delphinoid cetaceans are observed near an underway vessel.
- 4.2.6 North Atlantic right whales.
- 4.2.6.1 The Lessee must ensure all vessels maintain a separation distance of 500 meters (1,640 ft) or greater from any sighted North Atlantic right whale.
- 4.2.6.2 The Lessee must ensure that the following avoidance measures are taken if a vessel comes within 500 meters (1,640 ft) of any North Atlantic right whale:

- 4.2.6.2.1 If underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots (18.5 km/h) or less until the 500 meters (1,640 ft) minimum separation distance has been established (except as provided in 4.2.6.2.2).
- 4.2.6.2.2 If a North Atlantic right whale is sighted in a vessel's path, or within 100 meters (328 ft) to an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. The lessee must not engage engines until the North Atlantic right whale has moved outside the vessel's path and beyond 100 meters (328 ft), at which point the Lessee must comply with 4.2.6.2.1.
- 4.2.6.2.3 If a vessel is stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 100 meters (328 ft), at which point the Lessee must comply with 4.2.6.2.1.

4.2.7 Non-delphinoid cetaceans other than the North Atlantic right whale.

- 4.2.7.1 The Lessee must ensure all vessels maintain a separation distance of 100 meters (328 ft) or greater from any sighted non-delphinoid cetacean.
- 4.2.7.2 The Lessee must ensure that the following avoidance measures are taken if a vessel comes within 100 meters (328 ft) of any sighted non-delphinoid cetacean:
 - 4.2.7.2.1 If any non-delphinoid cetacean is sighted, the vessel underway must reduce speed and shift the engine to neutral, and must not engage the engines until the non-delphinoid cetacean has moved outside of the vessel's path and beyond 100 meters (328 ft).
 - 4.2.7.2.2 If a vessel is stationary, the vessel must not engage engines until the sighted non-delphinoid cetacean has moved out of the vessel's path and beyond 100 meters (328 ft).

4.2.8 Delphinoid cetaceans and Pinnipeds.

- 4.2.8.1 The Lessee must ensure that all vessels underway do not divert to approach any delphinoid cetacean and/or pinniped.
- 4.2.8.2 The Lessee must ensure that if a delphinoid cetacean and/or pinniped approaches any vessel underway, the vessel underway must avoid excessive speed or abrupt changes in direction to avoid injury to the delphinoid cetacean and/or pinniped.

4.2.9 Sea Turtles.

- 4.2.9.1 The Lessee must ensure all vessels maintain a separation distance of 50 meters (164 ft) or greater from any sighted sea turtle.

4.3 Archaeological Survey Requirements

- 4.3.1 Archaeological Survey Required. The Lessee must provide the results of an archaeological survey with its plans.
- 4.3.2 Qualified Marine Archaeologist. The Lessee must ensure that the analysis of archaeological survey data collected in support of plan submittal and the preparation of archaeological reports in support of plan submittal are conducted by a Qualified Marine Archaeologist.
- 4.3.3 Tribal Pre-Survey Meeting. The Lessee must invite by certified mail the Narragansett Indian Tribe, the Shinnecock Indian Nation, and the Lenape Tribe of Delaware to a tribal pre-survey meeting. The purpose of this meeting will be for the Lessee and the Lessee's Qualified Marine Archaeologist to discuss the Lessee's Survey Plan and consider requests to monitor portions of the archaeological survey and the geotechnical exploration activities, including the visual logging and analysis of geotechnical samples (*e.g.*, cores). This meeting must be held subsequent to the pre-survey meeting with the Lessor (see 2.1.2). Invitation to the tribal pre-survey meeting must be made at least 15 calendar days prior to the date of the proposed tribal pre-survey meeting. The meeting must be scheduled for a date at least 30 calendar days prior to the commencement of survey activities performed in support of a plan and at a location and time that affords the participants a reasonable opportunity to participate. The anticipated date for the meeting must be identified in the timeline of activities described in the applicable survey plan (see 2.1.1).
- 4.3.4 Geotechnical Exploration.
- 4.3.4.1 The Lessee may only conduct geotechnical exploration activities in support of plan submittal in locations where an analysis of the results of geophysical surveys has been completed. This analysis must include a determination by a Qualified Marine Archaeologist as to whether any potential archaeological resources are present in the area.
- 4.3.4.2 Except as allowed by the Lessor under 4.3.6, the geotechnical exploration activities must avoid potential archaeological resources by a minimum of 50 meters, and the Qualified Marine Archaeologist must calculate the avoidance distance from the maximum discernible extent of the archaeological resource.
- 4.3.4.3 Upon completion of geotechnical exploration activities, a Qualified Marine Archaeologist must certify, in the Lessee's archaeological reports, that such activities did not impact potential historic properties identified as a result of the HRG surveys performed in support of plan submittal, except as follows: in the event that the geotechnical exploration activities did impact potential historic properties identified in the archaeological surveys without the Lessor's prior approval, the Lessee and the Qualified Marine Archaeologist who prepared the report must instead provide a statement documenting the extent of these impacts.

- 4.3.5 Monitoring and Avoidance. The Lessee must inform the Qualified Marine Archaeologist that he or she is permitted to be present during HRG surveys and bottom-disturbing activities performed in support of plan submittal to ensure avoidance of potential archaeological resources, as determined by the Qualified Marine Archaeologist (including bathymetric, seismic, and magnetic anomalies; side scan sonar contacts; and other seafloor or sub-surface features that exhibit potential to represent or contain potential archaeological sites or other historic properties). In the event that the Qualified Marine Archaeologist indicates that he or she wishes to be present, the Lessee must facilitate the Qualified Marine Archaeologist's presence, as requested by the Qualified Marine Archaeologist, and provide the Qualified Marine Archaeologist the opportunity to inspect data quality.
- 4.3.6 No Impact without Approval. The Lessee must not knowingly impact a potential archaeological resource without the Lessor's prior approval.
- 4.3.7 Post-Review Discovery Clauses. If the Lessee, while conducting site characterization activities in support of plan submittal, discovers a potential archaeological resource, such as the presence of a shipwreck (*e.g.*, a sonar image or visual confirmation of an iron, steel, or wooden hull, wooden timbers, anchors, concentrations of historic objects, piles of ballast rock), prehistoric artifacts, or relict landforms within the project area, the Lessee must:
- 4.3.7.1 Immediately halt seafloor/bottom-disturbing activities within the area of discovery;
 - 4.3.7.2 Notify the Lessor within 24 hours of discovery;
 - 4.3.7.3 Notify the Lessor in writing via report to the Lessor within 72 hours of its discovery;
 - 4.3.7.4 Keep the location of the discovery confidential and take no action that may adversely affect the archaeological resource until the Lessor conducts an evaluation and instructs the applicant on how to proceed; and
 - 4.3.7.5 Conduct any additional investigations as directed by the Lessor to determine if the resource is eligible for listing in the National Register of Historic Places (30 CFR 585.802(b)). The Lessor will direct the Lessee to conduct such investigations if: (1) the site has been impacted by the Lessee's project activities; or (2) impacts to the site or to the area of potential effect cannot be avoided. If investigations indicate that the resource is potentially eligible for listing in the National Register of Historic Places, the Lessor will tell the Lessee how to protect the resource or how to mitigate adverse effects to the site. If the Lessor incurs costs in protecting the resource, under Section 110(g) of the National Historic Preservation Act, the Lessor may charge the Lessee reasonable costs for carrying out preservation responsibilities under the OCS Lands Act (30 CFR 585.802(c-d)).

4.4 Geological and Geophysical (G&G) Survey Requirements

- 4.4.1 The Lessee must ensure that all vessels conducting activity in support of a plan (*i.e.*, SAP and COP) submittal comply with the geological and geophysical survey requirements specified in 4.4, except under extraordinary circumstances when complying with these requirements would put the safety of the vessel or crew at risk.
- 4.4.2 Visibility. The Lessee must not conduct G&G surveys in support of plan submittal at any time when lighting or weather conditions (*e.g.*, darkness, rain, fog, sea state) prevent visual monitoring of the high-resolution geophysical (HRG) survey exclusion zone (see 4.4.6) or the geotechnical exploration exclusion zone (see 4.4.7), except as allowed under 4.4.3.
- 4.4.3 Modification of Visibility Requirement. If the Lessee intends to conduct G&G survey operations in support of plan submittal at night or when visual observation is otherwise impaired, it must submit to the Lessor an alternative monitoring plan detailing the alternative monitoring methodology (*e.g.*, active or passive acoustic monitoring technologies). The alternative monitoring plan must demonstrate the effectiveness of the methodology proposed to the Lessor's satisfaction. The Lessor may, after consultation with National Marine Fisheries Service (NMFS), decide to allow the Lessee to conduct G&G surveys in support of plan submittal at night or when visual observation is otherwise impaired using the proposed alternative monitoring methodology.
- 4.4.4 Protected-Species Observer. The Lessee must ensure that the exclusion zone for all G&G surveys performed in support of plan submittal is monitored by NMFS-approved protected species observers around the sound source. The number of protected species observers must be sufficient to effectively monitor the exclusion zone at all times. In order to ensure effective monitoring, observers must be on watch for no more than 4 consecutive hours, with at least a 2-hour break after a 4-hour watch, unless otherwise accepted by the Lessor. Observers must be on watch for no more than 12 hours in a 24-hour period. The Lessee must provide to the Lessor a list of observers and their résumés no later than 45 calendar days prior to the scheduled start of surveys performed in support of plan submittal. The Lessee must provide the résumés of additional observers at least 15 calendar days prior to each observer's start date. The Lessor will send the observer qualifications to NMFS for approval.
- 4.4.5 Observation Location and Optical Device Availability. The Lessee must ensure that monitoring occurs from the highest available vantage point on the associated operational platform, allowing for 360-degree scanning. The Lessee must ensure that each observer has access to reticle binoculars and other suitable equipment to adequately perceive and monitor protected species within the exclusion zone during surveys conducted in support of plan submittal.

- 4.4.6 High-Resolution Geophysical (HRG) Surveys. The following stipulations are specific to HRG surveys conducted in support of plan submittal where one or more acoustic sound source is operating at frequencies below 200 kHz:
- 4.4.6.1 Establishment of Default Exclusion Zone. The Lessee must ensure that a protected species observer monitors a 200-meter default exclusion zone for cetaceans, pinnipeds, and sea turtles. In the case of the North Atlantic right whale, the Lessee must observe a minimum separation distance of 500 m (1,640 ft), as required under 4.2.6.1.
- 4.4.6.1.1 If the Lessor determines that the exclusion zone does not encompass the 180 dB Level A harassment threshold calculated for the acoustic source having the highest source level, the Lessor will consult with NMFS and may impose additional, relevant requirements on the Lessee, including, but not limited to, required expansion of this exclusion zone.
- 4.4.6.2 Field Verification of HRG Survey Exclusion Zone. The Lessee must conduct field verification of the exclusion zone for the HRG survey equipment operating below 200 kHz. As part of such field verification, the Lessee must take acoustic measurements at a minimum of two reference locations and in a manner that is sufficient to establish the following: source level (peak at 1 meter) and distance to the 207, 180, 166, 160, and 150 dB(RMS) re 1 μ Pa sound pressure level (SPL) isopleths as well as the 187 dB re 1 μ Pa cumulative sound exposure level (cSEL) and 206 dB_{peak}. The Lessee must take these sound measurements at the reference locations at two depths (i.e., a depth at mid-water and a depth at approximately 1 meter (3.28 ft) above the seafloor). The Lessee must report the field verification results to the Lessor in the SAP and COP Survey Plans, unless otherwise authorized by the Lessor.
- 4.4.6.3 Field Verification Plan for HRG Survey Exclusion Zone. No later than 45 days prior to the commencement of the field verification activities, the Lessee must submit a plan for verifying the sound source levels of any electromechanical survey equipment operating at frequencies below 200 kHz. The plan must demonstrate how the field verification activities will comply with the requirements of 4.4.6.2. Prior to the commencement of the field verification activities, the Lessor may require the Lessee to modify the plan to address any comments the Lessor submits to the Lessee on the contents of the plan in a manner deemed satisfactory to the Lessor.

- 4.4.6.4 Modification of Exclusion Zone Per Lessee Request. The Lessee may use the results from its field verification to request modification of the exclusion zone for the specific HRG survey equipment under consideration. The Lessee must base any proposed new exclusion zone radius on the largest safety zone configuration of the target Level A or Level B harassment acoustic threshold zone as defined by NMFS. The Lessee must use this modified zone for all subsequent use of field-verified equipment. The Lessee may periodically reevaluate the modified zone using the field verification procedures described in 4.4.6.2. The Lessee must obtain Lessor approval of any new exclusion zone before it is implemented.
- 4.4.6.5 Clearance of Exclusion Zone. The Lessee must ensure that active acoustic sound sources are not activated until the protected species observer has reported the exclusion zone clear of all marine mammals and sea turtles for at least 60 minutes.
- 4.4.6.6 Seasonal Management Areas (SMAs) Right Whale Monitoring. The Lessee must ensure that between November 1 and July 31, vessel operators monitor NMFS North Atlantic Right Whale reporting systems (*e.g.*, the Early Warning System, Sighting Advisory System, and Mandatory Ship Reporting System) for the presence of North Atlantic right whales during HRG survey operations.
- 4.4.6.7 Dynamic Management Area (DMA) Shutdown Requirement. The Lessee must ensure that vessels cease HRG survey activities within 24 hours of NMFS establishing a DMA in the Lessee's HRG survey area. The Lessee may resume HRG survey activities in the affected area as soon as the DMA has expired.
- 4.4.6.8 Electromechanical Survey Equipment Ramp-Up. The Lessee must ensure that, when technically feasible, a ramp-up of the electromechanical survey equipment occurs at the start or re-start of HRG survey activities. A ramp-up must begin with the power of the smallest acoustic equipment for the HRG survey at its lowest power output. The power output must be gradually increased and other acoustic sources added in such a way that the source level would rise in steps not exceeding 6 dB per 5-minute period.
- 4.4.6.9 Shutdown for Non-Delphinoid Cetaceans and Sea Turtles. If a non-delphinoid cetacean or sea turtle is sighted at or within the exclusion zone, the Lessee must immediately shut down all the electromechanical survey equipment. The Lessee must ensure that the vessel operator immediately complies with such a call by the observer. Any disagreement or discussion must occur only after shutdown. Subsequent restart of the electromechanical survey equipment must use the ramp-up provisions described in 4.4.6.8 and must only occur following clearance of the exclusion zone of all marine mammals and sea turtles for at least 60 minutes as described in 4.4.6.5.

4.4.6.10 Power Down for Delphinoid Cetaceans and Pinnipeds. If a delphinoid cetacean or pinniped is sighted at or within the exclusion zone, the Lessee must immediately power down the electromechanical survey equipment to the lowest power output that is technically feasible. The Lessee must ensure that the vessel operator immediately complies with such a call by the observer. Any disagreement or discussion must occur only after power-down. Subsequent restart of the electromechanical survey equipment must use the ramp-up procedures described in 4.4.6.8 and may occur only after (1) the exclusion zone is clear of delphinoid cetaceans and pinnipeds or (2) a determination by the protected species observer after a minimum of 10 minutes of observation that the delphinoid cetacean and/or pinniped is approaching the vessel or towed equipment at a speed and vector that indicates voluntary approach to bow-ride or chase towed equipment.

4.4.6.10.1 Pauses in Electromechanical Survey Sound Source. The Lessee must ensure that if the electromechanical sound source shuts down for reasons other than encroachment into the exclusion zone by a non-delphinoid cetacean or sea turtle, including, reasons such as, but not limited to, mechanical or electronic failure, resulting in the cessation of the sound source for a period greater than 20 minutes, restart of the electromechanical survey equipment commences only after clearance of the exclusion zone, as described in 4.4.6.5, and the implementation of ramp-up procedures, as described in 4.4.6.8. If the shutdown is less than 20 minutes, the equipment may be restarted as soon as practicable at its operational level as long as visual surveys were continued diligently throughout the silent period and the exclusion zone remained clear of marine mammals and sea turtles. If visual surveys were not continued diligently during a shutdown of 20 minutes or less, the Lessee must restart the electromechanical survey equipment following clearance of the exclusion zone, as described in 4.4.6.5, and implementation of ramp-up procedures, as described in 4.4.6.8.

4.4.7 Geotechnical (Sub-bottom) Exploration. Stipulations specific to geotechnical exploration conducted in support of plan submittal are provided in 4.4.7.1 through 4.4.7.6.

4.4.7.1 Establishment of Default Exclusion Zone. The Lessee must ensure that a protected species observer monitors a 200-meter (656 ft) default exclusion zone for all marine mammals and sea turtles around any vessel conducting geotechnical surveys.

- 4.4.7.2 Modification of Default Exclusion Zone Per Lessee Request. If the Lessee wishes to modify the 200 m (656 ft) default exclusion zone for specific geotechnical exploration equipment, the Lessee must submit a plan for verifying the sound source levels of the specific geotechnical exploration equipment to the Lessor. The plan must demonstrate how the field verification activities will comply with the requirements of 4.4.7.3. The Lessor may require that the Lessee modify the plan to address any comments the Lessor submits to the Lessee on the contents of the plan in a manner deemed satisfactory to the Lessor prior to the commencement of field verification activities. Any new exclusion zone radius proposed by the Lessee must be based on the largest safety zone configuration of the target Level A or Level B harassment acoustic threshold zone as defined by NMFS. The Lessee must use this modified zone for all subsequent use of field-verified equipment. The Lessee may periodically reevaluate the modified zone using the field verification procedures described in 4.4.7.3. The Lessee must obtain Lessor approval of any new exclusion zone before it is implemented.
- 4.4.7.3 Field Verification of Geotechnical Exclusion Zone. If the Lessee wishes to modify the existing exclusion zone, the Lessee must conduct field verification of the exclusion zone for specific geotechnical exploration equipment. The Lessee must use the results of the sound measurements from the survey equipment to establish a new exclusion zone, which may be greater than or less than the 200 m (656 ft) default exclusion zone depending on the results of the field tests. As part of such field verification, the Lessee must take acoustic measurements at a minimum of two reference locations and in a manner that is sufficient to establish the following: source level (peak at 1 meter) and distance to the 207, 180, 166, 160, and 150 dB(RMS) re 1 μ Pa sound pressure level (SPL) isopleths as well as the 187 dB re 1 μ Pa cumulative sound exposure level (cSEL) and 206 dB_{peak}. The Lessee must take these sound measurements at the reference locations at two depths (i.e., a depth at mid-water and a depth at approximately 1 meter above the seafloor).
- 4.4.7.4 Clearance of Exclusion Zone. The Lessee must ensure that the geotechnical sound source is not activated until the protected species observer has reported the exclusion zone clear of all marine mammals and sea turtles for 60 minutes.
- 4.4.7.5 Shutdown for Non-Delphinoid Cetaceans and Sea Turtles. If any non-delphinoid cetaceans or sea turtles are sighted at or within the exclusion zone, the Lessee must immediately shut down the geotechnical survey equipment. The vessel operator must comply immediately with such a call by the observer. Any disagreement or discussion should occur only after shutdown. Subsequent restart of the geotechnical survey equipment must only occur following clearance of the exclusion zone as described in 4.4.7.4.

4.4.7.6 Pauses in Geotechnical Survey Sound Source. The Lessee must ensure that if the geotechnical sound source shuts down for reasons other than encroachment into the exclusion zone by a non-delphinoid cetacean or sea turtle, including, but not limited to, mechanical or electronic failure resulting in the cessation of the sound source for a period greater than 20 minutes, restart of the geotechnical survey equipment commences only after clearance of the exclusion zone, as described in 4.4.7.4. If the shutdown is less than 20 minutes, the equipment may be restarted as soon as practicable as long the Lessee has continued visual surveys diligently throughout the silent period and the exclusion zone remained clear of marine mammals and sea turtles. If visual surveys were not continued diligently during a shutdown of 20 minutes or less, the Lessee must restart the geotechnical survey equipment following clearance of the exclusion zone, as described in 4.4.7.4.

4.5 Protected-Species Reporting Requirements

The Lessee must ensure compliance with the following reporting requirements for site characterization activities performed in support of plan submittal, and, where appropriate, must fulfill these requirements using the contact information provided as an Enclosure to this lease, or updated contact information as provided by the Lessor:

4.5.1 Reporting Injured or Dead Protected Species. The Lessee must ensure that sightings of any injured or dead protected species (*e.g.*, marine mammals, sea turtles or sturgeon) are reported to the Lessor, NMFS and the NMFS Northeast Region's Stranding Hotline (866-755-6622 or current) within 24 hours of sighting, regardless of whether the injury or death is caused by a vessel. In addition, if the injury or death was caused by a collision with a project-related vessel, the Lessee must notify the Lessor of the strike within 24 hours. The Lessee must use the form provided in Appendix A to ADDENDUM "C" to report the sighting or incident. If the Lessee's activity is responsible for the injury or death, the Lessee must ensure that the vessel assists in any salvage effort as requested by NMFS.

4.5.2 Reporting Observed Impacts to Protected Species.

4.5.2.1 The Lessee must report any observed takes of listed marine mammals, sea turtles or sturgeon (as defined in 1.13) resulting in injury or mortality within 24 hours to the Lessor and NMFS.

4.5.2.2 The Lessee must report any observations concerning any impacts on Endangered Species Act listed marine mammals, sea turtles or sturgeon to the Lessor and NMFS Northeast Region's Stranding Hotline within 48 hours.

4.5.2.3 The Lessee must record injuries or mortalities using the form provided in Appendix A to ADDENDUM "C".

- 4.5.3 Protected Species Observer Reports. The Lessee must ensure that the protected-species observer record all observations of protected species using standard marine mammal observer data collection protocols. The list of required data elements for these reports is provided in Appendix B to ADDENDUM “C”.
- 4.5.4 Reports of G&G Survey Activities and Observations. The Lessee must provide BOEM and NMFS with reports every 90 calendar days following the commencement of HRG and/or geotechnical exploration activities, and a final report at the conclusion of the HRG and/or geotechnical exploration activities. Each report must include a summary of survey activities, all protected species observer and incident reports (See Appendices A and B), a summary of the survey activities, and an estimate of the number of listed marine mammals and sea turtles observed and/or taken during these survey activities.
- 4.5.5 Marine Mammal Protection Act Authorization(s). If the Lessee is required to obtain an authorization pursuant to section 101(a)(5) of the Marine Mammal Protection Act prior to conducting survey activities, the Lessee must provide to the Lessor a copy of such authorization prior to commencing survey activities, pursuant to 30 CFR 585.801(b).

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

APPENDIX "A"

Lease Number OCS-A 0499

Incident Report: Protected Species Injury or Mortality

Photographs/Video should be taken of all injured or dead animals.

Observer's full name: _____

Reporter's full name: _____

Species Identification: _____

Name and type of platform: _____

Date animal observed: _____ Time animal observed: _____

Date animal collected: _____ Time animal collected: _____

Environmental conditions at time of observation (i.e. tidal stage, Beaufort Sea State, weather):

Water temperature (°C) and depth (m/ft) at site: _____

Describe location of animal and events 24 hours leading up to, including and after, the incident (incl. vessel speeds, vessel activity and status of all sound source use):

Photograph/Video taken: YES / NO If Yes, was the data provided to NMFS? YES / NO
(Please label *species, date, geographic site* and *vessel name* when transmitting photo and/or video)

Date and Time reported to NMFS Stranding Hotline: _____

Sturgeon Information: *(please designate cm/m or inches and kg or lbs)*

Species: _____

Fork length (or total length): _____ Weight: _____

Condition of specimen/description of animal: _____

Fish Decomposed: NO SLIGHTLY MODERATELY SEVERELY

Fish tagged: YES / NO If Yes, please record all tag numbers.

Tag #(s): _____

Genetic samples collected: YES / NO

Genetics samples transmitted to: _____ on ____/____/20....

Sea Turtle Species Information: (please designate cm/m or inches)

Species: _____ Weight (kg or lbs): _____

Sex: Male Female Unknown

How was sex determined?: _____

Straight carapace length: _____ Straight carapace width: _____

Curved carapace length: _____ Curved carapace width: _____

Plastron length: _____ Plastron width: _____

Tail length: _____ Head width: _____

Condition of specimen/description of animal: _____

Existing Flipper Tag Information

Left: _____ Right: _____

PIT Tag#: _____

Miscellaneous:

Genetic biopsy collected: YES NO Photographs taken: YES NO

Turtle Release Information:

Date: _____ Time: _____

Latitude: _____ Longitude: _____

State: _____ County: _____

Remarks: (note if turtle was involved with tar or oil, gear or debris entanglement, wounds, or mutilations, propeller damage, papillomas, old tag locations, etc.) _____

Marine Mammal information: *(please designate cm/m or ft/inches)*

Length of marine mammal (note direct or estimated): _____

Weight (if possible, kg or lbs): _____

Sex of marine mammal (if possible): _____

How was sex determined?: _____

Confidence of Species Identification: SURE UNSURE BEST GUESS

Description of Identification characteristics of marine mammal: _____

Genetic samples collected: YES / NO

Genetic samples transmitted to: _____ on ____ / ____ /20....

Fate of marine mammal: _____

Description of Injuries Observed: _____

Other Remarks/Drawings: _____

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

APPENDIX “B”

Lease Number OCS-A 0499

REQUIRED DATA ELEMENTS FOR PROTECTED SPECIES OBSERVER REPORTS

The Lessee must ensure that the protected-species observer record all observations of protected species using standard marine mammal observer data collection protocols. The list of required data elements for these reports is provided below:

1. Vessel name;
2. Observers' names and affiliations;
3. Date;
4. Time and latitude/longitude when daily visual survey began;
5. Time and latitude/longitude when daily visual survey ended; and
6. Average environmental conditions during visual surveys including:
 - a. Wind speed and direction;
 - b. Sea state (glassy, slight, choppy, rough, or Beaufort scale);
 - c. Swell (low, medium, high, or swell height in meters); and
 - d. Overall visibility (poor, moderate, good).
7. Species (or identification to lowest possible taxonomic level);
8. Certainty of identification (sure, most likely, best guess);
9. Total number of animals;
10. Number of juveniles;
11. Description (as many distinguishing features as possible of each individual seen, including length, shape, color and pattern, scars or marks, shape and size of dorsal fin, shape of head, and blow characteristics);
12. Direction of animal's travel relative to the vessel (preferably accompanied by a drawing);
13. Behavior (as explicit and detailed as possible, noting any observed changes in behavior);
14. Activity of vessel when sighting occurred.

U.S. DEPARTMENT OF THE INTERIOR
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ADDENDUM "D"

PROJECT EASEMENT

Lease Number OCS-A 0499

This section includes a description of the Project Easement(s), if any, associated with this lease, and the financial terms associated with it. This section will be updated as necessary.

I. Rent

The Lessee must begin submitting rent payments for any project easement associated with this lease commencing on the date that BOEM approves the Construction and Operations Plan (COP) or modification of the COP describing the project easement. Annual rent for a project easement 200 feet wide, centered on the transmission cable, is \$70.00 per statute mile. For any additional acreage required, the Lessee must also pay the greater of \$5.00 per acre per year or \$450.00 per year.

U.S. DEPARTMENT OF THE INTERIOR
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ADDENDUM "E"

RENT SCHEDULE

Lease Number OCS-A 0499

This section includes a description of the schedule for rent payments that will be determined after the Construction and Operations Plan (COP) has been approved or approved with modifications. This section will be updated as necessary.

Unless otherwise authorized by the Lessor in accordance with the applicable regulations in 30 CFR Part 585, the Lessee must make rent payments as described below.

U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF OCEAN ENERGY MANAGEMENT

Lease Number OCS-A 0499

CONTACT INFORMATION FOR REPORTING REQUIREMENTS

The following contact information must be used for the reporting and coordination requirements specified in Addendum C, Stipulation 3.2.5:

**United States Fleet Forces (USFF) N46
1562 Mitscher Ave, Suite 250
Norfolk, VA 23551
(757) 836-6206**

The following contact information must be used for the reporting requirements in Addendum C, Stipulation 4.4:

Reporting Injured or Dead Protected Species

NOAA Fisheries Northeast Region's Stranding Hotline
866-755-6622

All other reporting requirements in Stipulation 4.4

Bureau of Ocean Energy Management
Environment Branch for Renewable Energy
Phone: 703-787-1340
Email: renewable_reporting@boem.gov

National Marine Fisheries Service
Northeast Regional Office, Protected Resources Division
Section 7 Coordinator
Phone: 978-281-9328
Email: incidental.take@noaa.gov; kellie.foster-taylor@noaa.gov

Vessel operators may send a blank email to ne.rw.sightings@noaa.gov for an automatic response listing all current dynamic management areas (DMAs).



United States Department of the Interior

BUREAU OF OCEAN ENERGY MANAGEMENT
WASHINGTON, DC 20240-0001

OCS-A 0499
OCS-A 0549

Assignor: : Assignment Filed: September 28, 2021
Atlantic Shores Offshore Wind, LLC : Assignment Approved: April 18, 2022
1 Dock 72 Way, Floor 7 : Assignment Effective: April 18, 2022
Brooklyn, New York 11205 :
:

Assignees: :
Atlantic Shores Offshore Wind Project 1, LLC :
1 Dock 72 Way, Floor 7 :
Brooklyn, New York 11205 :
:
Atlantic Shores Offshore Wind Project 2, LLC :
1 Dock 72 Way, Floor 7 :
Brooklyn, New York 11205 :

Partial Assignment of Lease Approved Lease Segregated

Please find enclosed a copy of the above-referenced Outer Continental Shelf (OCS) Assignment of Record Title Interest in Federal OCS Renewable Energy Lease affecting lease OCS-A 0499. The Assignor has assigned 100 percent of their record title interest in a portion of lease OCS-A 0499. This assignment, as approved, has the effect of segregating the assigned portion into a new lease which shall keep the original lease number OCS-A 0499. The retained portion now carries the new lease number OCS-A 0549. The Assignor and Assignee are subject to the liability provisions of the Bureau of Ocean Energy Management (BOEM) regulations codified at 30 C.F.R. 585.410 and 585.411. The segregated lease is subject to all terms and conditions of the original lease, including the lease term and March 1, 2016, lease effective (anniversary) date. Both leases are in their site assessment term which commenced April 8, 2021.

BOEM records reflect the following ownership, including all right, title, and interest, of the subject leases:

Segregated portions creating new lease to carry lease number OCS-A 0499

Atlantic Shores Offshore Wind Project 1, LLC – 50% Record Title Interest
Atlantic Shores Offshore Wind Project 2, LLC – 50% Record Title Interest

Official Protraction Diagram Wilmington NJ18-02

- 1) Block 6687, S1/2 of SE1/4 of SE1/4
- 2) Block 6688, SW1/4 of SW1/4 of SW1/4
- 3) Block 6735, E1/2
- 4) Block 6736, All of Block
- 5) Block 6737, All of Block
- 6) Block 6738, NW1/4 of NW1/4 of NW1/4, S1/2 of NW1/4 of NW1/4, SW1/4 of NW1/4, NW1/4 of SE1/4 of NW1/4, S1/2 of SE1/4 of NW1/4, SW1/4, W1/2 of NW1/4 of SE1/4, SW1/4 of SE1/4, SW1/4 of SE1/4 of SE1/4
- 7) Block 6784, SE1/4
- 8) Block 6785, E1/2, SW1/4
- 9) Block 6786, All of Block
- 10) Block 6787, All of Block
- 11) Block 6788, All of Block
- 12) Block 6789, S1/2 of N1/2 of N1/2, S1/2 of N1/2, S1/2
- 13) Block 6834, N1/2 of NE1/4
- 14) Block 6835, E1/2, NW1/4, NE1/4 of SW1/4
- 15) Block 6836, All of Block
- 16) Block 6837, All of Block
- 17) Block 6838, All of Block
- 18) Block 6839, NE1/4, W1/2, NW1/4 of SE1/4
- 19) Block 6885, NE1/4, N1/2 of SE1/4, SE1/4 of SE1/4
- 20) Block 6886, All of Block
- 21) Block 6887, All of Block
- 22) Block 6888, NE1/4, W1/2, W1/2 of SE1/4
- 23) Block 6889, NW1/4 of NW1/4
- 24) Block 6936, NE1/4, N1/2 of NW1/4, SE1/4 of NW1/4, N1/2 of SE1/4, SE1/4 of SE1/4
- 25) Block 6937, N1/2, SW1/4, N1/2 of SE1/4, SW1/4 of SE1/4
- 26) Block 6938, N1/2 of NW1/4, SW1/4 of NW1/4
- 27) Block 6987, N1/2 of NW1/4

Containing 102,124 Acres

Annual Rental: \$306,372.00

Lessee Contact Information for lease OCS-A 0499:

	Lease Representative	Operations Representative
Name	Joris Veldhoven	Jennifer Daniels
Title	President and Treasurer	Vice President
Address	1 Dock 72 Way Floor 7 Brooklyn, New York 11205	1 Dock 72 Way Floor 7 Brooklyn, New York 11205
Phone	1-646-919-9838	1-781-964-4293
Fax	N/A	N/A
Email	Joris.Veldhoven@atlanticshoreswind.com	Jennifer.Daniels@atlanticshoreswind.com

Retained portion of the original lease redesignated as lease number OCS-A 0549

Atlantic Shores Offshore Wind, LLC - 100% Record Title Interest

Official Protraction Diagram Wilmington NJ18-02

- 1) Block 6389, E1/2
- 2) Block 6438, NE1/4 of NE1/4, S1/2 of NE1/4, SE1/4
- 3) Block 6439, All of Block
- 4) Block 6488, All of Block
- 5) Block 6489, All of Block
- 6) Block 6539, All of Block
- 7) Block 6588, All of Block
- 8) Block 6589, N1/2, N1/2 of S1/2, S1/2 of SW1/4
- 9) Block 6636, NE1/4
- 10) Block 6637, All of Block
- 11) Block 6638, All of Block
- 12) Block 6639, W1/2, S1/2 of SE1/4
- 13) Block 6687, N1/2, SW1/4, N1/2 of SE1/4, SW1/4 of SE1/4, N1/2 of SE1/4 of SE1/4
- 14) Block 6688, E1/2, NW1/4, N1/2 of SW1/4, N1/2 of SW1/4 of SW1/4, SE1/4 of SW1/4 of SW1/4, SE1/4 of SW1/4
- 15) Block 6689, All of Block
- 16) Block 6738, NE1/4, NE1/4 of NW1/4, NE1/4 of NW1/4 of NW1/4, NE1/4 of SE1/4 of NW1/4, NE1/4 of SE1/4, E1/2 of NW1/4 of SE1/4, E1/2 of SE1/4 of SE1/4, NW1/4 of SE1/4 of SE1/4
- 17) Block 6739, All of Block
- 18) Block 6789, N1/2 of N1/2 of N1/2

Containing 81,129 Acres

Annual Rental: \$243,387.00


Lessee Contact Information for lease OCS-A 0549:

	Lease Representative	Operations Representative
Name	Joris Veldhoven	Jennifer Daniels
Title	President and Treasurer	Vice President
Address	1 Dock 72 Way Floor 7 Brooklyn, New York 11205	1 Dock 72 Way Floor 7 Brooklyn, New York 11205
Phone	1-646-919-9838	1-781-964-4293
Fax	N/A	N/A
Email	Joris.Veldhoven@atlanticshoreswind.com	Jennifer.Daniels@atlanticshoreswind.com

Financial Assurance Requirements and Rent Payments

The financial assurance requirements of 30 C.F.R. 585 Subpart E apply separately to each lease. Rent payments for each lease must be paid annually to the Office of Natural Resources Revenue (ONRR). These payments must be made by Electronic Funds Transfer (EFT) and are due on or before the anniversary date of the lease. EFT instructions can be found on ONRR's website at: <http://www.onrr.gov/ReportPay/payments.htm>.

For further information regarding this notice, please contact the Ms. Gina Best at (703) 787-1341 or gina.best@boem.gov.

**JAMES
BENNETT**  Digitally signed by JAMES
BENNETT
Date: 2022.04.18
11:42:01 -04'00'

James F. Bennett
Program Manager
Office of Renewable Energy Programs

Enclosure

cc: Assignor
ONRR

SEP 28 2021

Office of Renewable
Energy Programs

**ASSIGNMENT OF RECORD TITLE INTEREST IN
FEDERAL OCS RENEWABLE ENERGY LEASE**

OCS-A 0499
Lease No.
March 1, 2016
Lease Effective Date
OCS-A 0549
Lease No. (Base Lease)
OCS-A 0499
Lease No. (Segregated Lease)

Part A: Assignment

This assignment is made with respect to the block(s) and/or aliquot part(s) described in Exhibit "A" attached hereto and made a part hereof.

Assignor(s) does hereby sell, assign, transfer and convey unto Assignee(s) the following undivided right, title and interest (insert name and qualification number of each Assignor and Assignee below):

Assignor(s):	Percentage Interest Conveyed
Atlantic Shores Offshore Wind, LLC	100.00%

Assignee(s):	Percentage Interest Received
Atlantic Shores Offshore Wind Project 1, LLC	50.00%
Atlantic Shores Offshore Wind Project 2, LLC	50.00%

Exhibit "B," which sets forth other provisions between Assignor(s) and Assignee(s), is attached to and made a part of this assignment.

For BOEM Use only – Do Not Type Below This Line

This Assignment of Record Title Interest has been filed as of the date stamped on this document and hereby approved by the Bureau of Ocean Energy Management on the date below.

By <u>JAMES BENNETT</u> Authorized Official for BOEM	<small>Digitally signed by JAMES BENNETT Date: 2022.04.18 11:45:08 -04'00'</small> <u>Program Manager, Office of Renewable Energy Programs</u> Title	<u>See Digital Signature</u> Approval Date
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Paperwork Reduction Act of 1995 (PRA) Statement: The PRA (44 U.S.C. 3501 et seq.) requires us to inform you that we collect this information to use in the adjudication process involved in leasing and lease operations. The BOEM uses the information to track ownership of leases in the OCS. Responses are required to obtain or retain a benefit. Release of such data and information is covered under 30 CFR 585.113. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB Control Number. Public reporting burden of this form is estimated to average 30 minutes per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Bureau of Ocean Energy Management, 45600 Woodland Road, Sterling, Virginia 20166.

Part B – Certification and Acceptance

1. Each Assignor certifies it is the owner of the interest in the above-described lease that is hereby assigned to the Assignee(s) specified above.
2. **DEBARMENT COMPLIANCE:** Assignee shall comply with the Department of the Interior’s nonprocurement debarment and suspension regulations as required by Subpart B of 2 CFR Part 1400 and shall communicate the requirement to comply with these regulations to persons with whom it does business related to this interest assignment by including this term in its contracts and transactions.
3. **EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION COMPLIANCE CERTIFICATION:** Assignor(s) and Assignee(s) certify that they are in full compliance with Equal Opportunity Executive Order 11246, as amended, and the implementing regulations at 41 CFR 60-01 – Obligations of Contractors and Subcontractors; and 41 CFR 60-2 – Affirmative Action Programs. These requirements are for the purpose of preventing discrimination against persons on the basis of race, color, religion, sex, or national origin. These regulations have specific performance requirements.
4. Assignee’s execution of this assignment constitutes acceptance of all applicable terms, conditions, stipulations and restrictions pertaining to the lease described herein. Applicable terms and conditions include, but are not limited to, an obligation to conduct all operations on the leasehold in accordance with the terms and conditions of the lease, to restore the leased lands upon completion of any operations as described in the lease, and to furnish and maintain bond(s) pursuant to regulations at 30 CFR Part 585. This assignment is subject to the Outer Continental Shelf Lands Act of August 7, 1953, 43 U.S.C. 1331 et seq., as amended (the “Act”), and Assignee(s) is subject to, and shall fully comply with, all applicable regulations now or to be issued under the Act. Notwithstanding any agreement between the Assignor(s) and Assignee(s), the parties’ liability to the Bureau of Ocean Energy Management is governed by 30 CFR Part 585.

This Assignment of Interest will be made effective between the parties hereto as of _____, upon approval by the Bureau of Ocean Energy Management, United States Department of the Interior.

This instrument may be executed in any number of counterparts, each of which will be deemed an original instrument, but all of which together shall constitute but one and the same instrument provided, however, this instrument and any other counterpart hereof, will not be binding unless and until executed by all of the parties, and will not be accepted by the Bureau of Ocean Energy Management unless all counterparts are filed simultaneously.

I certify that the statements made herein by the undersigned are true, complete and correct to the best of my knowledge and belief and are made in good faith.


Title 18 U.S.C. 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Assignor Name: Atlantic Shores Offshore Wind, LLC

Assignor Name:

Assignor Qualification No. 15092

Assignor Qualification No.

By: 
Signatory Name: Jennifer Daniels
Signatory Title: Vice President

By: _____
Signatory Name:
Signatory Title:

September 28, 2021
Execution Date


Execution Date


Assignee Name: Atlantic Shores Offshore Wind Project 1, LLC

Assignee Name: Atlantic Shores Offshore Wind Project 2, LLC

Assignee Qualification No. 15116

Assignee Qualification No. 15117

By: 
Signatory Name: Jennifer Daniels
Signatory Title: Vice President

By: 
Signatory Name: Jennifer Daniels
Signatory Title: Vice President

September 28, 2021
Execution Date

September 28, 2021
Execution Date

Attach Notary Acknowledgement (not mandatory)

EXHIBIT "A"

**ASSIGNMENT OF RECORD TITLE INTEREST IN
FEDERAL OCS RENEWABLE ENERGY LEASE**

The Assignment is made with respect to the following described block(s) and/or aliquot part(s) of the lease:

Area Name or Protraction Diagram	Block	Subdivision or Aliquot Part (If entire block, enter "All")
Wilmington NJ18-02	6687	S1/2 of SE1/4 of SE1/4
	6688	SW1/4 of SW1/4 of SW1/4
	6735	E1/2
	6736	All
	6737	All
	6738	NW1/4 of NW1/4 of NW1/4, S1/2 of NW1/4 of NW1/4, SW1/4 of NW1/4, NW1/4 of SE1/4 of NW1/4, S1/2 of SE1/4 of NW1/4, SW1/4, W1/2 of NW1/4 of SE1/4, SW1/4 of SE1/4, SW1/4 of SE1/4 of SE1/4
	6784	SE 1/4
	6785	E1/2, SW1/4
	6786	All
	6787	All
	6788	All
	6789	S1/2 of N1/2 of N1/2, S1/2 of N1/2, S1/2
	6834	N1/2 of NE1/4
	6835	E1/2, NW1/4, NE1/4 of SW1/4
	6836	All
	6837	All
	6838	All
	6839	NE1/4, W1/2, NW1/4 of SE1/4
	6885	NE1/4, N1/2 of SE1/4, SE1/4 of SE1/4
	6886	All
	6887	All
	6888	NE1/4, W1/2, W1/2 of SE1/4
	6889	NW1/4 of NW1/4
	6936	NE1/4, N1/2 of NW1/4, SE1/4 of NW1/4, N1/2 of SE1/4, SE1/4 of SE1/4
	6937	N1/2, SW1/4, N1/2 of SE1/4, SW1/4 of SE1/4
	6938	N1/2 of NW1/4, SW1/4 of NW1/4
	6987	N1/2 of NW1/4

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF OCEAN ENERGY MANAGEMENT COMMERCIAL LEASE OF SUBMERGED LANDS FOR RENEWABLE ENERGY DEVELOPMENT ON THE OUTER CONTINENTAL SHELF <i>Paperwork Reduction Act of 1995 statement: This form does not constitute an information collection as defined by 44 U.S.C. § 3501 et seq. and therefore does not require approval by the Office of Management and Budget.</i>	Office Sterling, VA	Renewable Energy Lease Number OCS-A 0499
	Cash Bonus and/or Acquisition Fee \$1,006,240	Resource Type Wind
	Effective Date March 1, 2016	Block Number(s) See Addendum A

This lease, which includes any addenda hereto, is hereby entered into by and between the United States of America, (“Lessor”), acting through the Bureau of Ocean Energy Management (“BOEM”), its authorized officer, and

Lessee	Interest Held
US Wind Inc.	100%

(“Lessee”). This lease is effective on the date written above (“Effective Date”) and will continue in effect until the lease terminates as set forth in Addendum “B.” In consideration of any cash payment heretofore made by the Lessee to the Lessor and in consideration of the promises, terms, conditions, covenants, and stipulations contained herein and attached hereto, the Lessee and the Lessor agree as follows:

Section 1: Statutes and Regulations.

This lease is issued pursuant to subsection 8(p) of the Outer Continental Shelf Lands Act (“the Act”), 43 U.S.C. §§ 1331 *et seq.* This lease is subject to the Act and regulations promulgated pursuant to the Act, including but not limited to, offshore renewable energy and alternate use regulations at 30 CFR Part 585 as well as other applicable statutes and regulations in existence on the Effective Date of this lease. This lease is also subject to those statutes enacted (including amendments to the Act or other statutes) and regulations promulgated thereafter, except to the extent that they explicitly conflict with an express provision of this lease. It is expressly understood that amendments to existing statutes, including but not limited to the Act, and regulations may be made, and/or new statutes may be enacted or new regulations promulgated, which do not explicitly conflict with an express provision of this lease, and that the Lessee bears the risk that such amendments, regulations, and statutes may increase or decrease the Lessee’s obligations under the lease.

Section 2: Rights of the Lessee.

- (a) The Lessor hereby grants and leases to the Lessee the exclusive right and privilege, subject to the terms and conditions of this lease and applicable regulations, to: (1) submit to the Lessor for approval a Site Assessment Plan (SAP) and Construction and Operations Plan (COP) for the project identified in Addendum "A" of this lease; and (2) conduct activities in the area identified in Addendum "A" of this lease ("leased area") that are described in a SAP or COP that has been approved by the Lessor. This lease does not, by itself, authorize any activity within the leased area.
- (b) The rights granted to the Lessee herein are limited to those activities described in any SAP or COP approved by the Lessor. The rights granted to the Lessee are limited by the lease-specific terms, conditions, and stipulations required by the Lessor per Addendum "C."
- (c) This lease does not authorize the Lessee to conduct activities on the Outer Continental Shelf (OCS) relating to or associated with the exploration for, or development or production of, oil, gas, other seabed minerals, or renewable energy resources other than those renewable energy resources identified in Addendum "A."

Section 3: Reservations to the Lessor.

- (a) All rights in the leased area not expressly granted to the Lessee by the Act, applicable regulations, this lease, or any approved SAP or COP, are hereby reserved to the Lessor.
- (b) The Lessor will decide whether to approve a SAP or COP in accordance with the applicable regulations in 30 CFR Part 585. The Lessor retains the right to disapprove a SAP or COP based on the Lessor's determination that the proposed activities would have unacceptable environmental consequences, would conflict with one or more of the requirements set forth in subsection 8(p)(4) of the Act (43 U.S.C. § 1337(p)(4)), or for other reasons provided by the Lessor pursuant to 30 CFR 585.613(e)(2) or 30 CFR 585.628(f)(2). Disapproval of plans will not subject the Lessor to liability. The Lessor also retains the right to approve with modifications a SAP or COP, as provided in applicable regulations.
- (c) The Lessor reserves the right to suspend the Lessee's operations in accordance with the national security and defense provisions of section 12 of the Act and applicable regulations.
- (d) The Lessor reserves the right to authorize other uses within the leased area that will not unreasonably interfere with activities described in Addendum "A."

Section 4: Payments.

- (a) The Lessee must make all rent payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, unless otherwise specified in Addendum "B."
- (b) The Lessee must make all operating fee payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, as specified in Addendum "B."

Section 5: Plans.

The Lessee may conduct those activities described in Addendum “A” only in accordance with a SAP or COP approved by the Lessor. The Lessee may not deviate from an approved SAP or COP except as provided in applicable regulations in 30 CFR Part 585.

Section 6: Associated Project Easements.

Pursuant to 30 CFR 585.200(b), the Lessee has the right to one or more project easements, without further competition, for the purpose of installing gathering, transmission, and distribution cables, pipelines, and appurtenances on the OCS, as necessary for the full enjoyment of the lease, and under applicable regulations in 30 CFR Part 585. As part of submitting a COP for approval, the Lessee may request that one or more easement(s) be granted by the Lessor. If the Lessee requests that one or more easement(s) be granted when submitting a COP for approval, such project easements will be granted by the Lessor in accordance with the Act and applicable regulations in 30 CFR Part 585 upon approval of the COP in which the Lessee has demonstrated a need for such easements. Such easements must be in a location acceptable to the Lessor, and will be subject to such conditions as the Lessor may require. The project easement(s) that would be issued in conjunction with an approved COP under this lease will be described in Addendum “D” to this lease, which will be updated as necessary.

Section 7: Conduct of Activities.

The Lessee must conduct, and agrees to conduct, all activities in the leased area in accordance with an approved SAP or COP, and with all applicable laws and regulations.

The Lessee further agrees that no activities authorized by this lease will be carried out in a manner that:

- (a) could unreasonably interfere with or endanger activities or operations carried out under any lease or grant issued or maintained pursuant to the Act, or under any other license or approval from any Federal agency;
- (b) could cause any undue harm or damage to the environment;
- (c) could create hazardous or unsafe conditions; or
- (d) could adversely affect sites, structures, or objects of historical, cultural, or archaeological significance, without notice to and direction from the Lessor on how to proceed.

Section 8: Violations, Suspensions, Cancellations, and Remedies.

If the Lessee fails to comply with (1) any of the applicable provisions of the Act or regulations, (2) the approved SAP or COP, or (3) the terms of this lease, including associated Addenda, the Lessor may exercise any of the remedies that are provided under the Act and applicable regulations, including, without limitation, issuance of cessation of

operations orders, suspension or cancellation of the lease, and/or the imposition of penalties, in accordance with the Act and applicable regulations.

The Lessor may also cancel this lease for reasons set forth in subsection 5(a)(2) of the Act (43 U.S.C. § 1334(a)(2)), or for other reasons provided by the Lessor pursuant to 30 CFR 585.437.

Non-enforcement by the Lessor of a remedy for any particular violation of the applicable provisions of the Act or regulations, or the terms of this lease, will not prevent the Lessor from exercising any remedy, including cancellation of this lease, for any other violation or for the same violation occurring at any other time.

Section 9: Indemnification.

The Lessee hereby agrees to indemnify the Lessor for, and hold the Lessor harmless from, any claim caused by or resulting from any of the Lessee's operations or activities on the leased area or project easements or arising out of any activities conducted by or on behalf of the Lessee or its employees, contractors (including Operator, if applicable), subcontractors, or their employees, under this lease, including claims for:

- a. loss or damage to natural resources,
- b. the release of any petroleum or any Hazardous Materials,
- c. other environmental injury of any kind,
- d. damage to property,
- e. injury to persons, and/or
- f. costs or expenses incurred by the Lessor.

Except as provided in any addenda to this lease, the Lessee will not be liable for any losses or damages proximately caused by the activities of the Lessor or the Lessor's employees, contractors, subcontractors, or their employees. The Lessee must pay the Lessor for damage, cost, or expense due and pursuant to this section within 90 days after written demand by the Lessor. Nothing in this lease will be construed to waive any liability or relieve the Lessee from any penalties, sanctions, or claims that would otherwise apply by statute, regulation, operation of law, or could be imposed by the Lessor or other government agency acting under such laws.

"Hazardous Material" means

1. Any substance or material defined as hazardous, a pollutant, or a contaminant under the *Comprehensive Environmental Response, Compensation, and Liability Act* at 42 U.S.C. §§ 9601(14) and (33);
2. Any regulated substance as defined by the Resource Conservation and Recovery Act ("RCRA") at 42 U.S.C. § 6991 (7), whether or not contained in or released from underground storage tanks, and any hazardous waste regulated under RCRA pursuant to 42 U.S.C. §§ 6921 *et seq.*;
3. Oil, as defined by the Clean Water Act at 33 U.S.C. § 1321(a)(1) and the Oil Pollution Act at 33 U.S.C. § 2701(23); or

4. Other substances that applicable Federal, state, tribal, or local laws define and regulate as “hazardous.”

Section 10: Financial Assurance.

The Lessee must provide and maintain at all times a surety bond(s) or other form(s) of financial assurance approved by the Lessor in the amount specified in Addendum “B.” As required by the applicable regulations in 30 CFR Part 585, if, at any time during the term of this lease, the Lessor requires additional financial assurance, then the Lessee must furnish the additional financial assurance required by the Lessor in a form acceptable to the Lessor within 90 days after receipt of the Lessor’s notice of such adjustment.

Section 11: Assignment or Transfer of Lease.

This lease may not be assigned or transferred in whole or in part without written approval of the Lessor. The Lessor reserves the right, in its sole discretion, to deny approval of the Lessee’s application to transfer or assign all or part of this lease. Any assignment will be effective on the date the Lessor approves the Lessee’s application. Any assignment made in contravention of this section is void.

Section 12: Relinquishment of Lease.

The Lessee may relinquish this entire lease, or any officially designated subdivision thereof by filing with the appropriate office of the Lessor a written relinquishment application, in accordance with applicable regulations in 30 CFR Part 585. No relinquishment of this lease or any portion thereof will relieve the Lessee or its surety of the obligations accrued hereunder, including but not limited to, the responsibility to remove property and restore the leased area pursuant to section 13 of this lease and applicable regulations.

Section 13: Removal of Property and Restoration of the Leased Area on Termination of Lease.

Unless otherwise authorized by the Lessor, pursuant to the applicable regulations in 30 CFR Part 585, the Lessee must remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seafloor of all obstructions created by activities on the leased area, including any project easements within two years following lease termination, whether by expiration, cancellation, contraction, or relinquishment, in accordance with any approved SAP, COP, or approved Decommissioning Application, and applicable regulations in 30 CFR Part 585.

Section 14: Safety Requirements.

The Lessee must:

- a. maintain all places of employment for activities authorized under this lease in compliance with occupational safety and health standards and, in addition, free

from recognized hazards to employees of the Lessee or of any contractor or subcontractor operating under this lease;

- b. maintain all operations within the leased area in compliance with regulations in 30 CFR Part 585 and orders from the Lessor and other Federal agencies with jurisdiction, intended to protect persons, property and the environment on the OCS; and
- c. provide any requested documents and records, which are pertinent to occupational or public health, safety, or environmental protection, and allow prompt access, at the site of any operation or activity conducted under this lease, to any inspector authorized by the Lessor or other Federal agency with jurisdiction.

Section 15: Debarment Compliance.

The Lessee must comply with the Department of the Interior's non-procurement debarment and suspension regulations set forth in 2 CFR Parts 180 and 1400 and must communicate the requirement to comply with these regulations to persons with whom it does business related to this lease by including this requirement in all relevant contracts and transactions.

Section 16: Equal Opportunity Clause.

During the performance of this lease, the Lessee must fully comply with paragraphs (1) through (7) of section 202 of Executive Order 11246, as amended (reprinted in 41 CFR 60-1.4(a)), and the implementing regulations, which are for the purpose of preventing employment discrimination against persons on the basis of race, color, religion, sex, or national origin. Paragraphs (1) through (7) of section 202 of Executive Order 11246, as amended, are incorporated in this lease by reference.

Section 17: Certification of Nonsegregated Facilities.

By entering into this lease, the Lessee certifies, as specified in 41 CFR 60-1.8, that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. As used in this certification, the term "facilities" means, but is not limited to, any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees. Segregated facilities include those that are segregated by explicit directive or those that are in fact segregated on the basis of race, color, religion, sex, or national origin, because of habit, local custom, or otherwise; provided, that separate or single-user restrooms and necessary dressing or sleeping areas must be provided to assure privacy as appropriate. The Lessee further agrees that it will obtain identical certifications from proposed contractors and subcontractors prior to awarding contracts or subcontracts unless they are exempt under 41 CFR 60-1.5.

Section 18: Notices.

All notices or reports provided from one party to the other under the terms of this lease must be in writing, except as provided herein and in the applicable regulations in 30 CFR Part 585. Written notices must be delivered to the party's Lease Representative, as specifically listed in Addendum "A," either electronically, by hand, by facsimile, or by United States first class mail, adequate postage prepaid. Either party may notify the other of a change of address by doing so in writing. Until notice of any change of address is delivered as provided in this section, the last recorded address of either party will be deemed the address for all notices required under this lease. For all operational matters, notices must be provided to the party's Operations Representative, as specifically listed in Addendum "A," as well as the Lease Representative.

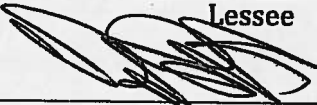
Section 19: Severability Clause.

If any provision of this lease is held unenforceable, all remaining provisions of this lease will remain in full force and effect.

Section 20: Modification.

Unless otherwise authorized by the applicable regulations in 30 CFR Part 585, this lease may be modified or amended only by mutual agreement of the Lessor and the Lessee. No such modification or amendment will be binding unless it is in writing and signed by duly authorized signatories of the Lessor and the Lessee.

US Wind Inc.

Lessee


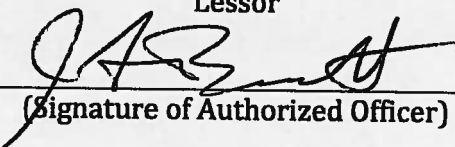
(Signature of Authorized Officer)
RICCARDO TOTO

(Name of Signatory)
Sole Director

(Title)
January 12th, 2016

(Date)

The United States of America

Lessor


(Signature of Authorized Officer)
James F. Bennett

(Name of Signatory)
Program Manager, Office of
Renewable Energy Programs

(Title)
February 4, 2016

(Date)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

ADDENDUM "A"

DESCRIPTION OF LEASED AREA AND LEASE ACTIVITIES

Lease Number OCS-A 0499

I. Lessor and Lessee Contact Information

Lessee Company Number: 15023

(a) Lessor's Contact Information

	Lease Representative	Operations Representative
Title	Program Manager	<i>SAME AS LEASE REPRESENTATIVE</i>
Address	U.S. Department of the Interior Bureau of Ocean Energy Management 45600 Woodland Road Mail Stop VAM-OREP Sterling, VA 20166	
Phone	(703) 787-1300	
Fax	(703) 787-1708	
Email	renewableenergy@boem.gov	

(b) Lessee's Contact Information

	Lease Representative	Operations Representative
Name	<i>SALVATORE VITALE</i>	<i>PAOLO SAMMARTINO</i>
Title	<i>LEGAL COUNSEL</i>	<i>CHIEF OPERATING OFFICER</i>
Address	<i>US WIND INC, 1 N CHARLES ST 21202 BALTIMORE, MD SUITE 2310</i>	<i>US WIND INC, 1 N CHARLES ST 21202 BALTIMORE, MD SUITE 2310</i>
Phone	<i>410 727 4020</i>	<i>410 727 4020</i>
Fax	<i>410 727 4026</i>	<i>410 727 4026</i>
Email	<i>s.vitale@venexia.ut</i>	<i>p.sammartino@venexia.ut</i>

II. Description of Leased Area

The total acreage of the lease area is approximately hectares 74,160 hectares (183,353 acres)

This area is subject to later adjustment, in accordance with applicable regulations (e.g., contraction, relinquishment, etc.).

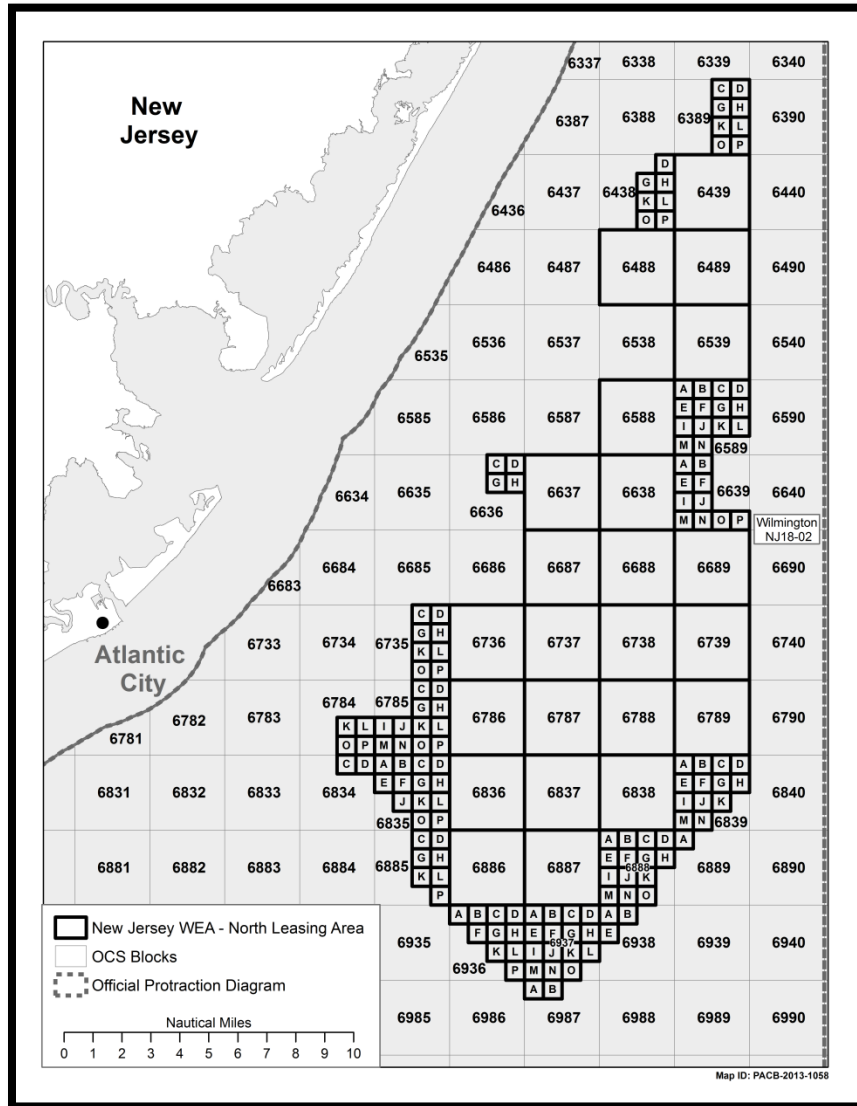
Lease OCS-A 0499

The following Blocks or portions of Blocks lying within Official Protraction Diagram Wilmington NJ18-02 are depicted on the map below and comprise 74,160 hectares (183,353 acres), more or less.

- 1) Block 6389, E1/2
- 2) Block 6438, NE1/4 of NE1/4, S1/2 of NE1/4, SE1/4
- 3) Block 6439, All of Block
- 4) Block 6488, All of Block
- 5) Block 6489, All of Block
- 6) Block 6539, All of Block
- 7) Block 6588, All of Block
- 8) Block 6589, N1/2, SW1/4, N1/2 of SE1/4
- 9) Block 6636, NE1/4
- 10) Block 6637, All of Block
- 11) Block 6638, All of Block
- 12) Block 6639, W1/2, S1/2 of SE1/4
- 13) Block 6687, All of Block
- 14) Block 6688 All of Block
- 15) Block 6689, All of Block
- 16) Block 6735, E1/2
- 17) Block 6736, All of Block
- 18) Block 6737, All of Block
- 19) Block 6738, All of Block
- 20) Block 6739, All of Block
- 21) Block 6784, SE1/4
- 22) Block 6785, E1/2, SW1/4
- 23) Block 6786, All of Block
- 24) Block 6787, All of Block
- 25) Block 6788, All of Block
- 26) Block 6789, All of Block
- 27) Block 6834, N1/2 of NE1/4
- 28) Block 6835, E1/2, NW1/4, NE1/4 of SW1/4
- 29) Block 6836, All of Block
- 30) Block 6837, All of Block
- 31) Block 6838, All of Block
- 32) Block 6839, NE1/4, W1/2, NW1/4 of SE1/4
- 33) Block 6885, NE1/4, N1/2 of SE1/4, SE1/4 of SE1/4
- 34) Block 6886, All of Block
- 35) Block 6887, All of Block
- 36) Block 6888, NE1/4, W1/2, W1/2 of SE1/4
- 37) Block 6889, NW1/4 of NW1/4
- 38) Block 6936, NE1/4, N1/2 of NW1/4, SE1/4 of NW1/4, N1/2 of SE1/4, SE1/4 of SE1/4

- 39) Block 6937, N1/2, SW1/4, N1/2 of SE1/4, SW1/4 of SE1/4
- 40) Block 6938, N1/2 of NW1/4, SW1/4 of NW1/4
- 41) Block 6987, N1/2 of NW1/4

For the purposes of these calculations, a full Block is 2,304 hectares. The acreage of a hectare is 2.471043930.



Map of Lease OCS-A 0499

III. Renewable Energy Resource

Wind

IV. Description of the Project

A project to generate energy using wind turbine generators and any associated resource assessment activities, located on the OCS in the leased area, as well as associated offshore substation platforms, inner array cables, and subsea export cables.

V. Description of Project Easement(s)

Once approved, the Lessor will incorporate Lessee's project easement(s) in this lease as Addendum "D."

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

ADDENDUM “B”

LEASE TERM AND FINANCIAL SCHEDULE

Lease Number OCS-A 0499

I. Lease Term

The duration of each term of the lease is described below. The terms may be extended or otherwise modified in accordance with applicable regulations in 30 CFR Part 585.

Lease Term	Duration
Preliminary Term	1 year
Site Assessment Term	5 years
Operations Term	25 years

Schedule: Addendum C includes a schedule and reporting requirements for conducting site characterization activities.

Renewal: The Lessee may request renewal of the operations term of this lease, in accordance with applicable regulations in 30 CFR Part 585. The Lessor, at its discretion, may approve a renewal request to conduct substantially similar activities as were originally authorized under this lease or in an approved plan. The Lessor will not approve a renewal request that involves development of a type of renewable energy not originally authorized in the lease. The Lessor may revise or adjust payment terms of the original lease as a condition of lease renewal.

Unless otherwise described below, the Preliminary Term begins on the Effective Date of this lease for leases issued competitively. Unless otherwise described below, for noncompetitively issued leases, the Site Assessment Term begins on the Effective Date of this lease. The Operations Term begins on the date that the Lessor approves the Lessee’s Construction and Operations Plan (COP).

II. Definitions

“Available for Commercial Operations” means the status of an individual wind generation turbine on or after the first day that it engages in Commercial Operations on the lease until the day when it is permanently decommissioned. These dates are determined by the COP.

“Commercial Operations” means the generation of electricity or other energy product for

commercial use, sale, or distribution.

“Commercial Operation Date,” or “COD,” refers to the date on which the Lessee first begins Commercial Operations on the lease.

“Delivery Point” is the meter identified in the COP where the Lessee’s facility interconnects with the electric grid to deliver electricity for sale.

“Lease Issuance Date” refers to the date on which this lease has been signed by *both* the Lessee and the Lessor.

“Effective Date” has the same meaning as “effective date” in BOEM regulations provided in 30 CFR 585.237.

“End Date” refers to the earlier of a) the last calendar day of the last month of the Operations Term; or b) the date on which the lease terminates in the event of a lease termination.

“Lease Anniversary” refers to the anniversary of the Effective Date of the lease. where the Lessee’s facility interconnects with the electric grid to deliver electricity for sale.

III. Payments

Unless otherwise authorized by the Lessor in accordance with the applicable regulations in 30 CFR Part 585, the Lessee must make payments as described below.

(a) **Rent.** The Lessee must pay rent as described below:

Rent payments prior to the COD, or prior to the lease End Date in the event that the lease terminates prior to the COD, are calculated by multiplying the acres in the leased area by the rental rate per acre as follows:

Lease OCS-A 0499

- Acres in Project Area: 183,353
- Annual Rental Rate: \$3.00 per acre or fraction thereof
- Rental Fee for Entire Project Area: \$3.00 x 183,353 = \$550,059

The first year’s rent payment of \$550,059 is due within 45 days of the date that the lease is received by the Lessee for execution, in accordance with 30 CFR 585.503. Rent for the entire leased area for the next year and for each subsequent year is due on or before each Lease Anniversary through the year in which the COD occurs. The rent for each year subsequent to the COD on the imputed portion of the lease not authorized for Commercial Operations is due on or before each Lease Anniversary. The imputed portion of the lease that is not authorized for Commercial Operations at each Lease Anniversary in year t , S_t , and the corresponding Adjusted Annual Rent Payment will be determined as follows:

$$(A) S_t = \left(1 - \frac{M'_t}{MAX(M'_t: \text{for all } t \geq 2)}\right)$$

(B) *Adjusted Annual Rent Payment* = S_t * *Rental Fee for Entire Leased Area*

Where:

S_t = Portion of the lease not authorized for Commercial Operations in year t based on the definition of t in Section III (b) (4) below.

M'_t = Actual Nameplate capacity expressed in megawatts (MW) rounded to the nearest second decimal in year t of Commercial Operations on the lease as defined in Section III (b) (4) below, prior to any adjustments as specified in the most recent approved COP for turbine maintenance, replacements, repowering, or decommissioning. For our purposes nameplate capacity is the maximum rated electric output the turbines of the wind farm facility under commercial operations can produce at their rated wind speed designated by the turbine's manufacturer.

$MAX(M'_t)$ = Highest value of M'_t projected in the most recent approved version of the COP to be achieved in any year of Commercial Operations on the lease.

The Adjusted Annual Rent Payment calculated in Equation (A) herein, will be rounded up to the nearest dollar. The annual rent payments will be set forth in Addendum "E" when the COP is initially approved or subsequently revised.

Consider an example of a 1,000 MW project on a lease with an Effective Date of January 1, 2014 and a COD of January 1, 2022 on a lease area consisting of 100,000 acres as follows:

Payment (Jan. 1 st)	M'_t (MW)	$MAX(M'_t)$ (MW)	$\left(1 - \frac{M'_t}{MAX(M'_t)}\right)$	Rental Fee for Entire Area	Payment Amount
2014	0	1,000	1.0	\$300,000	\$300,000
...
2021	0		1.0		\$300,000
2022	500		0.5		\$150,000
2023	500		0.5		\$150,000
2024	500		0.5		\$150,000
2025	800		0.2		\$60,000
2026	800		0.2		\$60,000
2027	800		0.2		\$60,000
2028	1,000		0.0		\$0

In the event a revised COP is approved by BOEM with an alternative installation schedule that differs from the previously-approved COP, the Lessee must make subsequent payments based on the revised installation schedule. In addition, the Lessee must make a payment equal to the sum of any incremental annual rent payments that would have been due at the Lease Anniversary of prior years based on the differences between the Initial Installation Schedules specified in the previously-approved COP and the revised COP, plus interest on the annual balances, in accordance with 30 CFR 1218.54.

Consider an example whereby the initial COP specified an installation schedule with all 1,000 MW online at the COD, i.e., M'_t is 1,000 MW at COD. The following table demonstrates how the back rent payments would be calculated if the project was initially scheduled as a single phase, but then later determined to be the three-phase project as shown in the previous example in a revised COP approved prior to the payment due on January 1, 2023.

Payment (Jan. 1 st)	Initial M'_t (MW)	Revised M'_t (MW)	Single-Phase Payment Amount	Three-Phase Payment Amount	Back Rent Payment Amount	Subsequent Rent Payment Amount
2014	0	0	\$300,000	\$300,000	\$0	\$0
...
2021	0	0	\$300,000	\$300,000	\$0	\$0
2022	1,000	500	\$0	\$150,000	\$150,000	\$0
2023	1,000	500	\$0	\$150,000	\$0	\$150,000
2024	1,000	500	\$0	\$150,000	\$0	\$150,000
2025	1,000	800	\$0	\$60,000	\$0	\$60,000
2026	1,000	800	\$0	\$60,000	\$0	\$60,000
2027	1,000	800	\$0	\$60,000	\$0	\$60,000
2028	1,000	1,000	\$0	0	\$0	\$0

The last rent payment prior to Commercial Operations being authorized on the entire lease area, i.e., the year in which the value of S_t is equal to zero, or prior to the lease End Date, in the event that the lease terminates prior to Commercial Operations being authorized on the entire lease area, will represent the final rent payment, unless a revised COP identifying an alternative maximum initial capacity is approved by BOEM. All rent payments, including the last rent payment, are payable for the full year and will not be prorated to the COD or other installation milestones. The COD is equivalent to the authorization date for the first phase of development on the lease, to be updated based on the initial or revised approved COP documentation. The schedule of rent payments on the lease is defined in Addendum "E". All rent payments must be made as required in 30 CFR 1218.51. Late rent payments will be charged interest in accordance with 30 CFR 1218.54.

(1) Project Easement.

Rent for any project easement(s) is described in Addendum "D".

(2) Relinquishment.

If the Lessee submits an application for relinquishment of a portion of the leased area within the first 45 calendar days following the date that the lease is received by the Lessee for execution, and the Lessor approves that application, no rent payment will be due on that relinquished portion of the leased area. Later relinquishments of any leased area will reduce the Lessee's rent payments due the year following the Lessor's approval of the

relinquishment, through a reduction in the Acres in Leased Area, the corresponding Rental Fee for the Entire Leased Area, and any related Adjusted Annual Rent Payments.

(b) **Operating Fee.** The Lessee must pay an operating fee as described below:

(1) Initial Operating Fee Payment.

The Lessee must pay an initial prorated operating fee within 45 calendar days after the COD. The initial operating fee payment covers the first year of Commercial Operations on the lease and will be calculated in accordance with the following subsection (4), using an operating fee rate of 0.02 and a capacity factor of 0.4.

(2) Annual Operating Fee Payments.

The Lessee must pay the operating fee for each subsequent year of Commercial Operations on or before each Lease Anniversary following the formula in subsection (4). The Lessee must calculate each operating fee annually subsequent to the initial operating fee payment using an operating fee rate of 0.02 through the twenty-five year operations term of the lease. The capacity factor of 0.4 will remain in effect until the Lease Anniversary of the year in which the Lessor adjusts the capacity factor.

(3) Final Operating Fee Payment.

The final operating fee payment is due on the Lease Anniversary prior to the End Date. The final operating fee payment covers the last year of Commercial Operations on the lease and will be calculated in accordance with the formula in subsection (4) as follows.

(4) The formula for calculating the operating fee in year *t*.

F_t	=	M_t	*	H	*	C_p	*	P_t	*	r_t
(annual operating fee)		(nameplate capacity)		(hours per year)		(capacity factor)		(power price)		(operating fee rate)

Where:

t =	the year of Commercial Operations on the lease starting from each Lease Anniversary, where <i>t</i> equals 1 represents the year beginning on the Lease Anniversary prior to, or on, the COD.
F_t =	the dollar amount of the annual operating fee in year <i>t</i> .
M_t =	the nameplate capacity expressed in megawatts (MW) rounded to the nearest second decimal place in year <i>t</i> of Commercial Operations on the lease. The value of M_t , reflecting the availability of turbines, will be determined based on the COP. This value will be adjusted to reflect any modifications to the COP approved by BOEM as of the date each operating fee payment is due, in accordance with the calculation in Equation 1, for each year of Commercial Operations on the lease.

$$(1) M_t = \sum_{w=1}^{W_t} \left(N_w * \left[\frac{\left(\sum_{d=1}^D E_{w,t,d} \right)}{D} \right] \right)$$

Where:

W_t = Number of individual wind generation turbines, w , that will be available for Commercial Operations during any day of the year, t , per the COP.

N_w = Nameplate capacity of individual wind generation turbine, w , per the COP expressed in MW.

$E_{w,t,d}$ = Indicates whether individual wind generation turbine, w , will be available for Commercial Operations on day d of year t . The value is set to 1 for any day in year t for which the condition is true, i.e., the wind turbine will be available for Commercial Operations, and zero for any day in year t for which the condition is false, i.e., the wind turbine will not be available for Commercial Operations. The month of February is always assumed to have 28 days for purposes of this calculation, where March 1st will be counted as the first day of Commercial Operations if Commercial Operations commence on February 29th of a leap year.

D = Days in the year set equal to 365 in all years for purposes of this calculation.

M_t may be reduced only in the event that installed capacity is permanently decommissioned per the COP. M_t will not be changed in response to routine or unplanned maintenance of units, including the temporary removal of a nacelle for off-site repair or replacement with a similar unit.

EXAMPLE: Assume that the Lease Anniversary is January 1st, the COD is July 1, 2018, that the facility will ultimately have 100 individual wind generation turbines with a nameplate capacity of 5.0 MW each, and that the COP specifies the following, cumulative installation schedule for wind turbines to become available for Commercial Operations:

- July 1, 2018 (COD): 20 turbines (20 new units);
- October 1, 2018: 45 turbines (25 new units);
- January 1, 2019: 50 turbines (5 new units);
- July 1, 2019: 65 turbines (15 new units);
- January 1, 2020: 95 turbines (30 new units);
- February 29, 2020: 100 turbines (5 new units).

Further assume that the COP calls for 50 of the turbines to be decommissioned after September 30, 2039 ($t = 22$), and that the remaining turbines are decommissioned at

the End Date of March 15, 2040 ($t = 23$).

The value of M_t would be estimated as demonstrated in Table 1a for each year of Commercial Operations on the lease in this example.

Table 1a: Example of M_t Calculations for Installation and Decommissioning

t	Turbines	MW	Commercial Operations Period	Comm. Ops. Days	Days in Year	Share of Days	MW	M_t
1	20	100	Jul. 1 st to Dec. 31 st	184	365	50.41%	50.41	81.92
	25	125	Oct. 1 st to Dec. 31 st	92		25.21%	31.51	
2	50	250	Jan. 1 st to Dec. 31 st	365		100.00%	250.00	287.81
	15	75	Jul. 1 st to Dec. 31 st	184		50.41%	37.81	
3	95	475	Jan. 1 st to Dec. 31 st	365		100.00%	475.00	495.96
	5	25	Mar. 1 st to Dec. 31 st	306		83.84%	20.96	
4	100	500	Jan. 1 st to Dec. 31 st	365		100.00%	500.00	500.00
...
21	100	500	Jan. 1 st to Dec. 31 st	365		100.00%	500.00	500.00
22	50	250	Jan. 1 st to Dec. 31 st	365		100.00%	250.00	436.98
	50	250	Jan. 1 st to Sep. 30 th	273	74.79%	186.98		
23	50	250	Jan. 1 st to Mar. 15 th	74	20.27%	50.68	50.68	

To illustrate the impact of decommissioning a portion of the individual wind generation turbines and replacing them with units of greater capacity on the calculation of M_t , assume that at the end of March 31, 2022, 10 units are to be made unavailable due to decommissioning, and that the incremental units have a capacity of 7.0 MW and are expected to be made available for Commercial Operations on September 15, 2022. The impact on M_t in 2022 and in subsequent years starting in 2023 and continuing until decommissioning is illustrated in Table 1b.

Table 1b: Example of M_t Calculations for Repowering

t	Turbines	MW	Commercial Operations Period	Comm. Ops. Days	Days in Year	Share of Days	MW	M_t
5	90 (5.0)	450	Jan. 1 st to Dec. 31 st	365	365	100.00%	450.00	483.04
	10 (5.0)	50	Jan. 1 st to Mar. 31 st	90		24.66%	12.33	
	10 (7.0)	70	Sep. 15 th to Dec. 31 st	108		29.59%	20.71	
6	90 (5.0)	450	Jan. 1 st to Dec. 31 st	365		100.00%	450.00	520.00
	10 (7.0)	70	Jan. 1 st to Dec. 31 st	365		100.00%	70.00	

$H =$ the number of hours in the year for billing purposes which is equal to 8,760 for all years of Commercial Operations on the lease.

$c_p =$ the “Capacity Factor” in Performance Period p , which represents the share of anticipated generation of the facility that is delivered to where the Lessee’s facility interconnects with the electric grid (i.e. the Delivery Point) relative to its generation at continuous full power operation at the nameplate capacity, expressed as a decimal between zero and one.

The initial Capacity Factor (C_0) will be set to 0.4.

The Capacity Factor will be subject to adjustment at the end of each Performance Period. After the sixth year of Commercial Operations on the lease has concluded, the Lessee will utilize data gathered from years two through six of Commercial Operations on the lease and propose a revised Capacity Factor to be used to calculate subsequent annual payments, as provided for in Table 2 below. A similar process will be conducted at the conclusion of each five-year Performance Period, thereafter.

Table 2: Definition of Performance Periods

Performance Period (<i>p</i>)	Commercial Operation Years (<i>t</i>)	Payments Affected by Adjustment	Capacity Factor (<i>c</i>)	Date End Year (<i>n</i>)
0 (COD)	Not Applicable	Payments 1 to 7	$c_0=0.4$	--
1	$t = 2$ to 6	Payments 8 to 12	c_1	$n_1=6$
2	$t = 7$ to 11	Payments 13 to 17	c_2	$n_2=11$
3	$t = 12$ to 16	Payments 18 to 22	c_3	$n_3=16$
4	$t = 17$ to 21	Payments 23 to End Date	c_4	$n_4=21$

Adjustments to the Capacity Factor

The Actual 5-year Average Capacity Factor (X_p) is calculated for each Performance Period after COD ($p > 0$) per Equation 2 below. X_p represents the sum of actual, metered electricity generation in megawatt-hours (MWh) at the Delivery Point to the electric grid (A_t) divided by the amount of electricity generation in MWh that would have been produced if the facility operated continuously at its full, stated capacity (M_t) in all of the hours (h_t) in each year, t , of the corresponding five-year period.

$$(2) X_p = \frac{\sum_{t=n-4}^n A_t}{\left(\sum_{t=n-4}^n M_t * h_t \right)}$$

Where:

M_t = Nameplate Capacity as defined above.

n = “Date End Year” value for the Performance Period, p , as defined in Table 2.

p = Performance Period as defined in Table 2.

A_t = Actual generation in MWh associated with each year of Commercial Operations, t , on the lease that is transferred at the Delivery Point; Delivery Point meter data supporting the values submitted for annual actual generation must be recorded, preserved, and timely provided to the Lessor upon request. In the event the Lessor requires the assistance of the Lessee in obtaining information useful in verifying such information, for example by waiving confidentiality with respect to data held by a third party, such assistance must be timely provided.

h_t = Hours in the year on which the Actual Generation associated with each year of

	<p>Commercial Operations, t, on the lease is based; this definition of “hours in the year” differs from the definition of H in the operating fee equation above. The hours in the year for purposes of calculating the capacity factor must take into account the actual number of hours, including those in leap years.</p> <p>The value of the Capacity Factor at the outset of Commercial Operations ($p = 0$) is set to 0.4 as stated in equation 3:</p> <p>(3) $c_0 = 0.4$</p> <p>The value of the Capacity Factor corresponding to each Performance Period (c_p) is set according to equations 4A, 4B, and 4C as follows for each value of p greater than zero. The Capacity Factor is set equal to the Actual 5-Year Average Capacity Factor provided that the value falls within a range of plus or minus 10 percent of the previous Performance Period’s capacity factor.</p> <p>(4A) $c_p = X_p$ for $c_{p-1} * 0.90 \leq X_p \leq c_{p-1} * 1.10$</p> <p>(4B) $c_p = c_{p-1} * 0.90$ for $X_p < c_{p-1} * 0.90$</p> <p>(4C) $c_p = c_{p-1} * 1.10$ for $X_p > c_{p-1} * 1.10$</p> <p>All values for c_p must be rounded to the nearest third decimal place.</p>
<p>$P_t =$</p>	<p>a measure of the annual average wholesale electric power price expressed in dollars per MW hour.</p> <p>The Lessee must calculate P_t at the time each operating fee payment is due, subject to approval by the Lessor. The Base Price (P_b) must equal the weighted average of the peak and off-peak spot price indices for the PJM West power market for the most recent year of data available as reported by the Federal Energy Regulatory Commission (FERC) as part of its annual <u>State of the Markets Report</u> with specific reference to the summary entitled “Electric Market Overview: Regional Spot Prices.” The latest version of this report is available at http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-3yr-regional-elec-pr.pdf. If FERC stops publishing its annual <u>State of the Markets Report</u> required for this calculation or the specified location of the data changes over time, the Lessor must specify an alternate source of data and methodology that is approximately equivalent.</p> <p>The peak and off-peak price indices must be weighted 52.0% and 48.0%, respectively, for purposes of estimating the weighted index value for the Base Price. For example, in the March 12, 2012 State of the Markets Report the peak price index for 2011 was \$51.99/MWh and the corresponding off-peak price index for 2011 was \$33.94/MWh, resulting in a weighted index value for the Base Price for 2011 (P_{2011}) of \$43.33/MWh ($=52.0\% * \\$51.99 / \text{MWh} + 48.0\% * \\$33.94 / \text{MWh}$). The calculation of P_b must be rounded up to the nearest, second decimal place.</p>

The Base Price must be adjusted for inflation from the year associated with the published spot prices to the year in which the operating fee is to be paid as shown in equations (5A) and (5B):

$$(5A) P_t = P_b * \left(\frac{GDP_g}{GDP_{g-1}} \right)^{y-g} * \left(\frac{GDP_g}{GDP_b} \right) \text{ for } g \geq b$$

$$(5B) P_t = P_b * \left(\frac{GDP_g}{GDP_{g-1}} \right)^{y-b} \text{ for } g < b$$

Where:

GDP = Annual Implicit Price Deflators for Gross Domestic Product (GDP deflator index) from Table 1.1.9, line 1, in the Survey of Current Business published by the U.S. Bureau of Economic Analysis (BEA) in the specified period; the latest version of this data is currently available at:

<http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1>

If BEA stops publishing the data required for this calculation, or the specified location of the data changes over time, the Lessor will specify an alternative source of data and methodology that it considers approximately equivalent.

b = The most recent year for which FERC reports the appropriate electricity spot price data expressed as the year, e.g., 2009, as in the illustrative example below.

g = The most recent year for which GDP deflator indices are available from BEA expressed as the year, e.g., 2011, as in the illustrative example below.

y = The year the annual payment is due expressed as the year corresponding to the value of *t* described above, e.g., 2013, as in the illustrative example below.

The second term on the right-hand side of equation (5A) represents a projected annual change in the index of inflation employing the last year of data available from BEA, while the third term represents the cumulative change in the index of inflation up to the previous year.

Example:

The following hypothetical example is provided to illustrate the methodology using Equation (5A) and the illustrative values provided for *b*, *g*, and *y* above, applied to historical GDP deflator data. If the actual FERC price indices are based on 2009 data and the GDP deflator indices are available for 2011, the inflation-adjusted price index value would be determined from equation (5A) as follows for a payment occurring in

$r_t =$	<p>$y = 2013:$</p> $P_{t(2013)} = P_{2009} * \left(\frac{GDP_{2011}}{GDP_{2010}} \right)^{2013-2011} * \left(\frac{GDP_{2011}}{GDP_{2009}} \right) = \frac{\$40.69}{\text{MWh}} * \left(\frac{113.361}{110.992} \right)^2 * \left(\frac{113.361}{109.729} \right) = \frac{\$43.85}{\text{MWh}}$ <p>Note: The current GDP deflator index is 113.361 for 2011, 110.992 for 2010, and 109.729 for 2009 (last revised by BEA on April 27, 2012); the FERC index price for the year 2009 is \$38.40/MWh (On-peak: \$44.60/MWh; Off-peak: \$31.68/MWh; last revised March 12, 2012). Although 2011 FERC prices are available, the 2009 prices are used in the example to illustrate the concept.</p> <p>The Lessor and the Lessee will use the latest FERC price indices and revised BEA GDP deflator index values at the time the pricing adjustments are made. The source of data used in the calculations must be noted in the Lessee's documentation supporting their estimate of the value of P_t each year for review and approval by the Lessor.</p>
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(c) **Reporting, Validation, Audits, and Late Payments.**

The Lessee must submit the values used in the operating fee formula to the Lessor at the time the annual payment based on these values is made. Submission of this and other reporting, validation, audit and late payment information as requested by the Lessor must be sent to the Lessor using the contact information indicated in Addendum "A", unless the Lessor directs otherwise. Failure to submit the estimated values and the associated documentation on time to the Lessor may result in penalties as specified in applicable regulations.

Within 60 days of the submission by the Lessee of the annual payment, the Lessor will review the data submitted and validate that the operating fee formula was applied correctly. If the Lessor validation results in a different operating fee amount, the amount of the annual operating fee payment will be revised to the amount determined by the Lessor.

The Lessor also reserves the right to audit the meter data upon which the Actual 5-year Average Capacity Factor is based at any time during the lease term. If, as a result of such audit, the Lessor determines that any annual operating fee payment was calculated incorrectly, the Lessor has the right to correct any errors and collect the correct annual operating fee payment amount.

If the annual operating fee is revised downward as a result of the Lessee's calculations, as validated by the Lessor, or an audit of meter data conducted by the Lessee or Lessor, the Lessee will be refunded the difference between the amount of the payment received and

the amount of the revised annual operating fee, without interest. Similarly, if the payment amount is revised upward, the Lessee is required to pay the difference between the amount of the payment received and the amount of the revised annual operating fee, plus interest on the balance, in accordance with 30 CFR § 1218.54.

Late operating fee payments will be charged interest in accordance with 30 CFR § 1218.54.

III. Financial Assurance

The Lessor will base the determination for the amounts of all SAP, COP, and decommissioning financial assurance requirements on estimates of the cost to meet all accrued lease obligations. The Lessor determines the amount of supplemental and decommissioning financial assurance requirements on a case-by-case basis. The amount of financial assurance required to meet all lease obligations includes:

(a) **Initial Financial Assurance.** Prior to the Lease Issuance date and in accordance with 30 CFR 585.515, the Lessee must provide an initial lease-specific bond, or other approved means of meeting the Lessor's initial financial assurance requirements in an amount equal to \$100,000.

(b) **Additional Financial Assurance.** In addition to the initial lease-specific financial assurance previously discussed and as set forth in 30 CFR 585.516-.517, the Lessee is also required to provide additional supplemental bonds associated with the SAP and COP, or other form of financial assurances and a decommissioning bond or other approved means of meeting the Lessee's decommissioning obligations.

(1) Prior to the Lessor's approval of a SAP, the Lessor will require an additional supplemental bond or other form of financial assurance in an amount determined by the Lessor based on the complexity, number, and location of all facilities involved in the site assessment activities planned in the SAP, and estimates of the costs to meet all accrued obligations, in accordance with applicable BOEM regulations (30 CFR 585.515-537). The supplemental financial assurance requirement is in addition to the initial lease-specific financial assurance in the amount of \$100,000. The Lessee may meet these obligations by providing a new bond or other acceptable form of financial assurance, or increasing the amount of its existing bond or other form of financial assurance.

(2) Prior to the Lessor's approval of a COP, the Lessor may require an additional supplemental bond or other form of financial assurance in an amount determined by the Lessor based on the complexity, number, location of all facilities, activities and Commercial Operations planned in the COP, and estimates of the costs to meet all accrued obligations, in accordance with applicable BOEM regulations (30 CFR 585.515-537). The supplemental financial assurance requirement is in addition to the initial lease-specific financial assurance in the amount of \$100,000, and any additional supplemental bond or other form of financial assurance required

with the SAP. The Lessee may meet these obligations by providing a new bond or other acceptable form of financial assurance, or increasing the amount of its existing bond or other form of financial assurance.

(3) The Lessor will require a decommissioning bond or other form of financial assurance based on the anticipated decommissioning costs in accordance with applicable BOEM regulations (30 CFR 585.515-537). The decommissioning obligation must be guaranteed through an acceptable form of financial assurance and will be due on a schedule to be approved by BOEM in accordance with the number of facilities installed or being installed.

(c) **Adjustments to Financial Assurance Amounts.** The Lessor reserves the right to adjust the amount of any financial assurance requirement (initial, supplemental or decommissioning) associated with this lease and/or reassess the Lessee's cumulative lease obligations, including decommissioning obligations, at any time. If the Lessee's cumulative lease obligations and/or liabilities increase or decrease, the Lessor will notify the Lessee of any intended adjustment to the financial assurance requirements and provide the Lessee an opportunity to comment in accordance with applicable BOEM regulations.

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

ADDENDUM “C”

LEASE-SPECIFIC TERMS, CONDITIONS, AND STIPULATIONS

Lease Number OCS-A 0499

The Lessee’s rights to conduct activities on the leased area are subject to the following terms, conditions, and stipulations. The Lessor reserves the right to impose additional terms, and conditions incident to the future approval or approval with modifications of plans, such as a Site Assessment Plan (SAP) or Construction and Operations Plan (COP).

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1 DEFINITIONS

- 1.1 Definition of “Archaeological Resource”: The term “archaeological resource” has the same meaning as “archaeological resource” in BOEM regulations provided in 30 CFR 585.112.
- 1.2 Definition of “Dynamic Management Area (DMA)”: The term “DMA” refers to a temporary area designated by the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and a circle around a confirmed North Atlantic right whale sighting. The radius of this circle expands incrementally with the number of whales sighted, and a buffer is included beyond the core area, as designated by NMFS, to allow for whale movement. NOAA NMFS may apply mandatory or voluntary speed restrictions. Information regarding the location and status of applicable DMAs is available from the NMFS Office of Protected Resources.
- 1.3 Definition of “Effective Date”: The term “Effective Date” has the same meaning as “effective date” in BOEM regulations provided in 30 CFR 585.237.
- 1.4 Definition of “Geological and Geophysical Survey (G&G Survey)”: The term “G&G Survey” serves as a collective term for surveys that collect data on the geology of the seafloor and landforms below the seafloor. High resolution geophysical surveys and geotechnical (sub-bottom) exploration are components of G&G surveys.
- 1.5 Definition of “Geotechnical Exploration”: The term “Geotechnical Exploration” is used to refer to the process by which site-specific sediment and underlying geologic data are acquired from the seafloor and the sub-bottom and includes geotechnical surveys utilizing borings, vibracores, and cone penetration tests.
- 1.6 Definition of “High Resolution Geophysical Survey (HRG Survey)”: The term “HRG Survey” means a marine remote-sensing survey using, but not limited to, such equipment as side-scan sonar, magnetometer, shallow and medium (seismic) penetration sub-bottom profiler systems, narrow beam or multibeam echo sounder, or other such equipment employed for the purposes of providing data on geological conditions, identifying shallow hazards, identifying archaeological resources, charting bathymetry, and gathering other site characterization information.
- 1.7 Definition of “Listed Species”: The term “listed species,” also referred to in adjective form as “listed,” means any species of fish, wildlife, or plant that has been determined to be endangered or threatened under Section 4 of the Endangered Species Act. Listed species are provided in 50 CFR 17.11-17.12.
- 1.8 Definition of “Plan”: The term “plan” means a Site Assessment Plan (SAP) and/or a Construction and Operations Plan (COP).

- 1.9 Definition of “Protected-Species Observer”: The term “protected-species observer,” or “observer,” means an individual who is trained in the shipboard identification and behavior of protected species. Protected species include marine mammals (those protected under the Endangered Species Act and those protected under the Marine Mammal Protection Act) and sea turtles.
- 1.10 Definition of “Ramp-up”: The term “ramp-up” means the process of incrementally increasing the acoustic source level of the survey equipment when conducting HRG surveys until it reaches the operational setting.
- 1.11 Definition of “Site Assessment Activities”: The term “site assessment activities” or “site assessment,” has the same meaning as “site assessment activities” in 30 CFR 585.112.
- 1.12 Definition of “Qualified Marine Archaeologist”: The term “qualified marine archaeologist” means a person retained by the Lessee who meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology (48 FR 44738-44739), and has experience analyzing marine geophysical data.
- 1.13 Definition of “Take”: The terms “Takes,” “Taken,” and “Taking” have the same meaning as the term “take” as defined in 16 U.S.C. § 1532(19).

2 SCHEDULE

2.1 Site Characterization

2.1.1 Survey Plan(s).

- 2.1.1.1 SAP Survey Plan. If the Lessee proposes to conduct site assessment activities during the site assessment term, then the Lessee must submit to the Lessor a complete SAP survey plan. This SAP survey plan must include details and timelines of the surveys to be conducted on this lease necessary to support the submission of a SAP (i.e., necessary to satisfy the information requirements in the applicable regulations, including but not limited to 30 CFR 585.606, 610, 611).

The Lessee must submit the SAP survey plan to the Lessor at least 30 calendar days prior to the date of the required pre-survey meeting with the Lessor (See 2.1.2). The Lessor may require that the Lessee modify the SAP survey plan to address any comments the Lessor submits to the Lessee on the contents of the SAP survey plan in a manner deemed satisfactory to the Lessor prior to the commencement of any survey activities described in the SAP survey plan.

- 2.1.1.2 COP Survey Plan. The Lessee must submit to the Lessor a complete COP survey plan providing details and timelines of the surveys to be conducted on this lease that are necessary to support the submission of a COP (i.e., necessary to satisfy the information requirements in the applicable regulations, including but not limited to 30 CFR 585.621, 626, 627). The Lessee must submit the COP survey plan to the Lessor at least 30 calendar days prior to the date of the pre-survey meeting with the Lessor (see 2.1.2). The Lessee must modify the COP survey plan to address any comments the Lessor submits to the Lessee on the contents of the COP survey plan in a manner deemed satisfactory to the Lessor prior to the commencement of these survey activities.
- 2.1.2 Pre-Survey Meeting(s) with the Lessor. At least 60 days prior to the initiation of survey activities in support of the submission of a plan (i.e., SAP and/or COP), the Lessee must hold a pre-survey meeting with the Lessor to discuss the applicable proposed survey plan and timelines. The Lessee must ensure the presence at this meeting of a Qualified Marine Archaeologist (see 4.2.2). The Lessor may request the presence of other relevant subject matter experts at this meeting.

2.2 Progress Reporting

- 2.2.1 Semi-Annual Progress Report. The Lessee must submit to the Lessor a semi-annual (i.e., every six months) progress report through the duration of the site assessment term that includes a brief narrative of the overall progress since the last progress report, or – in the case of the first report – since the Effective Date. The progress report must include an update regarding progress in executing the activities included in the survey plan(s), and include as an enclosure an updated survey plan(s) accounting for any modifications in schedule.

3 NATIONAL SECURITY AND MILITARY OPERATIONS

The Lessee must comply with the requirements specified in stipulations 3.1, 3.2, and 3.3 when conducting site characterization activities in support of plan submittal.

3.1 Hold and Save Harmless

The Lessee assumes all risks of damage or injury to persons or property that occurs in, on, or above the OCS, to any persons or to any property of any person or persons in connection with any activities being performed by the Lessee in, on, or above the OCS, if such injury or damage to such person or property occurs by reason of the activities of any agency of the United States Government, its contractors, or subcontractors, or any of its officers, agents or employees, being conducted as a part of, or in connection with, the programs or activities of the individual military command headquarters (hereinafter “the appropriate command headquarters”) listed in the contact information provided as an Enclosure to this lease, whether compensation for such damage or injury might be due under a theory of strict or absolute liability or otherwise.

Notwithstanding any limitation of the Lessee's liability in Section 9 of the lease, the Lessee assumes this risk whether such injury or damage is caused in whole or in part by any act or omission, regardless of negligence or fault, of the United States, its contractors or subcontractors, or any of its officers, agents, or employees. The Lessee further agrees to indemnify and save harmless the United States against all claims for loss, damage, or injury in connection with the programs or activities of the command headquarters, whether the same be caused in whole or in part by the negligence or fault of the United States, its contractors, or subcontractors, or any of its officers, agents, or employees and whether such claims might be sustained under a theory of strict or absolute liability or otherwise.

3.2 Evacuation or Suspension of Activities

- 3.2.1 General. The Lessee hereby recognizes and agrees that the United States reserves and has the right to temporarily suspend operations and/or require evacuation on this lease in the interest of national security pursuant to Section 3(c) of this lease.
- 3.2.2 Notification. Every effort will be made by the appropriate military agency to provide as much advance notice as possible of the need to suspend operations and/or evacuate. Advance notice will normally be given before requiring a suspension or evacuation. Temporary suspension of operations may include but is not limited to the evacuation of personnel and appropriate sheltering of personnel not evacuated.

“Appropriate sheltering” means the protection of all Lessee personnel for the entire duration of any Department of Defense activity from flying or falling objects or substances, and will be implemented by an order (oral and/or written) from the BOEM Office of Renewable Energy Programs (OREP) Program Manager, after consultation with the appropriate command headquarters or other appropriate military agency or higher Federal authority. The appropriate command headquarters, military agency or higher authority will provide information to allow the Lessee to assess the degree of risk to, and provide sufficient protection for, the Lessee's personnel and property.

- 3.2.3 Duration. Suspensions or evacuations for national security reasons will not generally exceed 72 hours; however, any such suspension may be extended by order of the OREP Program Manager. During such periods, equipment may remain in place, but all operations, if any, must cease for the duration of the temporary suspension if so directed by the OREP Program Manager. Upon cessation of any temporary suspension, the OREP Program Manager will immediately notify the Lessee that such suspension has terminated and operations on the leased area can resume.

- 3.2.4 Lessee Point-of-Contact for Evacuation/Suspension Notifications. The Lessee must inform the Lessor of the persons/offices to be notified to implement the terms of 3.2.2 and 3.2.3.
- 3.2.5 Coordination with Command Headquarters. The Lessee must establish and maintain early contact and coordination with the appropriate command headquarters (see Contact Information for Reporting Requirements Sheet), in order to avoid or minimize the potential to conflict with and minimize the potential effects of conflicts with military operations.
- 3.2.6 Reimbursement. The Lessee is not entitled to reimbursement for any costs or expenses associated with the suspension of operations or activities or the evacuation of property or personnel in fulfillment of the military mission in accordance with 3.2.1 through 3.2.5 above.

3.3 Electromagnetic Emissions

Prior to entry into any designated defense operating area, warning area, or water test area for the purpose of commencing survey activities undertaken to support SAP or COP submittal, the Lessee must enter into an agreement with the commander of the appropriate command headquarters to coordinate the electromagnetic emissions associated with such survey activities. The Lessee must ensure that all electromagnetic emissions associated with such survey activities are controlled as directed by the commander of the appropriate command headquarters.

4 STANDARD OPERATING CONDITIONS

4.1 General Requirements

- 4.1.1 Prior to the start of operations, the Lessee must hold a briefing to establish responsibilities of each involved party, define the chains of command, discuss communication procedures, provide an overview of monitoring procedures, and review operational procedures. This briefing must include all relevant personnel, crew members and protected species observers (PSO). New personnel must be briefed as they join the work in progress.
- 4.1.2 The Lessee must ensure that all vessel operators and crew members, including PSOs, are familiar with, and understand, the requirements specified in Addendum C.
- 4.1.3 The Lessee must ensure that a copy of the standard operating conditions (Addendum C) is made available on every project-related vessel.

4.1.4 Marine Trash and Debris Prevention. The Lessee must ensure that vessel operators, employees, and contractors actively engaged in activity in support of plan (i.e., SAP and COP) submittal are briefed on marine trash and debris awareness and elimination, as described in the Bureau of Safety and Environmental Enforcement (BSEE) Notice to Lessees and Operators (NTL) No. 2012-G01 (“Marine Trash and Debris Awareness and Elimination”) or any NTL that supersedes this NTL, except that the Lessor will not require the Lessee, vessel operators, employees, and contractors to undergo formal training or post placards. The Lessee must ensure that these vessel operator employees and contractors are made aware of the environmental and socioeconomic impacts associated with marine trash and debris and their responsibilities for ensuring that trash and debris are not intentionally or accidentally discharged into the marine environment. The above-referenced NTL provides information the Lessee may use for this awareness briefing.

4.2 Vessel Strike Avoidance Measures

- 4.2.1 The Lessee must ensure that all vessels conducting activities in support of plan submittal comply with the vessel-strike avoidance measures specified in stipulations 4.2.1 through 4.2.9.1, except under extraordinary circumstances when complying with these requirements would put the safety of the vessel or crew at risk.
- 4.2.2 The Lessee must ensure that vessel operators and crews maintain a vigilant watch for cetaceans, pinnipeds, and sea turtles and slow down or stop their vessel to avoid striking these protected species.
- 4.2.3 The Lessee must ensure that all vessel operators comply with 10 knot (18.5 km/hr) speed restrictions in any Dynamic Management Area (DMA).
- 4.2.4 The Lessee must ensure that vessels 65 feet in length or greater, operating from November 1 through July 31, operate at speeds of 10 knots (18.5 km/hr) or less.
- 4.2.5 The Lessee must ensure that all vessel operators reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of non-delphinoid cetaceans are observed near an underway vessel.
- 4.2.6 North Atlantic right whales.
- 4.2.6.1 The Lessee must ensure all vessels maintain a separation distance of 500 meters (1,640 ft) or greater from any sighted North Atlantic right whale.
- 4.2.6.2 The Lessee must ensure that the following avoidance measures are taken if a vessel comes within 500 meters (1,640 ft) of any North Atlantic right whale:

- 4.2.6.2.1 If underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots (18.5 km/h) or less until the 500 meters (1,640 ft) minimum separation distance has been established (except as provided in 4.2.6.2.2).
- 4.2.6.2.2 If a North Atlantic right whale is sighted in a vessel's path, or within 100 meters (328 ft) to an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. The lessee must not engage engines until the North Atlantic right whale has moved outside the vessel's path and beyond 100 meters (328 ft), at which point the Lessee must comply with 4.2.6.2.1.
- 4.2.6.2.3 If a vessel is stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 100 meters (328 ft), at which point the Lessee must comply with 4.2.6.2.1.

4.2.7 Non-delphinoid cetaceans other than the North Atlantic right whale.

- 4.2.7.1 The Lessee must ensure all vessels maintain a separation distance of 100 meters (328 ft) or greater from any sighted non-delphinoid cetacean.
- 4.2.7.2 The Lessee must ensure that the following avoidance measures are taken if a vessel comes within 100 meters (328 ft) of any sighted non-delphinoid cetacean:
 - 4.2.7.2.1 If any non-delphinoid cetacean is sighted, the vessel underway must reduce speed and shift the engine to neutral, and must not engage the engines until the non-delphinoid cetacean has moved outside of the vessel's path and beyond 100 meters (328 ft).
 - 4.2.7.2.2 If a vessel is stationary, the vessel must not engage engines until the sighted non-delphinoid cetacean has moved out of the vessel's path and beyond 100 meters (328 ft).

4.2.8 Delphinoid cetaceans and Pinnipeds.

- 4.2.8.1 The Lessee must ensure that all vessels underway do not divert to approach any delphinoid cetacean and/or pinniped.
- 4.2.8.2 The Lessee must ensure that if a delphinoid cetacean and/or pinniped approaches any vessel underway, the vessel underway must avoid excessive speed or abrupt changes in direction to avoid injury to the delphinoid cetacean and/or pinniped.

4.2.9 Sea Turtles.

- 4.2.9.1 The Lessee must ensure all vessels maintain a separation distance of 50 meters (164 ft) or greater from any sighted sea turtle.

4.3 Archaeological Survey Requirements

- 4.3.1 Archaeological Survey Required. The Lessee must provide the results of an archaeological survey with its plans.
- 4.3.2 Qualified Marine Archaeologist. The Lessee must ensure that the analysis of archaeological survey data collected in support of plan submittal and the preparation of archaeological reports in support of plan submittal are conducted by a Qualified Marine Archaeologist.
- 4.3.3 Tribal Pre-Survey Meeting. The Lessee must invite by certified mail the Narragansett Indian Tribe, the Shinnecock Indian Nation, and the Lenape Tribe of Delaware to a tribal pre-survey meeting. The purpose of this meeting will be for the Lessee and the Lessee's Qualified Marine Archaeologist to discuss the Lessee's Survey Plan and consider requests to monitor portions of the archaeological survey and the geotechnical exploration activities, including the visual logging and analysis of geotechnical samples (*e.g.*, cores). This meeting must be held subsequent to the pre-survey meeting with the Lessor (see 2.1.2). Invitation to the tribal pre-survey meeting must be made at least 15 calendar days prior to the date of the proposed tribal pre-survey meeting. The meeting must be scheduled for a date at least 30 calendar days prior to the commencement of survey activities performed in support of a plan and at a location and time that affords the participants a reasonable opportunity to participate. The anticipated date for the meeting must be identified in the timeline of activities described in the applicable survey plan (see 2.1.1).
- 4.3.4 Geotechnical Exploration.
- 4.3.4.1 The Lessee may only conduct geotechnical exploration activities in support of plan submittal in locations where an analysis of the results of geophysical surveys has been completed. This analysis must include a determination by a Qualified Marine Archaeologist as to whether any potential archaeological resources are present in the area.
- 4.3.4.2 Except as allowed by the Lessor under 4.3.6, the geotechnical exploration activities must avoid potential archaeological resources by a minimum of 50 meters, and the Qualified Marine Archaeologist must calculate the avoidance distance from the maximum discernible extent of the archaeological resource.
- 4.3.4.3 Upon completion of geotechnical exploration activities, a Qualified Marine Archaeologist must certify, in the Lessee's archaeological reports, that such activities did not impact potential historic properties identified as a result of the HRG surveys performed in support of plan submittal, except as follows: in the event that the geotechnical exploration activities did impact potential historic properties identified in the archaeological surveys without the Lessor's prior approval, the Lessee and the Qualified Marine Archaeologist who prepared the report must instead provide a statement documenting the extent of these impacts.

- 4.3.5 Monitoring and Avoidance. The Lessee must inform the Qualified Marine Archaeologist that he or she is permitted to be present during HRG surveys and bottom-disturbing activities performed in support of plan submittal to ensure avoidance of potential archaeological resources, as determined by the Qualified Marine Archaeologist (including bathymetric, seismic, and magnetic anomalies; side scan sonar contacts; and other seafloor or sub-surface features that exhibit potential to represent or contain potential archaeological sites or other historic properties). In the event that the Qualified Marine Archaeologist indicates that he or she wishes to be present, the Lessee must facilitate the Qualified Marine Archaeologist's presence, as requested by the Qualified Marine Archaeologist, and provide the Qualified Marine Archaeologist the opportunity to inspect data quality.
- 4.3.6 No Impact without Approval. The Lessee must not knowingly impact a potential archaeological resource without the Lessor's prior approval.
- 4.3.7 Post-Review Discovery Clauses. If the Lessee, while conducting site characterization activities in support of plan submittal, discovers a potential archaeological resource, such as the presence of a shipwreck (*e.g.*, a sonar image or visual confirmation of an iron, steel, or wooden hull, wooden timbers, anchors, concentrations of historic objects, piles of ballast rock), prehistoric artifacts, or relict landforms within the project area, the Lessee must:
- 4.3.7.1 Immediately halt seafloor/bottom-disturbing activities within the area of discovery;
 - 4.3.7.2 Notify the Lessor within 24 hours of discovery;
 - 4.3.7.3 Notify the Lessor in writing via report to the Lessor within 72 hours of its discovery;
 - 4.3.7.4 Keep the location of the discovery confidential and take no action that may adversely affect the archaeological resource until the Lessor conducts an evaluation and instructs the applicant on how to proceed; and
 - 4.3.7.5 Conduct any additional investigations as directed by the Lessor to determine if the resource is eligible for listing in the National Register of Historic Places (30 CFR 585.802(b)). The Lessor will direct the Lessee to conduct such investigations if: (1) the site has been impacted by the Lessee's project activities; or (2) impacts to the site or to the area of potential effect cannot be avoided. If investigations indicate that the resource is potentially eligible for listing in the National Register of Historic Places, the Lessor will tell the Lessee how to protect the resource or how to mitigate adverse effects to the site. If the Lessor incurs costs in protecting the resource, under Section 110(g) of the National Historic Preservation Act, the Lessor may charge the Lessee reasonable costs for carrying out preservation responsibilities under the OCS Lands Act (30 CFR 585.802(c-d)).

4.4 Geological and Geophysical (G&G) Survey Requirements

- 4.4.1 The Lessee must ensure that all vessels conducting activity in support of a plan (*i.e.*, SAP and COP) submittal comply with the geological and geophysical survey requirements specified in 4.4, except under extraordinary circumstances when complying with these requirements would put the safety of the vessel or crew at risk.
- 4.4.2 Visibility. The Lessee must not conduct G&G surveys in support of plan submittal at any time when lighting or weather conditions (*e.g.*, darkness, rain, fog, sea state) prevent visual monitoring of the high-resolution geophysical (HRG) survey exclusion zone (see 4.4.6) or the geotechnical exploration exclusion zone (see 4.4.7), except as allowed under 4.4.3.
- 4.4.3 Modification of Visibility Requirement. If the Lessee intends to conduct G&G survey operations in support of plan submittal at night or when visual observation is otherwise impaired, it must submit to the Lessor an alternative monitoring plan detailing the alternative monitoring methodology (*e.g.*, active or passive acoustic monitoring technologies). The alternative monitoring plan must demonstrate the effectiveness of the methodology proposed to the Lessor's satisfaction. The Lessor may, after consultation with National Marine Fisheries Service (NMFS), decide to allow the Lessee to conduct G&G surveys in support of plan submittal at night or when visual observation is otherwise impaired using the proposed alternative monitoring methodology.
- 4.4.4 Protected-Species Observer. The Lessee must ensure that the exclusion zone for all G&G surveys performed in support of plan submittal is monitored by NMFS-approved protected species observers around the sound source. The number of protected species observers must be sufficient to effectively monitor the exclusion zone at all times. In order to ensure effective monitoring, observers must be on watch for no more than 4 consecutive hours, with at least a 2-hour break after a 4-hour watch, unless otherwise accepted by the Lessor. Observers must be on watch for no more than 12 hours in a 24-hour period. The Lessee must provide to the Lessor a list of observers and their résumés no later than 45 calendar days prior to the scheduled start of surveys performed in support of plan submittal. The Lessee must provide the résumés of additional observers at least 15 calendar days prior to each observer's start date. The Lessor will send the observer qualifications to NMFS for approval.
- 4.4.5 Observation Location and Optical Device Availability. The Lessee must ensure that monitoring occurs from the highest available vantage point on the associated operational platform, allowing for 360-degree scanning. The Lessee must ensure that each observer has access to reticle binoculars and other suitable equipment to adequately perceive and monitor protected species within the exclusion zone during surveys conducted in support of plan submittal.

- 4.4.6 High-Resolution Geophysical (HRG) Surveys. The following stipulations are specific to HRG surveys conducted in support of plan submittal where one or more acoustic sound source is operating at frequencies below 200 kHz:
- 4.4.6.1 Establishment of Default Exclusion Zone. The Lessee must ensure that a protected species observer monitors a 200-meter default exclusion zone for cetaceans, pinnipeds, and sea turtles. In the case of the North Atlantic right whale, the Lessee must observe a minimum separation distance of 500 m (1,640 ft), as required under 4.2.6.1.
- 4.4.6.1.1 If the Lessor determines that the exclusion zone does not encompass the 180 dB Level A harassment threshold calculated for the acoustic source having the highest source level, the Lessor will consult with NMFS and may impose additional, relevant requirements on the Lessee, including, but not limited to, required expansion of this exclusion zone.
- 4.4.6.2 Field Verification of HRG Survey Exclusion Zone. The Lessee must conduct field verification of the exclusion zone for the HRG survey equipment operating below 200 kHz. As part of such field verification, the Lessee must take acoustic measurements at a minimum of two reference locations and in a manner that is sufficient to establish the following: source level (peak at 1 meter) and distance to the 207, 180, 166, 160, and 150 dB(RMS) re 1 μ Pa sound pressure level (SPL) isopleths as well as the 187 dB re 1 μ Pa cumulative sound exposure level (cSEL) and 206 dB_{peak}. The Lessee must take these sound measurements at the reference locations at two depths (i.e., a depth at mid-water and a depth at approximately 1 meter (3.28 ft) above the seafloor). The Lessee must report the field verification results to the Lessor in the SAP and COP Survey Plans, unless otherwise authorized by the Lessor.
- 4.4.6.3 Field Verification Plan for HRG Survey Exclusion Zone. No later than 45 days prior to the commencement of the field verification activities, the Lessee must submit a plan for verifying the sound source levels of any electromechanical survey equipment operating at frequencies below 200 kHz. The plan must demonstrate how the field verification activities will comply with the requirements of 4.4.6.2. Prior to the commencement of the field verification activities, the Lessor may require the Lessee to modify the plan to address any comments the Lessor submits to the Lessee on the contents of the plan in a manner deemed satisfactory to the Lessor.

- 4.4.6.4 Modification of Exclusion Zone Per Lessee Request. The Lessee may use the results from its field verification to request modification of the exclusion zone for the specific HRG survey equipment under consideration. The Lessee must base any proposed new exclusion zone radius on the largest safety zone configuration of the target Level A or Level B harassment acoustic threshold zone as defined by NMFS. The Lessee must use this modified zone for all subsequent use of field-verified equipment. The Lessee may periodically reevaluate the modified zone using the field verification procedures described in 4.4.6.2. The Lessee must obtain Lessor approval of any new exclusion zone before it is implemented.
- 4.4.6.5 Clearance of Exclusion Zone. The Lessee must ensure that active acoustic sound sources are not activated until the protected species observer has reported the exclusion zone clear of all marine mammals and sea turtles for at least 60 minutes.
- 4.4.6.6 Seasonal Management Areas (SMAs) Right Whale Monitoring. The Lessee must ensure that between November 1 and July 31, vessel operators monitor NMFS North Atlantic Right Whale reporting systems (*e.g.*, the Early Warning System, Sighting Advisory System, and Mandatory Ship Reporting System) for the presence of North Atlantic right whales during HRG survey operations.
- 4.4.6.7 Dynamic Management Area (DMA) Shutdown Requirement. The Lessee must ensure that vessels cease HRG survey activities within 24 hours of NMFS establishing a DMA in the Lessee's HRG survey area. The Lessee may resume HRG survey activities in the affected area as soon as the DMA has expired.
- 4.4.6.8 Electromechanical Survey Equipment Ramp-Up. The Lessee must ensure that, when technically feasible, a ramp-up of the electromechanical survey equipment occurs at the start or re-start of HRG survey activities. A ramp-up must begin with the power of the smallest acoustic equipment for the HRG survey at its lowest power output. The power output must be gradually increased and other acoustic sources added in such a way that the source level would rise in steps not exceeding 6 dB per 5-minute period.
- 4.4.6.9 Shutdown for Non-Delphinoid Cetaceans and Sea Turtles. If a non-delphinoid cetacean or sea turtle is sighted at or within the exclusion zone, the Lessee must immediately shut down all the electromechanical survey equipment. The Lessee must ensure that the vessel operator immediately complies with such a call by the observer. Any disagreement or discussion must occur only after shutdown. Subsequent restart of the electromechanical survey equipment must use the ramp-up provisions described in 4.4.6.8 and must only occur following clearance of the exclusion zone of all marine mammals and sea turtles for at least 60 minutes as described in 4.4.6.5.

4.4.6.10 Power Down for Delphinoid Cetaceans and Pinnipeds. If a delphinoid cetacean or pinniped is sighted at or within the exclusion zone, the Lessee must immediately power down the electromechanical survey equipment to the lowest power output that is technically feasible. The Lessee must ensure that the vessel operator immediately complies with such a call by the observer. Any disagreement or discussion must occur only after power-down. Subsequent restart of the electromechanical survey equipment must use the ramp-up procedures described in 4.4.6.8 and may occur only after (1) the exclusion zone is clear of delphinoid cetaceans and pinnipeds or (2) a determination by the protected species observer after a minimum of 10 minutes of observation that the delphinoid cetacean and/or pinniped is approaching the vessel or towed equipment at a speed and vector that indicates voluntary approach to bow-ride or chase towed equipment.

4.4.6.10.1 Pauses in Electromechanical Survey Sound Source. The Lessee must ensure that if the electromechanical sound source shuts down for reasons other than encroachment into the exclusion zone by a non-delphinoid cetacean or sea turtle, including, reasons such as, but not limited to, mechanical or electronic failure, resulting in the cessation of the sound source for a period greater than 20 minutes, restart of the electromechanical survey equipment commences only after clearance of the exclusion zone, as described in 4.4.6.5, and the implementation of ramp-up procedures, as described in 4.4.6.8. If the shutdown is less than 20 minutes, the equipment may be restarted as soon as practicable at its operational level as long as visual surveys were continued diligently throughout the silent period and the exclusion zone remained clear of marine mammals and sea turtles. If visual surveys were not continued diligently during a shutdown of 20 minutes or less, the Lessee must restart the electromechanical survey equipment following clearance of the exclusion zone, as described in 4.4.6.5, and implementation of ramp-up procedures, as described in 4.4.6.8.

4.4.7 Geotechnical (Sub-bottom) Exploration. Stipulations specific to geotechnical exploration conducted in support of plan submittal are provided in 4.4.7.1 through 4.4.7.6.

4.4.7.1 Establishment of Default Exclusion Zone. The Lessee must ensure that a protected species observer monitors a 200-meter (656 ft) default exclusion zone for all marine mammals and sea turtles around any vessel conducting geotechnical surveys.

- 4.4.7.2 Modification of Default Exclusion Zone Per Lessee Request. If the Lessee wishes to modify the 200 m (656 ft) default exclusion zone for specific geotechnical exploration equipment, the Lessee must submit a plan for verifying the sound source levels of the specific geotechnical exploration equipment to the Lessor. The plan must demonstrate how the field verification activities will comply with the requirements of 4.4.7.3. The Lessor may require that the Lessee modify the plan to address any comments the Lessor submits to the Lessee on the contents of the plan in a manner deemed satisfactory to the Lessor prior to the commencement of field verification activities. Any new exclusion zone radius proposed by the Lessee must be based on the largest safety zone configuration of the target Level A or Level B harassment acoustic threshold zone as defined by NMFS. The Lessee must use this modified zone for all subsequent use of field-verified equipment. The Lessee may periodically reevaluate the modified zone using the field verification procedures described in 4.4.7.3. The Lessee must obtain Lessor approval of any new exclusion zone before it is implemented.
- 4.4.7.3 Field Verification of Geotechnical Exclusion Zone. If the Lessee wishes to modify the existing exclusion zone, the Lessee must conduct field verification of the exclusion zone for specific geotechnical exploration equipment. The Lessee must use the results of the sound measurements from the survey equipment to establish a new exclusion zone, which may be greater than or less than the 200 m (656 ft) default exclusion zone depending on the results of the field tests. As part of such field verification, the Lessee must take acoustic measurements at a minimum of two reference locations and in a manner that is sufficient to establish the following: source level (peak at 1 meter) and distance to the 207, 180, 166, 160, and 150 dB(RMS) re 1 μ Pa sound pressure level (SPL) isopleths as well as the 187 dB re 1 μ Pa cumulative sound exposure level (cSEL) and 206 dB_{peak}. The Lessee must take these sound measurements at the reference locations at two depths (i.e., a depth at mid-water and a depth at approximately 1 meter above the seafloor).
- 4.4.7.4 Clearance of Exclusion Zone. The Lessee must ensure that the geotechnical sound source is not activated until the protected species observer has reported the exclusion zone clear of all marine mammals and sea turtles for 60 minutes.
- 4.4.7.5 Shutdown for Non-Delphinoid Cetaceans and Sea Turtles. If any non-delphinoid cetaceans or sea turtles are sighted at or within the exclusion zone, the Lessee must immediately shut down the geotechnical survey equipment. The vessel operator must comply immediately with such a call by the observer. Any disagreement or discussion should occur only after shutdown. Subsequent restart of the geotechnical survey equipment must only occur following clearance of the exclusion zone as described in 4.4.7.4.

4.4.7.6 Pauses in Geotechnical Survey Sound Source. The Lessee must ensure that if the geotechnical sound source shuts down for reasons other than encroachment into the exclusion zone by a non-delphinoid cetacean or sea turtle, including, but not limited to, mechanical or electronic failure resulting in the cessation of the sound source for a period greater than 20 minutes, restart of the geotechnical survey equipment commences only after clearance of the exclusion zone, as described in 4.4.7.4. If the shutdown is less than 20 minutes, the equipment may be restarted as soon as practicable as long the Lessee has continued visual surveys diligently throughout the silent period and the exclusion zone remained clear of marine mammals and sea turtles. If visual surveys were not continued diligently during a shutdown of 20 minutes or less, the Lessee must restart the geotechnical survey equipment following clearance of the exclusion zone, as described in 4.4.7.4.

4.5 Protected-Species Reporting Requirements

The Lessee must ensure compliance with the following reporting requirements for site characterization activities performed in support of plan submittal, and, where appropriate, must fulfill these requirements using the contact information provided as an Enclosure to this lease, or updated contact information as provided by the Lessor:

4.5.1 Reporting Injured or Dead Protected Species. The Lessee must ensure that sightings of any injured or dead protected species (*e.g.*, marine mammals, sea turtles or sturgeon) are reported to the Lessor, NMFS and the NMFS Northeast Region's Stranding Hotline (866-755-6622 or current) within 24 hours of sighting, regardless of whether the injury or death is caused by a vessel. In addition, if the injury or death was caused by a collision with a project-related vessel, the Lessee must notify the Lessor of the strike within 24 hours. The Lessee must use the form provided in Appendix A to ADDENDUM "C" to report the sighting or incident. If the Lessee's activity is responsible for the injury or death, the Lessee must ensure that the vessel assists in any salvage effort as requested by NMFS.

4.5.2 Reporting Observed Impacts to Protected Species.

4.5.2.1 The Lessee must report any observed takes of listed marine mammals, sea turtles or sturgeon (as defined in 1.13) resulting in injury or mortality within 24 hours to the Lessor and NMFS.

4.5.2.2 The Lessee must report any observations concerning any impacts on Endangered Species Act listed marine mammals, sea turtles or sturgeon to the Lessor and NMFS Northeast Region's Stranding Hotline within 48 hours.

4.5.2.3 The Lessee must record injuries or mortalities using the form provided in Appendix A to ADDENDUM "C".

- 4.5.3 Protected Species Observer Reports. The Lessee must ensure that the protected-species observer record all observations of protected species using standard marine mammal observer data collection protocols. The list of required data elements for these reports is provided in Appendix B to ADDENDUM “C”.
- 4.5.4 Reports of G&G Survey Activities and Observations. The Lessee must provide BOEM and NMFS with reports every 90 calendar days following the commencement of HRG and/or geotechnical exploration activities, and a final report at the conclusion of the HRG and/or geotechnical exploration activities. Each report must include a summary of survey activities, all protected species observer and incident reports (See Appendices A and B), a summary of the survey activities, and an estimate of the number of listed marine mammals and sea turtles observed and/or taken during these survey activities.
- 4.5.5 Marine Mammal Protection Act Authorization(s). If the Lessee is required to obtain an authorization pursuant to section 101(a)(5) of the Marine Mammal Protection Act prior to conducting survey activities, the Lessee must provide to the Lessor a copy of such authorization prior to commencing survey activities, pursuant to 30 CFR 585.801(b).

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APPENDIX "A"

Lease Number OCS-A 0499

Incident Report: Protected Species Injury or Mortality

Photographs/Video should be taken of all injured or dead animals.

Observer's full name: _____

Reporter's full name: _____

Species Identification: _____

Name and type of platform: _____

Date animal observed: _____ Time animal observed: _____

Date animal collected: _____ Time animal collected: _____

Environmental conditions at time of observation (i.e. tidal stage, Beaufort Sea State, weather):

Water temperature (°C) and depth (m/ft) at site: _____

Describe location of animal and events 24 hours leading up to, including and after, the incident (incl. vessel speeds, vessel activity and status of all sound source use):

Photograph/Video taken: YES / NO If Yes, was the data provided to NMFS? YES / NO
(Please label *species, date, geographic site* and *vessel name* when transmitting photo and/or video)

Date and Time reported to NMFS Stranding Hotline: _____

Sturgeon Information: *(please designate cm/m or inches and kg or lbs)*

Species: _____

Fork length (or total length): _____ Weight: _____

Condition of specimen/description of animal: _____

Fish Decomposed: NO SLIGHTLY MODERATELY SEVERELY

Fish tagged: YES / NO If Yes, please record all tag numbers.

Tag #(s): _____

Genetic samples collected: YES / NO

Genetics samples transmitted to: _____ on ____/____/20....

Sea Turtle Species Information: (please designate cm/m or inches)

Species: _____ Weight (kg or lbs): _____

Sex: Male Female Unknown

How was sex determined?: _____

Straight carapace length: _____ Straight carapace width: _____

Curved carapace length: _____ Curved carapace width: _____

Plastron length: _____ Plastron width: _____

Tail length: _____ Head width: _____

Condition of specimen/description of animal: _____

Existing Flipper Tag Information

Left: _____ Right: _____

PIT Tag#: _____

Miscellaneous:

Genetic biopsy collected: YES NO Photographs taken: YES NO

Turtle Release Information:

Date: _____ Time: _____

Latitude: _____ Longitude: _____

State: _____ County: _____

Remarks: (note if turtle was involved with tar or oil, gear or debris entanglement, wounds, or mutilations, propeller damage, papillomas, old tag locations, etc.) _____

Marine Mammal information: *(please designate cm/m or ft/inches)*

Length of marine mammal (note direct or estimated): _____

Weight *(if possible, kg or lbs)*: _____

Sex of marine mammal (if possible): _____

How was sex determined?: _____

Confidence of Species Identification: SURE UNSURE BEST GUESS

Description of Identification characteristics of marine mammal: _____

Genetic samples collected: YES / NO

Genetic samples transmitted to: _____ on ____ / ____ /20....

Fate of marine mammal: _____

Description of Injuries Observed: _____

Other Remarks/Drawings: _____

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APPENDIX “B”

Lease Number OCS-A 0499

REQUIRED DATA ELEMENTS FOR PROTECTED SPECIES OBSERVER REPORTS

The Lessee must ensure that the protected-species observer record all observations of protected species using standard marine mammal observer data collection protocols. The list of required data elements for these reports is provided below:

1. Vessel name;
2. Observers' names and affiliations;
3. Date;
4. Time and latitude/longitude when daily visual survey began;
5. Time and latitude/longitude when daily visual survey ended; and
6. Average environmental conditions during visual surveys including:
 - a. Wind speed and direction;
 - b. Sea state (glassy, slight, choppy, rough, or Beaufort scale);
 - c. Swell (low, medium, high, or swell height in meters); and
 - d. Overall visibility (poor, moderate, good).
7. Species (or identification to lowest possible taxonomic level);
8. Certainty of identification (sure, most likely, best guess);
9. Total number of animals;
10. Number of juveniles;
11. Description (as many distinguishing features as possible of each individual seen, including length, shape, color and pattern, scars or marks, shape and size of dorsal fin, shape of head, and blow characteristics);
12. Direction of animal's travel relative to the vessel (preferably accompanied by a drawing);
13. Behavior (as explicit and detailed as possible, noting any observed changes in behavior);
14. Activity of vessel when sighting occurred.

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ADDENDUM "D"

PROJECT EASEMENT

Lease Number OCS-A 0499

This section includes a description of the Project Easement(s), if any, associated with this lease, and the financial terms associated with it. This section will be updated as necessary.

I. Rent

The Lessee must begin submitting rent payments for any project easement associated with this lease commencing on the date that BOEM approves the Construction and Operations Plan (COP) or modification of the COP describing the project easement. Annual rent for a project easement 200 feet wide, centered on the transmission cable, is \$70.00 per statute mile. For any additional acreage required, the Lessee must also pay the greater of \$5.00 per acre per year or \$450.00 per year.

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ADDENDUM "E"

RENT SCHEDULE

Lease Number OCS-A 0499

This section includes a description of the schedule for rent payments that will be determined after the Construction and Operations Plan (COP) has been approved or approved with modifications. This section will be updated as necessary.

Unless otherwise authorized by the Lessor in accordance with the applicable regulations in 30 CFR Part 585, the Lessee must make rent payments as described below.

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Lease Number OCS-A 0499

CONTACT INFORMATION FOR REPORTING REQUIREMENTS

The following contact information must be used for the reporting and coordination requirements specified in Addendum C, Stipulation 3.2.5:

**United States Fleet Forces (USFF) N46
1562 Mitscher Ave, Suite 250
Norfolk, VA 23551
(757) 836-6206**

The following contact information must be used for the reporting requirements in Addendum C, Stipulation 4.4:

Reporting Injured or Dead Protected Species

NOAA Fisheries Northeast Region's Stranding Hotline
866-755-6622

All other reporting requirements in Stipulation 4.4

Bureau of Ocean Energy Management
Environment Branch for Renewable Energy
Phone: 703-787-1340
Email: renewable_reporting@boem.gov

National Marine Fisheries Service
Northeast Regional Office, Protected Resources Division
Section 7 Coordinator
Phone: 978-281-9328
Email: incidental.take@noaa.gov; kellie.foster-taylor@noaa.gov

Vessel operators may send a blank email to ne.rw.sightings@noaa.gov for an automatic response listing all current dynamic management areas (DMAs).



INCIDENTAL HARASSMENT AUTHORIZATION

Atlantic Shores, LLC (Atlantic Shores) 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 from April 20, 2022 through April 19, 2023.
2. This IHA authorizes take incidental to marine site characterization surveys in coastal waters off New Jersey and New York, as specified in Atlantic Shores' IHA application.
3. General Conditions
 - (a) A copy of this IHA must be in the possession of Atlantic Shores, the vessel operator, other relevant personnel, the lead marine mammal observer (PSO) (see description below), and any other relevant designees operating under the authority of the IHA.
 - (b) The species and/or stocks authorized for taking are listed in Table 1. Authorized take, by Level B harassment only, is limited to the species and numbers listed in Table 1.
 - (c) The taking by injury, serious injury or death of any of the species listed in Table 1 or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.
 - (d) Atlantic Shores shall instruct relevant vessel personnel with regard to the authority of the marine mammal monitoring team, and shall ensure that relevant vessel personnel and the marine mammal 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, marine mammal 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 shall be avoided.



- (f) Atlantic Shores 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).

4. Mitigation Requirements

- (a) Atlantic Shores must employ qualified, NMFS-approved visual PSOs (see Section 5 of this IHA). When specified acoustic sources (impulsive: sparkers; non-impulsive: non-parametric sub-bottom profilers) are operating, a minimum of one PSO must be on duty, per source vessel, during daylight hours 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 shall establish and monitor applicable Exclusion Zones (see below). These zones shall be based upon the radial distance from the acoustic source (rather than being based around the vessel itself).
- (d) Exclusion Zones must be as follows:
 - (i) A 500-meter (m) Exclusion Zone for North Atlantic right whales during use of specified acoustic sources (impulsive: sparkers; non-impulsive: non-parametric sub-bottom profilers).
 - (ii) A 100-m Exclusion Zone for all other marine mammals (excluding NARWs) during use of specified acoustic sources (see condition 4(a)).
- (e) Pre-start clearance and ramp-up – A ramp-up procedure, involving a gradual increase in source level output, is required at all times as part of the activation of the acoustic source when technically feasible. Operators should 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). Pre-start clearance observation zones must be as follows: 500-m for all ESA-listed marine mammals and 100-m for all other marine mammals (Table 3). 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 should not be less than 60 minutes prior to the planned ramp-up in order to allow the PSOs time to monitor the Exclusion 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 Exclusion Zones must be visible, except as indicated in (viii) below.

- (ii) Ramp-ups shall be scheduled so as to minimize the time spent with the source activated.
- (iii) A visual PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO that the Exclusion 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 PSOs 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 may not be initiated if any marine mammal is within the applicable Exclusion Zone. If a marine mammal is observed within the applicable Exclusion Zone during the 30 minute pre-start clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).
- (vii) PSOs must monitor the Exclusion 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 Exclusion 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 such circumstances.
- (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 Exclusion Zone. For any longer shutdown, pre-start clearance observation and ramp-up are required.

- (x) If any marine mammal species that are listed under the ESA are observed within the clearance zones, 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.
- (xi) Activation of survey equipment through ramp-up procedures may not occur when visual detection of marine mammals within the pre-clearance zone is not expected to be effective (*e.g.*, during inclement conditions such as heavy rain or fog)
- (f) 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 Exclusion 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 swiftly while allowing PSOs to maintain watch.
 - (iii) When the acoustic source is active and a marine mammal appears within or enters the applicable Exclusion 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 delphinids¹ and pinnipeds.
 - (A) If a delphinid (individual belonging to the genera of the Family *Delphinidae*) or pinniped is visually detected within the Exclusion Zone, no shutdown is required unless the PSO confirms the individual to be of a genus other than those described in Table 1; in which case, a shutdown is required.
 - (v) 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 Exclusion Zone), PSOs may use best professional judgment in making the decision to call for a shutdown.

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

- (vi) Upon implementation of shutdown, the source may be reactivated after the marine mammal has been observed exiting the applicable Exclusion 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.
 - (vii) 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).
 - (viii) Shutdown, pre-start clearance, and ramp-up procedures are not required during HRG survey operations using only non-impulsive sources (*e.g.*, parametric sub-bottom profilers) other than non-parametric sub-bottom profilers (*e.g.*, CHIRPs). Pre-clearance and ramp-up, but not shutdown, are required when using non-impulsive, non-parametric sub-bottom profilers.
- (g) 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 mammal and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammal. A 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 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) (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 baleen 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 mammal, with an understanding that at times this may not be possible (*e.g.*, for animals that approach the vessel; Table 3).
- (vii) When marine mammal are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distance (*e.g.*, attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area, 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) Atlantic Shores 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. 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) PSO names must be provided to NMFS by the operator for review and confirmation of their approval for specific roles prior to commencement of the survey². For prospective PSOs not previously approved, or for PSOs whose

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

approval is not current, NMFS must review and approve PSO qualifications. Resumes should 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.

- (c) NMFS may approve PSOs as conditional or unconditional. A conditionally-approved PSO may be one who is trained but has not yet attained the requisite experience. An unconditionally-approved PSO is one who has attained the necessary experience. For unconditional approval, the PSO must have a minimum of 90 days at sea performing the role during a geophysical survey, with the conclusion of the most recent relevant experience not more than 18 months previous.
- (d) At least one of the visual PSOs aboard the vessel must be unconditionally-approved. One unconditionally-approved visual PSO shall be designated as the lead for the entire PSO team. This lead should typically be the PSO with the most experience, would coordinate duty schedules and roles for the PSO team³, and serve as primary point of contact for the vessel operator. To the maximum extent practicable, the duty schedule shall be planned such that unconditionally-approved PSOs are on duty with conditionally-approved PSOs.
- (e) PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver shall be submitted to NMFS and must include written justification. Alternate experience that may be considered includes, but is not limited to (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; and (3) previous work experience as a PSO (PSO must be in good standing and demonstrate good performance of PSO duties).
- (f) 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.
- (g) PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and shall 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.

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.

- (h) 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.
- (i) Any observations of marine mammal by crew members aboard any vessel associated with the survey shall be relayed to the PSO team.
- (j) Atlantic Shores must work with the selected third-party PSO provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals, and to ensure that PSOs are capable of calibrating equipment as necessary for accurate distance estimates and species identification. Such equipment, at a minimum, shall include:
 - (i) At least one thermal (infrared) imaging device suited for the marine environment;
 - (ii) Reticle binoculars (*e.g.*, 7 x 50) 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 should also have an image stabilization system;
 - (v) Equipment necessary for accurate measurement of distances to marine mammal;
 - (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.
- (k) Equipment specified in (i) through (viii) above may be provided by an individual PSO, the third-party PSO provider, or the operator, but Atlantic Shores is responsible for ensuring PSOs have the proper equipment required to perform the duties specified within this IHA.
- (l) During good conditions (*e.g.*, daylight hours; Beaufort sea state 3 or less), PSOs shall 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.

- (m) Atlantic Shores 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 will abide by speed restrictions in the DMA per the lease conditions.

6. Reporting Requirements

- (a) Atlantic Shores shall 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 mammals sightings (dates, times, locations, activities, associated survey activities). The draft report shall also include geo-referenced, time-stamped vessel tracklines for all time periods during which acoustic sources were operating. Tracklines should include points recording any change in acoustic source status (*e.g.*, when the sources began operating, when they were turned off, or when they changed operational status such as from full array to single gun or vice versa). GIS files shall be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. In addition to the report, all raw observational data shall be made available. The report must summarize the information submitted in interim monthly reports (if required) as well as additional data collected as described above in *Data Collection*. A final report must be submitted within 30 days following resolution of any comments on the draft report. All draft and final marine mammal and acoustic monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *ITP.Potlock@noaa.gov*.
- (b) PSOs must use standardized electronic data forms to record data. PSOs shall record detailed information about any implementation of mitigation requirements, including the distance of marine mammal to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances. At a minimum, the following information must be recorded:
 - (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, number and volume of airguns operating in an array, tow depth of an acoustic source, and any other notes of significance (*i.e.*, pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.).
- (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 who sighted the animal;

4. Time of sighting;
5. Initial detection method;
6. Sightings cue;
7. Vessel location at time of sighting (decimal degrees);
8. Direction of vessel's travel (compass direction);
9. Speed of the vessel(s) from which the observation was made;
10. Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level or unidentified); also note the composition of the group if there is a mix of species;
11. Species reliability (an indicator of confidence in identification);
12. Estimated distance to the animal and method of estimating distance;
13. Estimated number of animals (high/low/best);
14. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
15. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars, or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
16. Detailed behavior observations (*e.g.*, number of blows/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, Atlantic Shores must report the sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866-755-6622) within two hours of occurrence, when practicable, or no later than 24 hours after occurrence.
 - (ii) North Atlantic 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/>).
- (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, Atlantic Shores must report the incident to NMFS as soon as feasible by phone (866-755-6622) and by email (nmfs.gar.stranding@noaa.gov and PR.ITP.MonitoringReports@noaa.gov) as soon as feasible. 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, Atlantic Shores must report the incident to NMFS by phone (866-755-6622) and by email (nmfs.gar.stranding@noaa.gov and PR.ITP.MonitoringReports@noaa.gov) as soon as feasible. 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.
8. Renewals – On a case-by-case basis, NMFS may issue a one-time, one-year Renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical, or nearly identical, activities are planned or (2) the specified activities would not be completed by the time this IHA expires and a

Renewal would allow for completion of the activities, provided all of the following conditions are met:

- (a) A request for Renewal is received no later than 60 days prior to the needed Renewal IHA effective date (the Renewal IHA expiration date cannot extend beyond one year from expiration of this IHA).
- (b) The request for Renewal must include the following:
 - (i) An explanation that the activities to be conducted under the requested Renewal IHA are identical to the activities analyzed for this IHA, are a subset of the activities, or include changes so minor that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).
 - (ii) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.
- (c) Upon review of the request for Renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings made in support of this IHA remain valid.

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

Date

Table 1—Authorized Incidental 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	Level B harassment takes	
Cetacean (Mysticete)	North Atlantic right whale	<i>Eubalaena glacialis</i>	Western Atlantic Stock	Yes	North Atlantic right whale	17	
	Fin whale	<i>Balaenoptera physalus</i>	Western North Atlantic Stock	Yes	Large whale	5	
	Sei whale	<i>Balaenoptera borealis</i>	Nova Scotia Stock	Yes	Large whale	2	
	Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian East Coastal Stock	No	Large whale	2	
	Humpback whale	<i>Megaptera novaeangliae</i>	West Indies DPS	No	Large whale	8	
Cetacean (Odontocete)	Sperm whale	<i>Physeter macrocephalus</i>	North Atlantic Stock	Yes	Large whale	1	
	Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western North Atlantic Stock	No	Small odontocete	17	
	Atlantic spotted dolphin	<i>Stenella frontalis</i>	Western North Atlantic Stock	No	Small odontocete	100	
	Common bottlenose dolphin		<i>Tursiops truncatus</i>	Western North Atlantic Offshore Stock	No	Small odontocete	1,175
				Western North Atlantic Northern Migratory Coastal Stock			385
	Long-finned pilot whale	<i>Globicephala melas</i>	Western North Atlantic Stock	No	Large odontocete	20	
	Risso's dolphin	<i>Grampus griseus</i>	Western North Atlantic Stock	No	Large odontocete	30	
	Common dolphin (short-beaked)	<i>Delphinus delphis</i>	Western North Atlantic Stock	No	Small odontocete	560	
Harbor porpoise	<i>Phocoena phocoena</i>	Western North Atlantic Stock	No	Small odontocete	282		
Pinniped (Phocid)	Gray seal	<i>Halichoerus grypus</i>	Western North Atlantic Stock	No	Seal	426	
	Harbor seal	<i>Phoca vitulina</i>	Western North Atlantic Stock	No	Seal	426	

Table 2—Level B Harassment Zones

Authorized marine mammal species	Level B harassment zone during sparker use	Level B harassment zone during non-parametric sub-bottom profiler use
North Atlantic right whale	141 meters	56 meters
Fin whale		
Sei whale		
Humpback whale		
Sperm whale		
Minke whale		
Atlantic white-sided dolphin		
Atlantic spotted dolphin		
Common bottlenose dolphin		
Long-finned pilot whale		
Risso's dolphin		
Common dolphin		
Harbor porpoise		
Gray seal		
Harbor seal		

Table 3—Distances/Times for Clearance, Shutdown/Exclusion, Vessel Separation Zones

Authorized marine mammal species	ESA-listed?	Pre-clearance zone		Vessel separation zone	Exclusion/shutdown zone	
		Distance (meters)	Duration (minutes)	Distance (meters)	Distance (meters)	Duration (minutes)
North Atlantic right whale	Yes	500	30	500	500	30
Fin whale						
Sei whale						
Sperm whale						
Humpback whale	No	100	30	100	100	15
Minke whale						
Long-finned pilot whale						
Risso's dolphin						
Harbor porpoise						
Gray seal						
Harbor seal						
Atlantic white-sided dolphin						
Atlantic spotted dolphin						
Common bottlenose dolphin (coastal and offshore stocks)						
Common dolphin						
					Not required. See condition 4(f)(iv) in this IHA	



INCIDENTAL HARASSMENT AUTHORIZATION

Atlantic Shores Offshore Wind, LLC (Atlantic Shores) 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 from June 9, 2023 through June 8, 2024.
2. This IHA authorizes take incidental to marine site characterization surveys offshore of New Jersey and New York, as specified in Atlantic Shores' IHA application, in the Bureau of Ocean Energy Management (BOEM) Lease Areas OCS-A-0499 and OCS-A-0549 and associated export cable routes (ECR) area.
3. General Conditions
 - (a) A copy of this IHA must be in the possession of Atlantic Shores, the vessel operator, other relevant personnel, the lead marine mammal observer (PSO) (see description below), and any other relevant designees operating under the authority of the IHA.
 - (b) The species and/or stocks authorized for taking are listed in Table 1. Authorized take, by Level B harassment only, is limited to the species and numbers listed in Table 1.
 - (c) The taking by injury, serious injury or death of any of the species listed in Table 1 or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.
 - (d) Atlantic Shores shall instruct relevant vessel personnel with regard to the authority of the marine mammal monitoring team, and shall ensure that relevant vessel personnel and the marine mammal 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, marine mammal 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 sources must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the acoustic source shall be avoided.



- (f) Atlantic Shores 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).

4. Mitigation Requirements

- (a) Atlantic Shores must employ independent, dedicated, qualified, NMFS-approved visual PSOs (see Section 5 of this IHA). When specified acoustic sources (impulsive: sparkers; non-impulsive: non-parametric sub-bottom profilers) are operating, a minimum of one PSO must be on duty, per source vessel, during daylight hours 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 shall establish and monitor applicable Exclusion Zones (see below). These zones shall be based upon the radial distance from the acoustic source (rather than being based around the vessel itself).
- (d) Exclusion Zones must be as follows:
 - (i) A 500-meter (m) Exclusion Zone for North Atlantic right whales during use of specified acoustic sources (impulsive: sparkers; non-impulsive: non-parametric sub-bottom profilers).
 - (ii) A 100-m Exclusion Zone for all other marine mammals (excluding NARWs) during use of specified acoustic sources (see condition 4(a)).
- (e) Pre-start clearance and ramp-up – A ramp-up procedure, involving a gradual increase in source level output, is required at all times as part of the activation of the acoustic source when technically feasible. Operators should ramp up sources to half power for 5 minutes and then gradually 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). Pre-start clearance observation zones must be as follows: 500-m for all ESA-listed marine mammals and 100-m for all other marine mammals (Table 3). 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 should not be less than 60 minutes prior to the planned ramp-up in order to allow the PSOs time to monitor the Exclusion 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 Exclusion Zones must be visible, except as indicated in (viii) below.

- (ii) Ramp-ups shall be scheduled so as to minimize the time spent with the source activated.
- (iii) A visual PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO that the Exclusion 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 PSOs 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 may not be initiated if any marine mammal is within the applicable Exclusion Zone. If a marine mammal is observed within the applicable Exclusion Zone during the 30 minute pre-start clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).
- (vii) PSOs must monitor the Exclusion 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 Exclusion 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 such circumstances.
- (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 Exclusion Zone. For any longer shutdown, pre-start clearance observation and ramp-up are required.

- (x) If any marine mammal species that are listed under the ESA are observed within the clearance zones, 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.
 - (xi) Activation of survey equipment through ramp-up procedures may not occur when visual detection of marine mammals within the pre-clearance zone is not expected to be effective (*e.g.*, during inclement conditions such as heavy rain or fog)
- (f) 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 Exclusion 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 swiftly while allowing PSOs to maintain watch.
 - (iii) When the acoustic source is active and a marine mammal appears within or enters the applicable Exclusion 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 delphinids¹ and pinnipeds.
 - (A) If a delphinid (individual belonging to the genera of the Family *Delphinidae*) or pinniped is visually detected within the Exclusion Zone, no shutdown is required unless the PSO confirms the individual to be of a genus other than those described in Table 1; in which case, a shutdown is required.
 - (v) 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 Exclusion Zone), PSOs may use best professional judgment in making the decision to call for a shutdown.

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

- (vi) Upon implementation of shutdown, the source may be reactivated after the marine mammal has been observed exiting the applicable Exclusion 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.
- (vii) 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).
- (viii) Shutdown, pre-start clearance, and ramp-up procedures are not required during HRG survey operations using only non-impulsive sources (*e.g.*, parametric sub-bottom profilers) other than non-parametric sub-bottom profilers (*e.g.*, CHIRPs). Pre-clearance and ramp-up, but not shutdown, are required when using non-impulsive, non-parametric sub-bottom profilers.
- (g) 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 mammal and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammal. A 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 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) (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 baleen 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 marine mammals are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distance (*e.g.*, attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area, 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) Atlantic Shores 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. 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) PSO names must be provided to NMFS by the operator for review and confirmation of their approval for specific roles prior to commencement of the survey². For prospective PSOs not previously approved, or for PSOs whose

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

approval is not current, NMFS must review and approve PSO qualifications. Resumes should 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.

- (c) NMFS may approve PSOs as conditional or unconditional. A conditionally-approved PSO may be one who is trained but has not yet attained the requisite experience. An unconditionally-approved PSO is one who has attained the necessary experience. For unconditional approval, the PSO must have a minimum of 90 days at sea performing the role during a geophysical survey, with the conclusion of the most recent relevant experience not more than 18 months previous.
- (d) At least one of the visual PSOs aboard the vessel must be unconditionally-approved. One unconditionally-approved visual PSO shall be designated as the lead for the entire PSO team. This lead should typically be the PSO with the most experience, would coordinate duty schedules and roles for the PSO team³, and serve as the primary point of contact for the vessel operator. To the maximum extent practicable, the duty schedule shall be planned such that unconditionally-approved PSOs are on duty with conditionally-approved PSOs.
- (e) PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver shall be submitted to NMFS and must include written justification. Alternate experience that may be considered includes, but is not limited to (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; and (3) previous work experience as a PSO (PSO must be in good standing and demonstrate good performance of PSO duties).
- (f) 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.
- (g) PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and shall 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.

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.

- (h) 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.
- (i) Any observations of marine mammals by crew members aboard any vessel associated with the survey shall be relayed to the PSO team.
- (j) Atlantic Shores must work with the selected third-party PSO provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals, and to ensure that PSOs are capable of calibrating equipment as necessary for accurate distance estimates and species identification. Such equipment, at a minimum, shall include:
 - (i) At least one thermal (infrared) imaging device suited for the marine environment;
 - (ii) Reticle binoculars (*e.g.*, 7 x 50) 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 should also have an image stabilization system;
 - (v) Equipment necessary for accurate measurement of distances to marine mammal;
 - (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.
- (k) Equipment specified in (i) through (viii) above may be provided by an individual PSO, the third-party PSO provider, or the operator, but Atlantic Shores is responsible for ensuring PSOs have the proper equipment required to perform the duties specified within this IHA.
- (l) During good conditions (*e.g.*, daylight hours; Beaufort sea state 3 or less), PSOs shall 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.

- (m) Atlantic Shores 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 will abide by speed restrictions in the DMA per the lease conditions.

6. Reporting Requirements

- (a) Atlantic Shores shall 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 mammals sightings (dates, times, locations, activities, associated survey activities). The draft report shall also include geo-referenced, time-stamped vessel tracklines for all time periods during which acoustic sources were operating. Tracklines should include points recording any change in acoustic source status (*e.g.*, when the sources began operating, when they were turned off, or when they changed operational status such as from full array to single gun or vice versa). GIS files shall be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. In addition to the report, all raw observational data shall be made available. The report must summarize the information submitted in interim monthly reports (if required) as well as additional data collected as described above in *Data Collection*. A final report must be submitted within 30 days following resolution of any comments on the draft report. All draft and final marine mammal and acoustic monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *ITP.Potlock@noaa.gov*.
- (b) PSOs must use standardized electronic data forms to record data. PSOs shall record detailed information about any implementation of mitigation requirements, including the distance of marine mammal to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances. At a minimum, the following information must be recorded:
 - (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, number and volume of airguns operating in an array, tow depth of an acoustic source, and any other notes of significance (*i.e.*, pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.).
- (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 who sighted the animal;

4. Time of sighting;
5. Initial detection method;
6. Sightings cue;
7. Vessel location at time of sighting (decimal degrees);
8. Direction of vessel's travel (compass direction);
9. Speed of the vessel(s) from which the observation was made;
10. Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level or unidentified); also note the composition of the group if there is a mix of species;
11. Species reliability (an indicator of confidence in identification);
12. Estimated distance to the animal and method of estimating distance;
13. Estimated number of animals (high/low/best);
14. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
15. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars, or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
16. Detailed behavior observations (*e.g.*, number of blows/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, Atlantic Shores must report the sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866-755-6622) within two hours of occurrence, when practicable, or no later than 24 hours after occurrence.
 - (ii) North Atlantic 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/>).
- (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, Atlantic Shores must report the incident to NMFS as soon as feasible by phone (866-755-6622) and by email (nmfs.gar.incidental-take@noaa.gov and PR.ITP.MonitoringReports@noaa.gov) as soon as feasible. 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, Atlantic Shores must report the incident to NMFS by phone (866-755-6622) and by email (nmfs.gar.incidental-take@noaa.gov and PR.ITP.MonitoringReports@noaa.gov) as soon as feasible. 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.
8. Renewals – On a case-by-case basis, NMFS may issue a one-time, one-year renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical, or nearly identical, activities are planned or (2) the specified activities would not be completed by the time this IHA expires and a

renewal would allow for completion of the activities, provided all of the following conditions are met:

- (a) A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (the renewal IHA expiration date cannot extend beyond one year from expiration of this IHA).
- (b) The request for renewal must include the following:
 - (i) An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed for this IHA, are a subset of the activities, or include changes so minor that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).
 - (ii) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.
- (c) Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings made in support of this IHA remain valid.

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

Table 1—Authorized Incidental 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	Level B harassment takes	
Cetacean (Mysticete)	North Atlantic right whale	<i>Eubalaena glacialis</i>	Western Atlantic Stock	Yes	North Atlantic right whale	3	
	Fin whale	<i>Balaenoptera physalus</i>	Western North Atlantic Stock	Yes	Large whale	6	
	Sei whale	<i>Balaenoptera borealis</i>	Nova Scotia Stock	Yes	Large whale	2	
	Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian East Coastal Stock	No	Large whale	24	
	Humpback whale	<i>Megaptera novaeangliae</i>	West Indies DPS	No	Large whale	5	
Cetacean (Odontocete)	Sperm whale	<i>Physeter macrocephalus</i>	North Atlantic Stock	Yes	Large whale	2	
	Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western North Atlantic Stock	No	Small odontocete	17	
	Atlantic spotted dolphin	<i>Stenella frontalis</i>	Western North Atlantic Stock	No	Small odontocete	50	
	Common bottlenose dolphin		<i>Tursiops truncatus</i>	Western North Atlantic Offshore Stock	No	Small odontocete	1,089
				Western North Atlantic Northern Migratory Coastal Stock			1,228
	Long-finned pilot whale	<i>Globicephala melas</i>	Western North Atlantic Stock	No	Large odontocete	20	
	Risso's dolphin	<i>Grampus griseus</i>	Western North Atlantic Stock	No	Large odontocete	30	
	Common dolphin (short-beaked)	<i>Delphinus delphis</i>	Western North Atlantic Stock	No	Small odontocete	100	
Harbor porpoise	<i>Phocoena phocoena</i>	Western North Atlantic Stock	No	Small odontocete	142		
Pinniped (Phocid)	Gray seal	<i>Halichoerus grypus</i>	Western North Atlantic Stock	No	Seal	736	
	Harbor seal	<i>Phoca vitulina</i>	Western North Atlantic Stock	No	Seal	736	

Table 2—Level B Harassment Zones

Authorized marine mammal species	Level B harassment zone during sparker use	Level B harassment zone during non-parametric sub-bottom profiler use
North Atlantic right whale	141 meters	56 meters
Fin whale		
Sei whale		
Humpback whale		
Sperm whale		
Minke whale		
Atlantic white-sided dolphin		
Atlantic spotted dolphin		
Common bottlenose dolphin		
Long-finned pilot whale		
Risso’s dolphin		
Common dolphin		
Harbor porpoise		
Gray seal		
Harbor seal		

Table 3—Distances/Times for Clearance, Shutdown/Exclusion, Vessel Separation Zones

Authorized marine mammal species	ESA-listed?	Pre-clearance zone		Vessel separation zone	Exclusion/shutdown zone	
		Distance (meters)	Duration (minutes)	Distance (meters)	Distance (meters)	Duration (minutes)
North Atlantic right whale	Yes	500		500	500	30
Fin whale						
Sei whale						
Sperm whale						
Humpback whale	No	100	30	100	100	15
Minke whale						
Long-finned pilot whale						
Risso’s dolphin						
Harbor porpoise						
Gray seal						
Harbor seal						
Atlantic white-sided dolphin						
Atlantic spotted dolphin						
Common bottlenose dolphin (coastal and offshore stocks)						
Common dolphin						
					Not required. See condition 4(f)(iv) in this IHA	



ATLANTIC SHORES OFFSHORE WIND LLC

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



Version 4
Version 4
April 22, 2022

rpsgroup.com

ATLANTIC SHORES OFFSHORE WIND LLC

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

With reference to BOEM Lease OCS-A 0499, BOEM Lease OCS-A 0549, BOEM NTL 2016 – G01, Atlantic Shores Survey Plan and the issued Incidental Harassment Authorization for this survey

Revision		
Date	Version	Revision made
29 March 2022	1	Draft based on approved 2021 IHA
11 April 2022	2	Draft issued for review. Updated under 2022 IHA application
19 April 2022	3	Draft issued for review. Updated based on ASOW comments
22 April 2022	4	Draft issued with the updated for BOEM Waivers

Approval for issue

Stephanie Milne

22 April 2022

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APPENDIX A NIGHT MONITORING EQUIPMENT SPECIFICATIONS

APPENDIX B : COMMUNICATION FLOWCHARTS

1 INTRODUCTION

Fugro has been contracted by Atlantic Shores Offshore Wind LLC (Atlantic Shores) to conduct high resolution geophysical (HRG) surveys within Lease Area OCS-A 0499. The details of the survey activities to be executed by Fugro are provided in the Atlantic Shores Survey Plan.

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) and the Bureau of Ocean Energy Management (BOEM) have advised that sound-producing survey equipment operating below 180 kilohertz (kHz) has the potential to cause acoustic harassment to marine species, in particular marine mammals. NOAA Fisheries and BOEM have also acknowledged vessel strike as a potential risk to marine species. As the proposed survey activities on behalf of Atlantic Shores will be conducted 24-hours or 12-hours per day and include the use of equipment operating below 180 kHz, Fugro has contracted with RPS to develop and execute an Environmental Management Plan (EMP) for Protected Species to ensure that marine mammals, sea turtles, and other protected marine species are not adversely affected by equipment noise or vessels.

1.1 Applicable Regulatory Documents and Permits

BOEM Lease OCS-A 0499 and the NOAA Fisheries GARFO Programmatic Consultation pursuant to Section 7 of the Endangered Species Act contains monitoring and mitigation requirements that apply to marine mammals, marine turtles, and other protected marine species.

NOAA authorized an Incidental Harassment Authorization (IHA) pursuant to Section 101(a)(5) of the MMPA and 50 CFR § 216 Subpart I on April 18, 2022 (which began April 20, 2022, and expires April 19, 2023). Atlantic Shores applied to NOAA Fisheries in August 2021 for a new IHA to ensure consistent IHA coverage for survey work. A waiver was approved so that Passive Acoustic Monitoring (PAM) is not required for geophysical or geotechnical operations. ASOW was granted a BOEM Waiver and Exclusion Zone Modification Request on their 2022 G&G Survey Plan.

2 MARINE PROTECTED SPECIES

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

- All marine mammals (whales, dolphins, seals, porpoise)
- Sea turtles
- Endangered Species Act (ESA) listed sturgeon

3 PROTECTED SPECIES OBSERVERS AND PASSIVE ACOUSTIC MONITORING OPERATORS

3.1 Staffing Plan

A team of four Protected Species Observers (PSOs) supplied by RPS will be on board each vessel that will be conducting 24-hour survey operations to undertake visual watches, implement mitigation, and conduct data collection and reporting in accordance with procedures and practices included in the Atlantic Shores Survey Plan, IHA, BOEM Lease, and BOEM Waiver Modifications (where applicable).

A team of two Protected Species Observers (PSOs) supplied by RPS will be on board each vessel that will be conducting 12-hour/daylight only survey operations to undertake visual watches, implement mitigation and conduct data collection and reporting in accordance with the Atlantic Shores Survey Plan, the IHA the requirements in the BOEM Lease and BOEM Waiver Modifications.

3.2 Roles and Responsibilities

Lead PSO

- Coordinate and Oversee PSO Operations and ensure compliance with monitoring requirements
- Visually monitor, detect, and identify marine mammals and determine distance to source
- Record and report marine mammal sightings, survey activities and environmental conditions according to survey plan
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the survey plan
- Communicate with the crew to implement mitigation actions as required by environmental protocols (including delays to initiation of survey equipment operating below 180kHz)
- Participate in daily meetings and drills with crew when appropriate

PSO

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

3.3 PSO Requirements

All PSOs will have completed a BOEM / NMFS approved protected species observer training program. PSOs will have relevant observation experience in the Atlantic or Gulf of Mexico. The CVs, PSO training certifications and NMFS approval letters of all proposed PSOs will be submitted to Fugro and Atlantic Shores such that they can be submitted to BOEM for review and approval at least 2 weeks prior to the start of survey operations.

4 MONITORING EQUIPMENT

4.1 Visual Monitoring Equipment

4.1.1 Day-time monitoring equipment

The PSO on duty will monitor for marine protected species using the naked eye and hand-held reticle binoculars. Digital single-lens reflex camera equipment will be provided to record sightings and verify species identification.

4.1.2 Night-time monitoring equipment

The PSOs on duty will monitor for marine protected species using night vision goggles that will either be equipped with a thermal clip-on or a hand-held FLIR monocular will be provided. The specifications of this equipment are provided in Appendix A.

RPS has used this equipment on multiple renewable wind leases and have collected data on the detection distances of various species groups.

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

4.1.3 Distance estimation and calibration of equipment of visual monitoring equipment

Reticle binoculars have the capability to localize the distance to detected animals.

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

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

5 VISUAL MONITORING PROCEDURES

5.1 Visual Monitoring Watches

24-Hour Operations Vessels:

- One PSO will be on watch at all times during transit.
- One PSO will be on watch at all times during daylight source operations.
- Two PSO will be on watch at all times during nighttime operations.

12-Hour/Day-light only Operations Vessels:

- One PSO will be on watch at all times during transit.
- One PSO will be on watch at all times during daylight source operations.

The following guidelines will apply to these watch periods:

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

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

Visual monitoring will begin no less than 60 minutes prior to the initiation of the sound sources operating below 180kHz and continue until source operations cease for a significant duration.

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

5.2 Monitoring During Day-time Reduced Visibility

During periods of reduced visibility (any time any of the EZs are not fully visible) during the day, the PSO on visual watch will continue observations. There will not be additional PSOs added to augment the visual monitoring until visibility has returned.

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

5.3 Proposed Monitoring Scheduled for PSOs: 24-hour Operations

	LOCAL	A	B	C	D		LOCAL	PSO	PSO
Night	20:00	PSO	PSO			Night	20:00	A	B
	21:00	PSO	PSO				21:00	A	B
	22:00	PSO		PSO			22:00	A	C
	23:00	PSO		PSO			23:00	A	C
	0:00		PSO		PSO		0:00	B	D
	1:00		PSO		PSO		1:00	B	D
	2:00	PSO		PSO			2:00	C	A
	3:00	PSO		PSO			3:00	C	A
	4:00			PSO	PSO		4:00	C	D
	5:00			PSO	PSO		5:00	C	D
Day	6:00				PSO	Day	6:00		D
	7:00				PSO		7:00		D
	8:00			PSO			8:00		C
	9:00			PSO			9:00		C
	10:00			PSO			10:00		C
	11:00				PSO		11:00		D
	12:00				PSO		12:00		D
	13:00		PSO				13:00		B
	14:00		PSO				14:00		B
	15:00		PSO				15:00		B
	16:00	PSO					16:00		A
	17:00	PSO					17:00		A
	18:00		PSO				18:00		B
	19:00		PSO				19:00		B
Monitoring hours		8	9	9	8				
Sleep break		12	11	11	11				

5.4 Proposed Monitoring Schedule for PSOs: 12 Hour Operations

LOCAL TIME	A	B
20:00	PSO	PSO
21:00		PSO
22:00		
23:00		
0:00		
1:00		
2:00		
3:00		
4:00		
5:00		
6:00	PSO	
7:00	PSO	
8:00	PSO	
9:00		PSO
10:00		PSO
11:00		PSO
12:00	PSO	
13:00	PSO	
14:00	PSO	
15:00		PSO
16:00		PSO
17:00		PSO
18:00	PSO	
19:00	PSO	PSO
Watch	7-9	7-9

Shifts shown in red will be performed by either PSO A or B, depending on the time of sunset (and when watch will terminate). Watches will be divided evenly between the PSOs and such that each person has 11 hrs off to sleep

NIGHT

DAY

6 MITIGATION PROCEDURES: STRIKE AVOIDANCE

6.1 Monitoring of NMFS NARW Notification Systems

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

- Whale Alert
- NOAA

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

<https://www.fisheries.noaa.gov/resource/map/north-atlantic-right-whale-sightings>

6.2 DMA Shutdown Requirement

Vessels must stop HRG survey activities within 24 hours of NMFS establishing a DMA in the survey area.

HRG survey activities may resume in the affected area as soon as the DMA has expired.

6.3 General Vessel Speed Restrictions

The following requirements apply to all vessels regardless of their length:

- Vessel speed will be restricted to 10 knots or less inside the Mid-Atlantic Seasonal Management Area (SMA) from November 1st through April 30th.
- Vessel speed will be restricted to 10 knots or less inside any established DMA.

6.4 Species-Specific Separation Distances & Speed Restrictions

6.4.1 North Atlantic Right Whale

All survey vessels will maintain a separation distance of 500 meters or greater from any sighted North Atlantic right whale (NARW)

- If underway, steer a course away from any sighted NARW at 10 knots until the separation distance is achieved
- If sighted within 200 meters to underway vessel, reduce speed and shift the engine to neutral until the NARW has moved beyond 500 meters and out of path, then re-engage engines and steer away at 10 knots

6.4.2 Any sighted ESA-listed species of Non-delphinoid Cetaceans or unidentified large marine mammal visible at the surface

All survey vessels will maintain a separation distance of 500 meters or greater from any ESA-listed species (Fin whale, Sei whale, Sperm whale) or other unidentified large marine mammal visible at the surface.

6.4.3 Non-delphinoid Cetaceans (Humpback and minke whales)

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

6.4.4 Small Cetaceans (Dolphins and Porpoise) and Seals

All vessels will maintain a separation distance of 50 meters or greater from any sighted small cetaceans (dolphins and porpoise) and pinnipeds

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

6.4.5 Sea Turtles

All vessels will maintain a separation distance of 50 meters or greater from any sighted sea turtle.

7 MITIGATION PROCEDURES: SOUND SOURCES

7.1 Survey Equipment Subject to Monitoring and Mitigation Procedures

All of the survey equipment that produces sound below 180kHz is subject to the following monitoring and mitigation protocols with the exception of the USBL, which is considered to be navigational equipment.

Equipment	Frequency Range	Subject to monitoring and mitigation requirements
Medium Penetrating Dual Seismic Sparker (Sparker)	.2 Hz – 4 kHz	Yes
High Resolution Sub-bottom Profiler (SBP) (Parametric)	8 – 10 kHz	Only for sea turtles
Side Scan Sonar (SSS)	300 / 600 kHz (600 kHz primary)	No
Multibeam Echo Sounder (MBES)	400 kHz	No

7.2 Sound Source Exclusion Zones and Pre-start Clearance Observation Zones

Two types of zones will be established around Atlantic Shores survey equipment operating below 180 kHz:

Pre-start Clearance Observation Zones (CZ): Applicable during the pre-clearance search periods conducted prior to initiating the mitigated < 180 kHz sound sources from silence, where detections of a protected species inside it’s applicable CZ during the search will result in a delay

- **500 meters:** North-Atlantic right whales
- **500 meters:** Large whales (Fin, Sei, and Sperm whales)
- **100 meters:** All other marine mammals with no exception to small delphinids or seals
- **50 meters:** Sea turtles
- **141 m:** Level B harassment zone for marine mammals* (for sparker operations)

*Delays are required at this distance for marine mammals where take has not been granted or where the authorized takes have been met.

Exclusion Zones (EZ): Applicable once the < 180 kHz sound sources have been activated, where detections of a protected species inside its applicable EZ will result in a shutdown

- **500 meters:** North-Atlantic right whales
- **100 meters:** All other ESA-listed species and marine mammals with the exception of voluntarily approaching delphinids as described in Section 7.7
- **50 meters:** Sea turtles
- **141 m:** Level B harassment zone for marine mammals* (for sparker operations)

*Shutdowns are required at this distance for marine mammals where take has not been granted or where the authorized takes have been met.

Note that CZs and EZs for the purposes of sound exposure mitigation are established around the survey equipment and not around the vessel itself.

Although mitigation will be applied for animals detected in the aforementioned EZs, observations will extend to the furthest observable distances which will include the 500 m monitoring zone required under the IHA.

7.3 Visual Search Periods

To activate any other equipment operating below 180kHz from silence, a minimum of a 30-minute search period must be conducted for marine mammals and sea turtles.

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

During nighttime or other periods of reduced visibility, the search must be conducted visually by the PSOs on watch.

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

7.4 Delays to Initiation of the < 180 kHz Sound Sources

If any marine mammal or sea turtle was detected visually inside its respective Pre-Start Clearance Zone during the 30-minute respective search period, initiation of the below 180 kHz sound sources must be delayed until:

- All marine protected species that were observed inside the relevant Clearance Zone have been confirmed by the visual observer to have been exiting the relevant Clearance Zone
- OR**
- When a marine protected species was not observed exiting the Clearance Zone, an additional time period has elapsed with no further sightings of the animal within the relevant Clearance Zone:
 - **15 minutes** for small cetaceans (porpoises and dolphins), pinnipeds, and giant manta rays
 - **30 minutes** for large whales including NARW and sea turtles

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

Note that if a marine mammal(s) for which no authorized takes have been granted OR a marine mammal(s) for which authorization has been granted by the authorized number of takes has been met is observed during the search prior to initiating the sound source, the larger applicable Clearance Zone of 141 m (the Level B Harassment zone) should be used such that no potential takes occur when the source is initiated.

During the day, if at any point during the 30-minute search period, the full EZs were not completely visible, then initiation of the source must be delayed until the full EZ has been visible for a full 30-minute clearance search. To summarize, in order to activate the sub-180 KHz source(s) on a vessel the EZs around the

vessel's source must have remained completely visible and clear of marine mammals and sea turtles for the durations described above. Written approval can be made by ASOW to continue operations in reduced visibility conditions.

7.5 Ramp Up (Soft Start) Procedure

Ramp-up or soft-start procedures cannot be conducted for individual pieces of survey equipment without increasing the HSE risk to personnel operating the equipment.

Operators should ramp up sources to half power for five minutes and then proceed to full power.

7.6 Short Breaks in Source Operations

In recognition of occasional short periods of silence for a variety of reasons other than for mitigation, the <180kHz sound sources may be silenced for periods of time not exceeding 30 minutes in duration and may be restarted for operations if:

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

7.7 Shut Down Procedures

If any marine protected species is sighted at or within its EZ, an immediate shutdown of the survey equipment operating below 180kHz is required.

EXCEPT

If delphinids voluntarily approach the vessel (e.g., to bow ride) when the sound sources are at full operating power, those sources can continue to operate; a shutdown is not required. The determination of whether the animal has "voluntarily" approached will be made by the PSO on watch.

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

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

- When all marine protected species have been confirmed by the visual observer to have been seen exiting the relevant EZ
OR
- When an animal was not observed exiting the EZ, and additional time period has elapsed with no further sightings of the animal within the relevant EZ:
 - **15 minutes** for small cetaceans (porpoises and dolphins) and pinnipeds
 - **30 minutes** for ESA-species, including NARW and sea turtles

Note that if a marine mammal(s) for which no authorized takes have been granted OR a marine mammal(s) for which authorization has been granted by the authorized number of takes has been met is observed while the < 180 kHz source is active, the larger EZ of 141 m (the Level B Harassment zone) should be used for all species except the NARW, where the 500 m EZ still applies, such that no potential takes occur.

7.8 Mitigation Communication Flowcharts

The mitigation procedures described in this Section of the EMP have been summarized in flowchart form and are provided in Appendix C.

8 REPORTING

8.1 Data Forms

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

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

8.2 Reporting Observed Impacts to Protected Species

It will be the responsibility of the Lead PSO on duty to report any impacts to an ESA species to NMFS, BOEM and the RPS Project Manager as soon as practicably possible but no more than 48 hours of any observations concerning impacts to ESA listed species and no more than 24 hours of the take of any ESA listed species. The ESA listed species is not just marine mammals or sea turtles but includes giant manta rays.

The RPS Project Manager will send reports to:

On-board:

- Fugro Onboard Party Chief
- Atlantic Shores Client Representative

On-shore:

- Fugro Project Manager

- Atlantic Shores Permit Manager

8.3 Injured or Dead Protected Species Reporting

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

On-board:

- Fugro Onboard Party Chief
- Atlantic Shores Client Representative

On-shore:

- Fugro Project Manager
- Atlantic Shores Permit Manager
- Atlantic Shores Project Manager

It will be the responsibility of the Atlantic Shores Development Director to provide the written report to NOAA and BOEM.

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

8.4 Daily Progress Report

A daily detection spreadsheet will be completed and submitted to the Fugro Party chief, Atlantic Shores onboard client representative 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.

8.5 Final Report

The PSO team will develop a final report summarizing the Atlantic Shores HRG survey activities and all PSO observations. The report will contain all of the data required to meet the requirements of the lease and IHA reporting requirements.

Reports will be completed and submitted to the RPS Project Manager within 10 days of survey completion. The RPS Project Manager will provide the finalized report to the Fugro Project Manager within 30 days of project completion for review and comment by the Fugro and Atlantic Shores team.

The RPS Project Manager will submit the final report to Atlantic Shores who will be responsible for submitting the report to BOEM and NMFS.

Appendix A Night Monitoring Equipment Specifications

A.1 Night Monitoring Equipment Specifications

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



Figure 1: Night vision goggles with thermal clip.

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



Figure 2: Handheld thermal FLIR.

Night Vision Goggle Technical Specifications

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

Thermal Acquisition Clip-On Technical Specifications

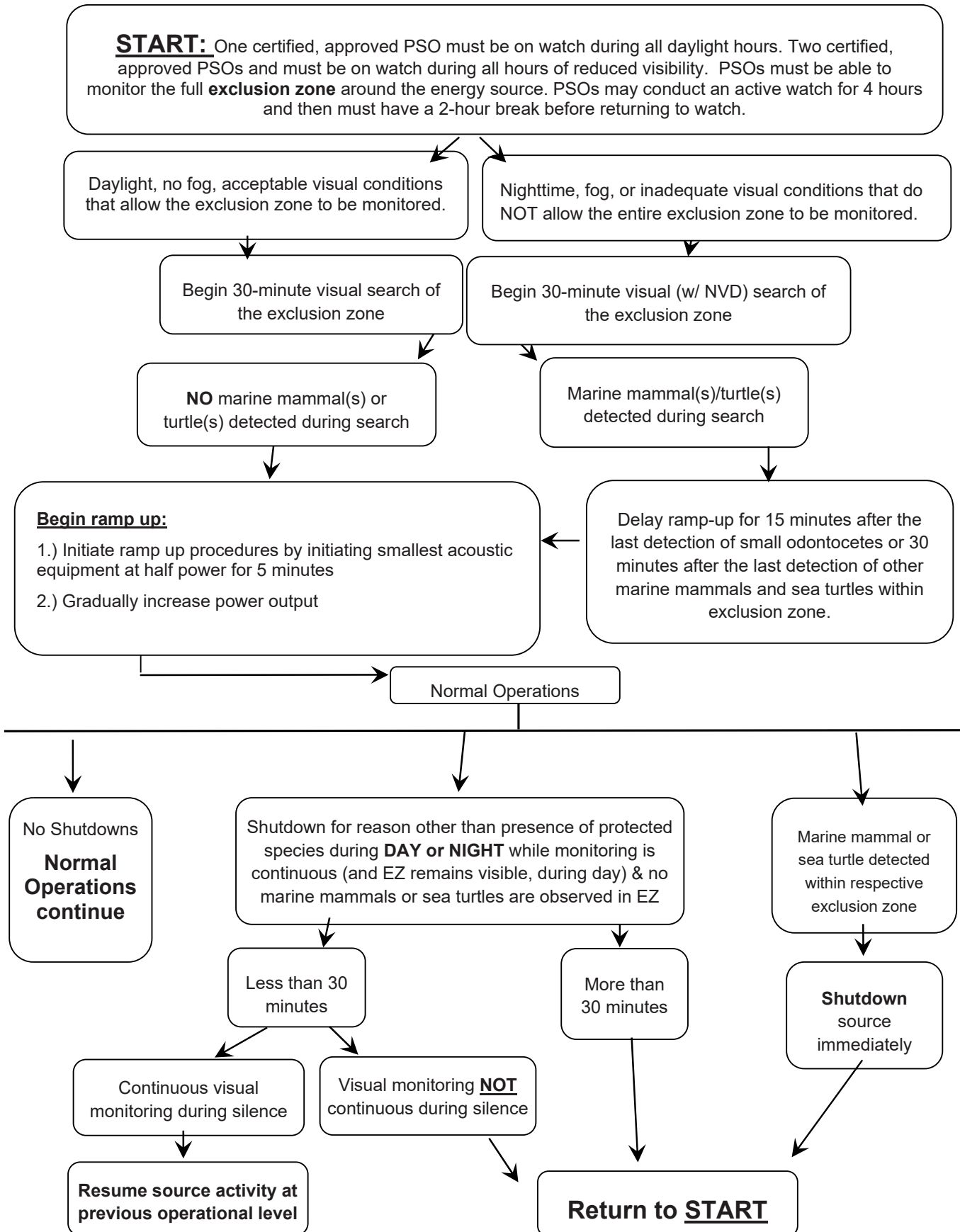
- Field of View: 20° circular (centered)
- Magnification: 1X, optical unity
- Sensor: 320 x 240 Vox uncooled LWIR microbolometer
- Display Brightness: Adjustable
- Polarity: White hot/black hot
- Calibration: Manual
- Range: Detection – 300m, Recognition – 260m
- Compatibility: PVS-7
- Interface: Standard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

Forward-looking Infrared (FLIR) Monocular Technical Specifications

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

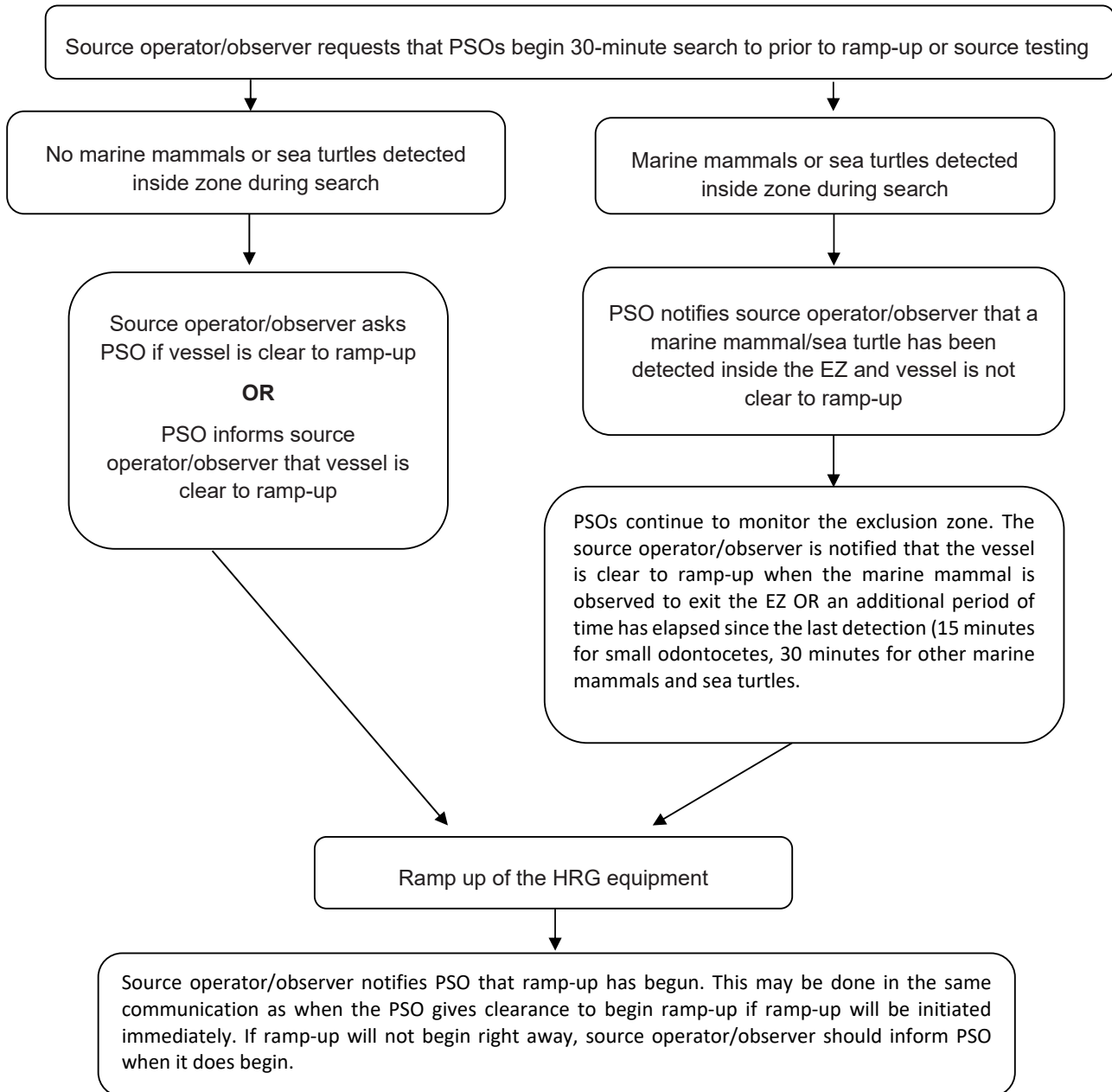
Appendix B: Communication Flowcharts

B.1 Mitigation Decision Flowchart



B.2 Ramp-up Communication Procedure for PSOs

The source operator / observer on duty notifies by phone the PSOs (day) on watch in person, via VHF radio or by phone that the vessel would like to activate the source for ramp-up or source testing at least 30 minutes prior to the intended time of the initiation of the source. (The operator may notify the PSO more than 30 minutes in advance of the intended source operations, if the initiation time is uncertain (i.e. source testing following array deployment) but **a 30-minute search must be completed** prior to activation of the source.) After 30 minutes have passed, the source operator / observer calls or radios the PSO on watch to ask if the vessel is clear to initiate ramp-up OR after 30 minutes have passed, the PSO informs the source operator / observer via radio that the vessel is clear to initiate ramp-up. Ramp-up begins. Source operator / observer informs PSO that ramp-up has begun.



ATLANTIC SHORES OFFSHORE WIND LLC

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



Version 4
Version 4
April 21, 2022

ATLANTIC SHORES OFFSHORE WIND LLC

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

With reference to BOEM Lease OCS-A 0499, BOEM Lease OCS-A 0549, BOEM NTL 2016 – G01, Atlantic Shores Survey Plan and the issued Incidental Harassment Authorization for this survey

Revision		
Date	Version	Revision made
29 March 2022	1	Draft based on approved 2021 IHA
11 April 2022	2	Draft issued for review. Updated under 2022 IHA application
19 April 2022	3	Draft issued for review. Updated based on ASOW comments

Approval for issue	
Stephanie Milne	21 April 2022

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Appendices

APPENDIX A NIGHT MONITORING EQUIPMENT SPECIFICATIONS

APPENDIX B : COMMUNICATION FLOWCHARTS

1 INTRODUCTION

STHE has been contracted by Atlantic Shores Offshore Wind LLC (Atlantic Shores) to conduct high resolution geophysical (HRG) surveys within Lease Area OCS-A 0499. The details of the survey activities to be executed by STHE are provided in the Atlantic Shores Survey Plan.

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) and the Bureau of Ocean Energy Management (BOEM) have advised that sound-producing survey equipment operating below 180 kilohertz (kHz) has the potential to cause acoustic harassment to marine species, in particular marine mammals. NOAA Fisheries and BOEM have also acknowledged vessel strike as a potential risk to marine species. As the proposed survey activities on behalf of Atlantic Shores will be conducted 24-hours or 12-hours per day and include the use of equipment operating below 180 kHz, STHE has contracted with RPS to develop and execute an Environmental Management Plan (EMP) for Protected Species to ensure that marine mammals, sea turtles, and other protected marine species are not adversely affected by equipment noise or vessels.

1.1 Applicable Regulatory Documents and Permits

BOEM Lease OCS-A 0499 and the NOAA Fisheries GARFO Programmatic Consultation pursuant to Section 7 of the Endangered Species Act contains monitoring and mitigation requirements that apply to marine mammals, marine turtles, and other protected marine species.

NOAA authorized an Incidental Harassment Authorization (IHA) pursuant to Section 101(a)(5) of the MMPA and 50 CFR § 216 Subpart I on April 18, 2022 (which began April 20, 2022, and expires April 19, 2023). Atlantic Shores applied to NOAA Fisheries in August 2021 for a new IHA to ensure consistent IHA coverage for survey work. A waiver was approved so that Passive Acoustic Monitoring (PAM) is not required for geophysical or geotechnical operations.

2 MARINE PROTECTED SPECIES

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

- All marine mammals (whales, dolphins, seals, porpoise)
- Sea turtles
- Endangered Species Act (ESA) listed sturgeon

3 PROTECTED SPECIES OBSERVERS AND PASSIVE ACOUSTIC MONITORING OPERATORS

3.1 Staffing Plan

A team of four Protected Species Observers (PSOs) supplied by RPS will be on board each vessel that will be conducting 24-hour survey operations to undertake visual watches, implement mitigation, and conduct data collection and reporting in accordance with procedures and practices included in the Atlantic Shores Survey Plan, IHA, BOEM Lease, and BOEM Waiver Modifications (where applicable).

A team of two Protected Species Observers (PSOs) supplied by RPS will be on board each vessel that will be conducting 12-hour/daylight only survey operations to undertake visual watches, implement mitigation and conduct data collection and reporting in accordance with the Atlantic Shores Survey Plan, the IHA the requirements in the BOEM Lease and BOEM Waiver Modifications.

3.2 Roles and Responsibilities

Lead PSO

- Coordinate and Oversee PSO Operations and ensure compliance with monitoring requirements
- Visually monitor, detect, and identify marine mammals and determine distance to source
- Record and report marine mammal sightings, survey activities and environmental conditions according to survey plan
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the survey plan
- Communicate with the crew to implement mitigation actions as required by environmental protocols (including delays to initiation of survey equipment operating below 180kHz)
- Participate in daily meetings and drills with crew when appropriate

PSO

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

3.3 PSO Requirements

All PSOs will have completed a BOEM / NMFS approved protected species observer training program. PSOs will have relevant observation experience in the Atlantic or Gulf of Mexico. The CVs, PSO training certifications and NMFS approval letters of all proposed PSOs will be submitted to STHE and Atlantic Shores such that they can be submitted to BOEM for review and approval at least 2 weeks prior to the start of survey operations.

4 MONITORING EQUIPMENT

4.1 Visual Monitoring Equipment

4.1.1 Day-time monitoring equipment

The PSO on duty will monitor for marine protected species using the naked eye and hand-held reticle binoculars. Digital single-lens reflex camera equipment will be provided to record sightings and verify species identification.

4.1.2 Night-time monitoring equipment

The PSOs on duty will monitor for marine protected species using night vision goggles that will either be equipped with a thermal clip-on or a hand-held FLIR monocular will be provided. The specifications of this equipment are provided in Appendix A.

RPS has used this equipment on multiple renewable wind leases and have collected data on the detection distances of various species groups.

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

4.1.3 Distance estimation and calibration of equipment of visual monitoring equipment

Reticle binoculars have the capability to localize the distance to detected animals.

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

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

5 VISUAL MONITORING PROCEDURES

5.1 Visual Monitoring Watches

24-Hour Operations Vessels:

- One PSO will be on watch at all times during transit.
- One PSO will be on watch at all times during daylight source operations.
- Two PSO will be on watch at all times during nighttime operations.

12-Hour/Day-light only Operations Vessels:

- One PSO will be on watch at all times during transit.
- One PSO will be on watch at all times during daylight source operations.

The following guidelines will apply to these watch periods:

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

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

Visual monitoring will begin no less than 60 minutes prior to the initiation of the sound sources operating below 180kHz and continue until source operations cease for a significant duration.

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

5.2 Monitoring During Day-time Reduced Visibility

During periods of reduced visibility (any time any of the EZs are not fully visible) during the day, the PSO on visual watch will continue observations. There will not be additional PSOs added to augment the visual monitoring until visibility has returned.

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

5.3 Proposed Monitoring Scheduled for PSOs: 24-hour Operations

	LOCAL	A	B	C	D		LOCAL	PSO	PSO
Night	20:00	PSO	PSO			Night	20:00	A	B
	21:00	PSO	PSO				21:00	A	B
	22:00	PSO		PSO			22:00	A	C
	23:00	PSO		PSO			23:00	A	C
	0:00		PSO		PSO		0:00	B	D
	1:00		PSO		PSO		1:00	B	D
	2:00	PSO		PSO			2:00	C	A
	3:00	PSO		PSO			3:00	C	A
	4:00			PSO	PSO		4:00	C	D
	5:00			PSO	PSO		5:00	C	D
Day	6:00				PSO	Day	6:00		D
	7:00				PSO		7:00		D
	8:00			PSO			8:00		C
	9:00			PSO			9:00		C
	10:00			PSO			10:00		C
	11:00				PSO		11:00		D
	12:00				PSO		12:00		D
	13:00		PSO				13:00		B
	14:00		PSO				14:00		B
	15:00		PSO				15:00		B
	16:00	PSO					16:00		A
	17:00	PSO					17:00		A
	18:00		PSO				18:00		B
	19:00		PSO				19:00		B
	Monitoring hours	8	9	9	8				
	Sleep break	12	11	11	11				

5.4 Proposed Monitoring Schedule for PSOs: 12 Hour Operations

LOCAL TIME	A	B
20:00	PSO	PSO
21:00		PSO
22:00		
23:00		
0:00		
1:00		
2:00		
3:00		
4:00		
5:00		
6:00	PSO	
7:00	PSO	
8:00	PSO	
9:00		PSO
10:00		PSO
11:00		PSO
12:00	PSO	
13:00	PSO	
14:00	PSO	
15:00		PSO
16:00		PSO
17:00		PSO
18:00	PSO	
19:00	PSO	PSO
Watch	7-9	7-9

Shifts shown in red will be performed by either PSO A or B, depending on the time of sunset (and when watch will terminate). Watches will be divided evenly between the PSOs and such that each person has 11 hrs off to sleep

NIGHT

DAY

6 MITIGATION PROCEDURES: STRIKE AVOIDANCE

6.1 Monitoring of NMFS NARW Notification Systems

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

- Whale Alert
- NOAA

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

<https://www.fisheries.noaa.gov/resource/map/north-atlantic-right-whale-sightings>

6.2 DMA Shutdown Requirement

Vessels must stop HRG survey activities within 24 hours of NMFS establishing a DMA in the survey area.

HRG survey activities may resume in the affected area as soon as the DMA has expired.

6.3 General Vessel Speed Restrictions

The following requirements apply to all vessels regardless of their length:

- Vessel speed will be restricted to 10 knots or less inside the Mid-Atlantic Seasonal Management Area (SMA) from November 1st through April 30th.
- Vessel speed will be restricted to 10 knots or less inside any established DMA.

6.4 Species-Specific Separation Distances & Speed Restrictions

6.4.1 North Atlantic Right Whale

All survey vessels will maintain a separation distance of 500 meters or greater from any sighted North Atlantic right whale (NARW)

- If underway, steer a course away from any sighted NARW at 10 knots until the separation distance is achieved
- If sighted within 200 meters to underway vessel, reduce speed and shift the engine to neutral until the NARW has moved beyond 500 meters and out of path, then re-engage engines and steer away at 10 knots

6.4.2 Any sighted ESA-listed species of Non-delphinoid Cetaceans or unidentified large marine mammal visible at the surface

All survey vessels will maintain a separation distance of 500 meters or greater from any ESA-listed species (Fin whale, Sei whale, Sperm whale) or other unidentified large marine mammal visible at the surface.

6.4.3 Non-delphinoid Cetaceans (Humpback and minke whales)

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

6.4.4 Small Cetaceans (Dolphins and Porpoise) and Seals

All vessels will maintain a separation distance of 50 meters or greater from any sighted small cetaceans (dolphins and porpoise) and pinnipeds

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

6.4.5 Sea Turtles

All vessels will maintain a separation distance of 50 meters or greater from any sighted sea turtle.

7 MITIGATION PROCEDURES: SOUND SOURCES

7.1 Survey Equipment Subject to Monitoring and Mitigation Procedures

All of the survey equipment that produces sound below 180kHz is subject to the following monitoring and mitigation protocols with the exception of the USBL, which is considered to be navigational equipment.

Equipment	Frequency Range	Subject to monitoring and mitigation requirements
Medium Penetrating Dual Seismic Sparker (Sparker)	.2 Hz – 4 kHz	Yes
High Resolution Sub-bottom Profiler (SBP) (Parametric)	8 – 10 kHz	Only for sea turtles
Side Scan Sonar (SSS)	300 / 600 kHz (600 kHz primary)	No
Multibeam Echo Sounder (MBES)	400 kHz	No

7.2 Sound Source Exclusion Zones and Pre-start Clearance Observation Zones

Two types of zones will be established around Atlantic Shores survey equipment operating below 180 kHz:

Pre-start Clearance Observation Zones (CZ): Applicable during the pre-clearance search periods conducted prior to initiating the mitigated < 180 kHz sound sources from silence, where detections of a protected species inside it’s applicable CZ during the search will result in a delay

- **500 meters:** North-Atlantic right whales
- **500 meters:** Large whales (Fin, Sei, and Sperm whales)
- **100 meters:** All other marine mammals with no exception to small delphinids or seals
- **50 meters:** Sea turtles
- **141 m:** Level B harassment zone for marine mammals* (for sparker operations)

*Delays are required at this distance for marine mammals where take has not been granted or where the authorized takes have been met.

Exclusion Zones (EZ): Applicable once the < 180 kHz sound sources have been activated, where detections of a protected species inside it's applicable EZ will result in a shutdown

- **500 meters:** North-Atlantic right whales
- **100 meters:** All other ESA-listed species and marine mammals with the exception of voluntarily approaching delphinids as described in Section 7.7
- **50 meters:** Sea turtles
- **141 m:** Level B harassment zone for marine mammals* (for sparker operations)

*Shutdowns are required at this distance for marine mammals where take has not been granted or where the authorized takes have been met.

Note that CZs and EZs for the purposes of sound exposure mitigation are established around the survey equipment and not around the vessel itself.

Although mitigation will be applied for animals detected in the aforementioned EZs, observations will extend to the furthest observable distances which will include the 500 m monitoring zone required under the IHA.

7.3 Visual Search Periods

To activate any other equipment operating below 180kHz from silence, a minimum of a 30-minute search period must be conducted for marine mammals and sea turtles.

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

During nighttime or other periods of reduced visibility, the search must be conducted visually by the PSOs on watch.

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

7.4 Delays to Initiation of the < 180 kHz Sound Sources

If any marine mammal or sea turtle was detected visually inside its respective Pre-Start Clearance Zone during the 30-minute search period, initiation of the below 180 kHz sound sources must be delayed until:

- All marine protected species that were observed inside the relevant Clearance Zone have been confirmed by the visual observer to have been exiting the relevant Clearance Zone
- OR**
- When a marine protected species was not observed exiting the Clearance Zone, an additional time period has elapsed with no further sightings of the animal within the relevant Clearance Zone:
 - **15 minutes** for small cetaceans (porpoises and dolphins), pinnipeds, and giant manta rays
 - **30 minutes** for large whales including NARW, and sea turtles

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

Note that if a marine mammal(s) for which no authorized takes have been granted OR a marine mammal(s) for which authorization has been granted by the authorized number of takes has been met is observed during the search prior to initiating the sound source, the larger applicable Clearance Zone of 141 m (the Level B Harassment zone) should be used such that no potential takes occur when the source is initiated.

During the day, if at any point during the 30-minute search period, the full EZs were not completely visible, then initiation of the source must be delayed until the full EZ has been visible for a full 30-minute clearance search. To summarize, in order to activate the sub-180 KHz source(s) on a vessel the EZs around the vessel's source must have remained completely visible and clear of marine mammals and sea turtles for the

durations described above. Written approval can be made by ASOW to continue operations in reduced visibility conditions.

7.5 Ramp Up (Soft Start) Procedure

Ramp-up or soft-start procedures cannot be conducted for individual pieces of survey equipment without increasing the HSE risk to personnel operating the equipment.

Operators should ramp up sources to half power for five minutes and then proceed to full power.

7.6 Short Breaks in Source Operations

In recognition of occasional short periods of silence for a variety of reasons other than for mitigation, the <180kHz sound sources may be silenced for periods of time not exceeding 30 minutes in duration and may be restarted for operations if:

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

7.7 Shut Down Procedures

If any marine protected species is sighted at or within its EZ, an immediate shutdown of the survey equipment operating below 180kHz is required.

EXCEPT

If delphinids voluntarily approach the vessel (e.g., to bow ride) when the sound sources are at full operating power, those sources can continue to operate; a shutdown is not required. The determination of whether the animal has “voluntarily” approached will be made by the PSO on watch.

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

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

- When all marine protected species have been confirmed by the visual observer to have been seen exiting the relevant EZ
OR
- When an animal was not observed exiting the EZ, and additional time period has elapsed with no further sightings of the animal within the relevant EZ:
 - **15 minutes** for small cetaceans (porpoises and dolphins) and pinnipeds
 - **30 minutes** for ESA-species, including NARW, and sea turtles

Note that if a marine mammal(s) for which no authorized takes have been granted OR a marine mammal(s) for which authorization has been granted by the authorized number of takes has been met is observed while the < 180 kHz source is active, the larger EZ of 141 m (the Level B Harassment zone) should be used for all species except the NARW, where the 500 m EZ still applies, such that no potential takes occur.

7.8 Mitigation Communication Flowcharts

The mitigation procedures described in this Section of the EMP have been summarized in flowchart form and are provided in Appendix C.

8 REPORTING

8.1 Data Forms

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

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

8.2 Reporting Observed Impacts to Protected Species

It will be the responsibility of the Lead PSO on duty to report any impacts to an ESA species to NMFS, BOEM and the RPS Project Manager as soon as practicably possible but no more than 48 hours of any observations concerning impacts to ESA listed species and no more than 24 hours of the take of any ESA listed species. The ESA listed species is not just marine mammals or sea turtles but includes giant manta rays.

The RPS Project Manager will send reports to:

On-board:

- STHE Onboard Party Chief
- Atlantic Shores Client Representative

On-shore:

- STHE Project Manager

- Atlantic Shores Permit Manager

8.3 Injured or Dead Protected Species Reporting

1. The PSO on watch will report the sightings of a dead and/or injured marine species to the Lead PSO, RPS project manager, on board client representative and STHE Party Chief.
2. The Lead PSO will report any observed injury or mortality in accordance with NMFS standard reporting guidelines, as well as to the stranding hotline for BOEM and NMFS coordination of proper response. This will occur as soon as practicably possible but no more than 24 hours of the detection. The shore-based RPS Project Manager may collect the data and assist with the initial phone report.
3. A report will be sent to RPS on the first break.
4. The RPS office will submit the report, which will include details of the BOEM and NMFS notifications, to the following distribution list within 12 hours of the detection:
 - On-board:**
 - STHE Onboard Party Chief
 - Atlantic Shores Client Representative
 - On-shore:**
 - STHE Project Manager
 - Atlantic Shores Permit Manager
 - Atlantic Shores Project Manager

It will be the responsibility of the Atlantic Shores Development Director to provide the written report to NOAA and BOEM.

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

8.4 Daily Progress Report

A daily detection spreadsheet will be completed and submitted to the STHE Party chief, Atlantic Shores onboard client representative 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.

8.5 Final Report

The PSO team will develop a final report summarizing the Atlantic Shores HRG survey activities and all PSO observations. The report will contain all of the data required to meet the requirements of the lease and IHA reporting requirements.

Reports will be completed and submitted to the RPS Project Manager within 10 days of survey completion. The RPS Project Manager will provide the finalized report to the STHE Project Manager within 30 days of project completion for review and comment by the STHE and Atlantic Shores team.

The RPS Project Manager will submit the final report to Atlantic Shores who will be responsible for submitting the report to BOEM and NMFS.

Appendix A Night Monitoring Equipment Specifications

A.1 Night Monitoring Equipment Specifications

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



Figure 1: Night vision goggles with thermal clip.

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



Figure 2: Handheld thermal FLIR.

Night Vision Goggle Technical Specifications

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

Thermal Acquisition Clip-On Technical Specifications

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

Forward-looking Infrared (FLIR) Monocular Technical Specifications

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

Appendix B: Communication Flowcharts

B.1 Mitigation Decision Flowchart

START: One certified, approved PSO must be on watch during all daylight hours. Two certified, approved PSOs and must be on watch during all hours of reduced visibility. PSOs must be able to monitor the full **exclusion zone** around the energy source. PSOs may conduct an active watch for 4 hours and then must have a 2-hour break before returning to watch.

Daylight, no fog, acceptable visual conditions that allow the exclusion zone to be monitored.

Nighttime, fog, or inadequate visual conditions that do NOT allow the entire exclusion zone to be monitored.

Begin 30-minute visual search of the exclusion zone

Begin 30-minute visual (w/ NVD) search of the exclusion zone

NO marine mammal(s) or turtle(s) detected during search

Marine mammal(s)/turtle(s) detected during search

Begin ramp up:

- 1.) Initiate ramp up procedures by initiating smallest acoustic equipment at half power for 5 minutes
- 2.) Gradually increase power output

Delay ramp-up for 15 minutes after the last detection of small odontocetes or 30 minutes after the last detection of other marine mammals and sea turtles within exclusion zone.

Normal Operations

No Shutdowns
Normal Operations continue

Shutdown for reason other than presence of protected species during **DAY or NIGHT** while monitoring is continuous (and EZ remains visible, during day) & no marine mammals or sea turtles are observed in EZ

Marine mammal or sea turtle detected within respective exclusion zone

Less than 30 minutes

More than 30 minutes

Shutdown source immediately

Continuous visual monitoring during silence

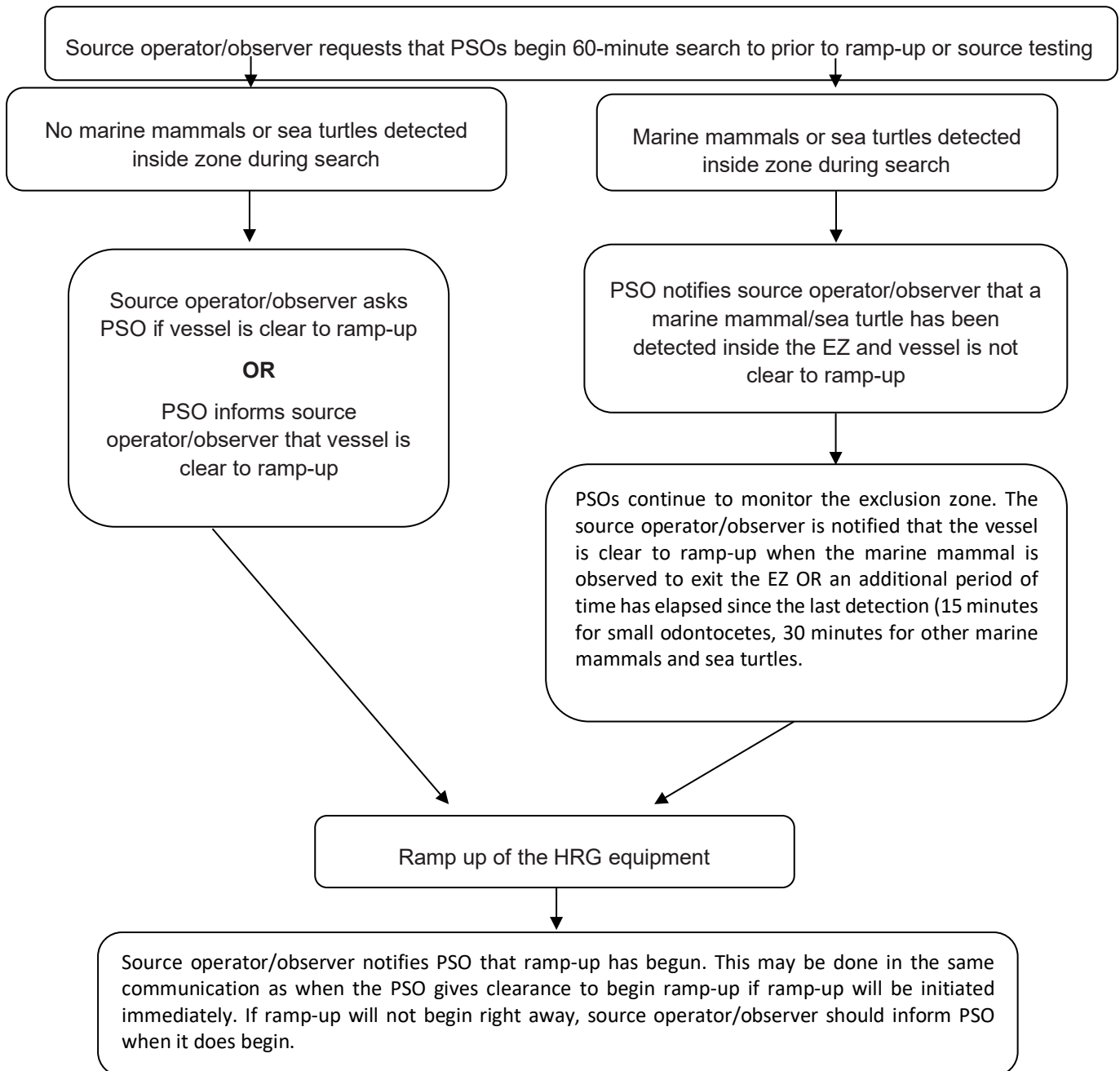
Visual monitoring **NOT** continuous during silence

Resume source activity at previous operational level

Return to START

B.2 Ramp-up Communication Procedure for PSOs

The source operator / observer on duty notifies by phone the PSOs (day) on watch in person, via VHF radio or by phone that the vessel would like to activate the source for ramp-up or source testing at least 60 minutes prior to the intended time of the initiation of the source. (The operator may notify the PSO more than 60 minutes in advance of the intended source operations, if the initiation time is uncertain (i.e. source testing following array deployment) but **a 30-minute search must be completed** prior to activation of the source.) After 30 minutes have passed, the source operator / observer calls or radios the PSO on watch to ask if the vessel is clear to initiate ramp-up. Ramp-up begins. Source operator / observer informs PSO that ramp-up has begun.



ATLANTIC SHORES OFFSHORE WIND LLC

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



Version 1
Version 1
June 09, 2023

ATLANTIC SHORES OFFSHORE WIND LLC

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

with reference to BOEM Lease OCS-A 0499/0549, NMFS Biological Opinion, Atlantic Shores Survey Plan, and the Incidental Harassment Authorization for this survey

Revision		
Date	Version	Revision made

Approval for issue	
Stephanie Milne	9 June 2023

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APPENDIX A : COMMUNICATION FLOWCHARTS

1 INTRODUCTION

ST Hudson has been contracted by Atlantic Shores Offshore Wind LLC (Atlantic Shores) to conduct high resolution geophysical (HRG) surveys within Export Cable Routes (ECR) for Lease Area OCS-A 0499/0549. The details of the survey activities to be executed by ST Hudson are provided in the Survey Plan.

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) and the Bureau of Ocean Energy Management (BOEM) have advised that sound-producing survey equipment operating below 180 kilohertz (kHz) has the potential to cause acoustic harassment to marine species, in particular marine mammals. NOAA Fisheries and BOEM have also acknowledged vessel strike as a potential risk to marine species. As the proposed survey activities on behalf of Atlantic Shores will be conducted 24-hours per day and include the use of equipment operating below 180 kHz, ST Hudson has contracted with RPS to develop and execute an Environmental Management Plan (EMP) for Protected Species to ensure that marine mammals, sea turtles, and other protected marine species are not adversely affected by equipment noise or vessels.

1.1 Applicable Regulatory Documents and Permits

BOEM Lease OCS-A 0499 and Lease OCS-A 0549 contains monitoring and mitigation requirements that apply to marine mammals, marine turtles, and other protected marine species. NOAA has released Project Design Criteria (PDCs) and Best Management Practices (BMPs) for Protected Species Associated with Offshore Wind Data Collection on 22 November 2021 to provide additional guidelines for operations. These PDCs and BMPs collectively implement the Endangered Species Act (ESA) requirements for high resolution geophysical (HRG), geotechnical and biological services as well as other site assessment/data collection activities.

Atlantic Shores filed in December 2022 to NOAA for an Incidental Harassment Authorization (IHA) pursuant to Section 101(a)(5) of the MMPA and 50 CFR § 216 Subpart I. The document is valid for one year and is effective from June 09, 2023, through June 08, 2024. Waiver approved so that Passive Acoustic Monitoring (PAM) is not required for geophysical operations.

2 MARINE PROTECTED SPECIES

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

- All marine mammals (whales, dolphins, seals, porpoise)
- Sea turtles
- Endangered Species Act (ESA) listed Atlantic sturgeon and giant manta rays

3 PROTECTED SPECIES OBSERVERS AND PASSIVE ACOUSTIC MONITORING OPERATORS

3.1 Staffing Plan

A team of two Protected Species Observers (PSOs) supplied by RPS will be on board each vessel that will be conducting 12-hour/daylight only survey operations to undertake visual watches, implement mitigation and conduct data collection and reporting in accordance with the Atlantic Shores Survey Plan, the IHA the requirements in the BOEM Lease and BOEM Waiver Modifications.

3.2 Roles and Responsibilities

Lead PSO

- Coordinate and Oversee PSO Operations and ensure compliance with monitoring requirements
- Visually monitor, detect, and identify marine mammals and determine distance to source
- Record and report marine mammal sightings, survey activities and environmental conditions according to survey plan
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the survey plan
- Communicate with the crew to implement mitigation actions as required by environmental protocols (including delays to initiation of survey equipment operating below 180kHz)
- Participate in daily meetings and drills with crew when appropriate

PSO

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

3.3 PSO Requirements

All PSOs will have completed a BOEM/NMFS approved protected species observer training program. PSOs will have relevant observation experience in the Atlantic or Gulf of Mexico. The CVs, PSO training certifications and NMFS approvals of all proposed PSOs will be submitted to ST Hudson and Atlantic Shores such that they can be submitted to BOEM for review and approval at least two weeks prior to the start of survey operations.

4 MONITORING EQUIPMENT

4.1 Visual Monitoring Equipment

4.1.1 Day-time monitoring equipment

The PSO on duty will monitor for marine protected species using the naked eye and hand-held reticle binoculars. Digital single-lens reflex camera equipment will be provided to record sightings and verify species identification.

4.1.2 Night-time monitoring equipment

Night-time operations will not occur on this survey. No night-time monitoring equipment will be deployed.

4.1.3 Distance estimation and calibration of equipment of visual monitoring equipment

Reticle binoculars have the capability to localize the distance to detected animals.

Monitoring equipment will be calibrated when possible throughout the duration of survey using the vessel radar, by comparing estimated distances to known distances and will be conducted during varying sea states during the day.

5 VISUAL MONITORING PROCEDURES

5.1 Visual Monitoring Watches

12-Hour/Day-light only Operations Vessels:

- One PSO will be on watch at all times during transit.
- One PSO will be on watch at all times during daylight source operations.

The following guidelines will apply to these watch periods:

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

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

Visual monitoring will begin no less than 60 minutes prior to the initiation of the sound sources operating below 180kHz and continue until source operations cease for a significant duration.

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

5.2 Monitoring During Day-time Reduced Visibility

During periods of reduced visibility (any time any of the shutdown zones are not fully visible) during the day, operation the PSO on visual watch will continue observations. There will not be additional PSOs added to augment the visual monitoring until visibility has returned.

5.3 Proposed Monitoring Schedule for PSOs: 12 Hour Operations

LOCAL TIME	A	B
20:00	PSO	PSO
21:00		PSO
22:00		
23:00		
0:00		
1:00		
2:00		
3:00		
4:00		
5:00		
6:00	PSO	
7:00	PSO	
8:00	PSO	
9:00		PSO
10:00		PSO
11:00		PSO
12:00	PSO	
13:00	PSO	
14:00	PSO	
15:00		PSO
16:00		PSO
17:00		PSO
18:00	PSO	
19:00	PSO	PSO
Watch	7-9	7-9

Shifts shown in red will be performed by either PSO A or B, depending on the time of sunset (and when watch will terminate). Watches will be divided evenly between the PSOs and such that each person has 11 hrs off to sleep

NIGHT

DAY

6 MITIGATION PROCEDURES: STRIKE AVOIDANCE

6.1 Monitoring of NMFS NARW Notification Systems

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

- Whale Alert
- NOAA

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

<https://www.fisheries.noaa.gov/resource/map/north-atlantic-right-whale-sightings>

6.2 General Vessel Speed Restrictions

The following requirements apply to all vessels regardless of their length:

- Vessel speed will be restricted to 10 knots or less inside the Mid-Atlantic Seasonal Management Area (SMA) from November 1st through April 30th.
- Vessel speed will be restricted to 10 knots or less inside any established DMA.

6.3 Species-Specific Separation Distances & Speed Restrictions

6.3.1 North Atlantic Right Whale or Unidentified large whale

All survey vessels will maintain a separation distance of 500 meters or greater from any sighted North Atlantic right whale (NARW)

- If underway, steer a course away from any sighted NARW at 10 knots or less until the separation distance is achieved
- If sighted within 200 meters to underway vessel, reduce speed and shift the engine to neutral* until the NARW has moved beyond 500 meters and out of path, then re-engage engines and steer away at 10 knots

6.3.2 Other ESA-listed Non-delphinoid Cetaceans (Fin whales, Sei whales, whales, Sperm whales)

All vessels will maintain a separation distance of 500 meters or greater from any sighted non-delphinoid (i.e., mysticetes and sperm whales) cetacean, OR large assemblages of delphinoid cetaceans

- If sighted within 200 meters to underway vessel, reduce speed and shift the engine to neutral* until the animal has moved beyond 500 meters

6.3.3 Any other sighted ESA-listed species (to include sea turtles and giant manta rays) visible at the surface

All survey vessels will maintain a separation distance of 500 meters or greater from any ESA-listed species or other unidentified large marine mammal visible at the surface.

- If a sea turtle or manta ray is sighted within 500m of 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.

- 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. In the event that operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through such areas.

6.3.4 Non-ESA listed whales (Humpback whales, Minke whales)

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

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

6.3.5 Small Cetaceans (Dolphins and Porpoise) and Seals

All vessels will maintain a separation distance of 50 meters or greater from any sighted small cetaceans (dolphins and porpoise) and pinnipeds

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

*Shifting into neutral is not required for any vessel towing gear or otherwise navigationally constrained

7 MITIGATION PROCEDURES: SOUND SOURCES

All of the survey equipment that produces sound below 180kHz is subject to the following monitoring and mitigation protocols and for the planned survey includes the following:

- Sparker: S-UHRS (GeoMarine Sparker) (Marine mammals and sea turtles)

Note: parametric SBP in use on this project is not subject to shutdown, pre-start clearance, or ramp up requirements

7.1 Sound Source Pre-Start Clearance Zones

The following shutdown zones apply to Atlantic Shores survey equipment operating below 180 kHz.

Note that shutdown zones for the purposes of sound exposure mitigation are established around the survey equipment and not around the vessel itself:

- 500 meters: All ESA-listed marine mammals
- 100 meters: All other marine mammals, sea turtles, manta rays.

Although mitigation will be applied for animals detected in the shutdown zones, observations will extend to the furthest observable distances.

7.2 Sound Source Shutdown Zones

The following shutdown zones apply to Atlantic Shores survey equipment operating below 180 kHz.

Note that shutdown zones for the purposes of sound exposure mitigation are established around the survey equipment and not around the vessel itself:

- 500 meters: North-Atlantic right whales and unidentified whales
- 100 meters: All other ESA-listed species (to include sea turtles) and marine mammals with the exception of delphinids (individual belonging to the genera of the Family Delphinidae) or pinnipeds.

Although mitigation will be applied for animals detected in the shutdown zones, observations will extend to the furthest observable distances.

7.3 Visual Search Periods

To activate any other equipment operating below 180kHz from silence, a minimum of a 30-minute search period must be conducted.

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

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

7.4 Delays to Initiation of the < 180 kHz Sound Sources

If any marine mammal or sea turtle was detected visually inside its respective shutdown zone during the 30-minute search period, initiation of the sound sources operating below 180kHz must be delayed until:

- **All** marine protected species that were observed inside the relevant shutdown zone have been confirmed by the visual observer to have been exiting the relevant shutdown zone
OR
- when a marine protected species was not observed exiting the shutdown zone, an additional time period has elapsed with no further sightings of the animal within the relevant shutdown zone:
 - **15 minutes** for small cetaceans (porpoises and dolphins) and pinnipeds and giant manta rays
 - **30 minutes** for ESA-listed mammals, and large whales including NARW
 - **30 minutes** for sea turtles

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

During the day, if at any point during the 30-minute search period, the full SZs were not completely visible, then initiation of the source must be delayed until the full SZ has been visible for a full 30-minute clearance search. To summarize, in order to activate the sub-180 kHz source(s) on a vessel the SZs around the vessel's source must have remained completely visible and clear of marine mammals and sea turtles for the durations described above. Written approval can be made by ASOW to continue operations in reduced visibility conditions.

7.5 Ramp Up (Soft Start) Procedure

Ramp-up of the sparker will be conducted by gradually increasing the operating level from the smallest setting to half power over 5 minutes, then increasing to the operating level over a period of approximately 15 minutes. Total ramp up duration should be 20 minutes.

7.6 Short Breaks in Source Operations

In recognition of occasional short periods of silence for a variety of reasons other than for mitigation, the <180kHz sound sources may be silenced for periods of time not exceeding 30 minutes in duration and may be restarted for operations if:

1. Visual monitoring by PSO is continued diligently through the silent period (during visual surveys, the shutdown zone must remain visible throughout the silent period)

AND

2. No marine protected species are observed in the shutdown zone.

7.7 Shutdown Procedures

If any marine protected species is sighted at or within its shutdown zone, an immediate shutdown of the survey equipment operating below 180kHz is required.

EXCEPT

If delphinids voluntarily approach the vessel (e.g., to bow ride) when the sound sources are at full operating power, those sources can continue to operate; a shutdown is not required. The determination of whether the animal has "voluntarily" approached will be made by the PSO on watch.

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

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

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

OR

- When an animal was not observed exiting the shutdown zone, and additional time period has elapsed with no further sightings of the animal within the relevant shutdown zone:
 - **15 minutes** for harbor porpoises.
 - **30 minutes** for all other marine mammals except delphinids (individual belonging to the genera of the Family Delphinidae) or pinnipeds.
 - **30 minutes** for sea turtles

7.8 Mitigation Communication Flowcharts

The mitigation procedures described in this Section of the EMP have been summarized in flowchart form and are provided in Appendix C.

7.9 Mitigation Communication Flowcharts

The mitigation procedures described in this Section of the EMP have been summarized in flowchart form and are provided in Appendix C.

8 REPORTING

8.1 Data Forms

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

- Vessel name;
- Observers' names and affiliations;
- Date and location of survey operations;
- Time and latitude/longitude when daily visual survey began;
- Time and latitude/longitude when daily visual survey ended; and
- Average environmental conditions during visual surveys, including
 - Wind speed and direction;
 - Sea state (glassy, slight, choppy, rough, or Beaufort scale, tidal state);
 - Swell (low, medium, high, or swell height in meters); and
 - Weather conditions (i.e., percent cloud cover, visibility, percent glare); and
 - Overall visibility (poor, moderate, good);
- Species (or identification to lowest possible taxonomic level, sex, age, classification [if known], numbers);
- Certainty of identification (sure, most likely, best guess);
- Total number of animals;
- Number of juveniles;
- Time and location (i.e., distance from sound source) of observation;

- Description (as many distinguishing features as possible of each individual seen, including length, shape, color and pattern, scars or marks, shape and size of dorsal fin, shape of head, and blow characteristics);
- Direction of animal's travel – related to the vessel (drawing preferably);
- Reaction of the animal(s) to relevant sound source (if any) and behavior - as explicit and detailed as possible; note any observed changes in behavior (e.g., avoidance, approach) including bearing and direction of travel; and
- Activity of vessel when sighting occurred.

8.2 Reporting Observed Impacts to Protected Species

It will be the responsibility of the Lead PSO on duty to report any impacts to an ESA species to NMFS, BOEM and the RPS Project Manager as soon as practicably possible but no more than 48 hours of any observations concerning impacts to ESA listed species and no more than 24 hours of the take of any ESA listed species. The ESA listed species is not just marine mammals or sea turtles but includes giant manta rays.

The RPS Project Manager will send reports to:

On-board:

- STHE Onboard Party Chief
- Atlantic Shores Client Representative

On-shore:

- STHE Project Manager
- Atlantic Shores Permit Manager

8.3 Injured or Dead Protected Species Reporting

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

On-board:

- STHE Onboard Party Chief
- Atlantic Shores Client Representative

On-shore:

- STHE Project Manager
- Atlantic Shores Permit Manager
- Atlantic Shores Project Manager

It will be the responsibility of the Atlantic Shores Development Director to provide the written report to NOAA and BOEM.

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

8.4 Daily Progress Report

A daily detection spreadsheet will be completed and submitted to the STHE Party chief, Atlantic Shores onboard client representative 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.

8.5 Monthly Data Report for Geophysical Operations

A monthly report of survey activities will be submitted to BOEM by RPS on the 15th of each month for each vessel conducting survey work. These reports will be submitted via email to (renewable_reporting@boem.gov) after editing, review and quality assurance checks are completed RPS prior to submission.

8.6 Final Report

The PSO team will develop a final report summarizing the Atlantic Shores HRG survey activities and all PSO observations. The report will contain all of the data required to meet the requirements of the lease and IHA reporting requirements.

Reports will be completed and submitted to the RPS Project Manager within 10 days of survey completion. The RPS Project Manager will provide the finalized report to the STHE Project Manager within 30 days of project completion for review and comment by the STHE and Atlantic Shores team.

The RPS Project Manager will submit the final report to Atlantic Shores who will be responsible for submitting the report to BOEM and NMFS.

Appendix A: Communication Flowcharts

A.1 Mitigation Decision Flowchart

START: One certified, approved PSO must be on watch during all daylight hours. Two certified, approved PSOs and must be on watch during all hours of reduced visibility. PSOs must be able to monitor the full **exclusion zone** around the energy source. PSOs may conduct an active watch for 4 hours and then must have a 2-hour break before returning to watch.

Daylight, no fog, acceptable visual conditions that allow the exclusion zone to be monitored.

Nighttime, fog, or inadequate visual conditions that do NOT allow the entire exclusion zone to be monitored.

Begin 30-minute visual search of the exclusion zone

Delay operations until full EZ is visible

NO marine mammal(s) or turtle(s) detected during search

Marine mammal(s)/turtle(s) detected during search

Begin ramp up:

- 1.) Initiate ramp up procedures by initiating smallest acoustic equipment at half power for 5 minutes
- 2.) Gradually increase power output over 15 minutes to reach full power

Delay ramp-up for 15 minutes after the last detection of small delphinids, pinnipeds, or giant manta rays or 30 minutes after the last detection of other marine mammals and sea turtles within exclusion zone.

Normal Operations

No Shutdowns
Normal Operations continue

Shutdown for reason other than presence of protected species during **DAY** while monitoring is continuous (and EZ remains visible) & no marine mammals or sea turtles are observed in EZ

Marine mammal or sea turtle detected within respective exclusion zone

Less than 30 minutes

More than 30 minutes

Shutdown source immediately

Continuous visual monitoring during silence

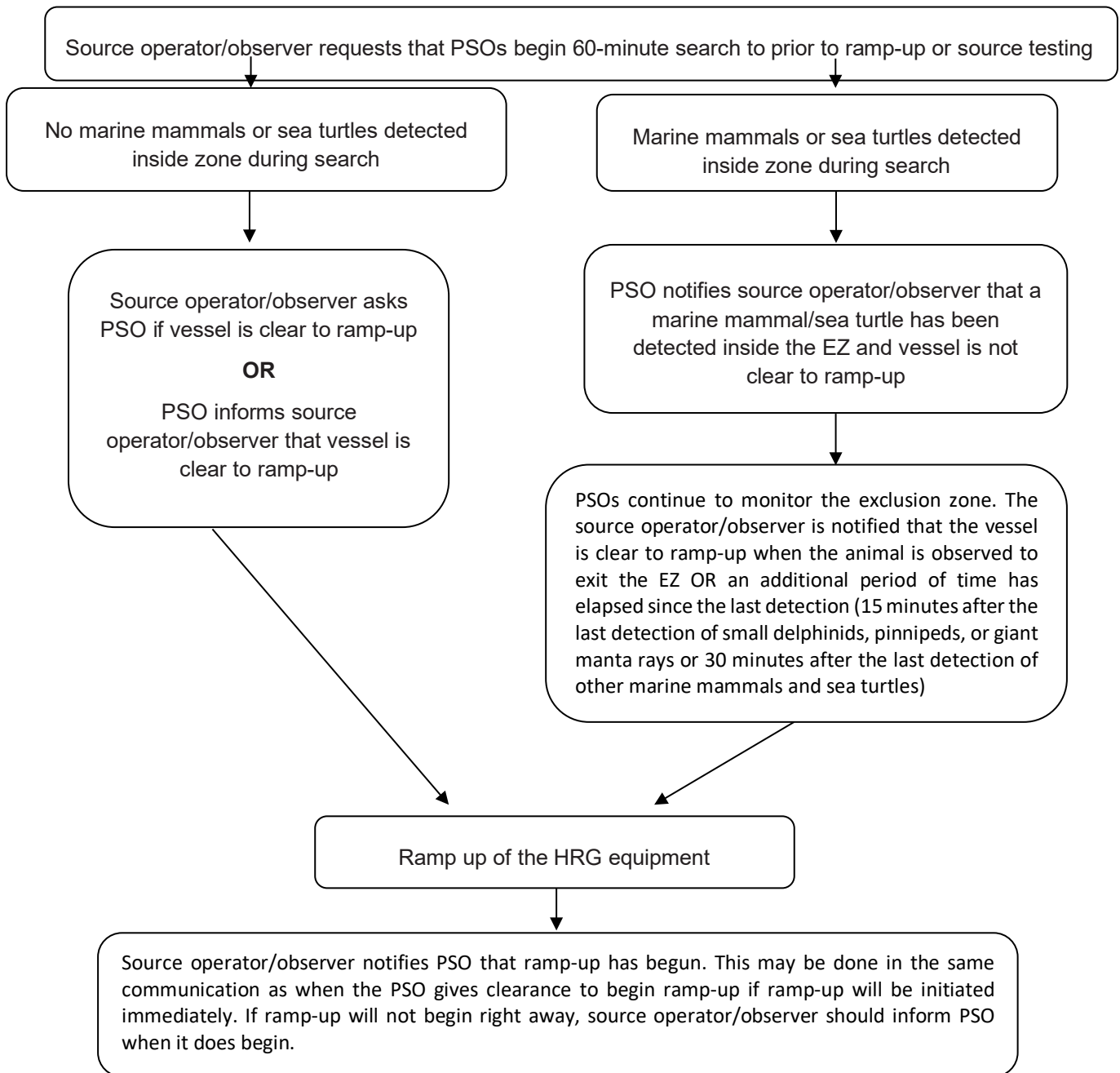
Visual monitoring **NOT** continuous during silence

Resume source activity at previous operational level

Return to START

A.2 Ramp-up Communication Procedure for PSOs

The source operator / observer on duty notifies by phone the PSOs (day) on watch in person, via VHF radio or by phone that the vessel would like to activate the source for ramp-up or source testing at least 60 minutes prior to the intended time of the initiation of the source. (The operator may notify the PSO more than 60 minutes in advance of the intended source operations, if the initiation time is uncertain (i.e. source testing following array deployment) but **a 30-minute search must be completed** prior to activation of the source.) After 30 minutes have passed, the source operator / observer calls or radios the PSO on watch to ask if the vessel is clear to initiate ramp-up. Ramp-up begins. Source operator / observer informs PSO that ramp-up has begun.



APPENDIX D: PSOS AND PAM OPERATORS ONBOARD

<i>R/V Fugro Enterprise 2022 PSOs</i>
Jo-Ann Sookar
Celine Ramsaran
Chelsey Twohy
Neftali Bonfil
Ana Lira
Jordan Boliver
Lilia Perez
Andrea Garcia
Keishan Ramsaran
Eren Penfield
Pedro Westendarp Ortega
Yoselin Mazondo
Cassandra Frey
Shelby Yahn
Francis Fritz Smith
Michelle Klein
Lyndon Lai Tan
Fernando Diaz

R/V Fugro Enterprise 2022 PAM Operators

Jo-Ann Sookar

Celine Ramsarran

Neftali Bonfil

Fritz Smith

Ana Lira

Jordan Boliver

Michelle Klein

Lyndon Lai Tan

Fernando Diaz

Chelsey Twohy

R/V Fugro Enterprise 2023 PSOs

Elizabeth Flores

Izchel Gomez

Aline Hilado

Jaime Santiago

Alejandra Olivares

M/V Bella Marie 2022 PSOs

Robert "Chase" McShane

Tiffany Ramdoo

M/V Bella Marie 2023 PSOs

Connor Reid

Munir Mehzen

APPENDIX E: VESSEL PHOTOS



Figure 1: *R/V Fugro Enterprise*



Figure 2: *M/V Bella Marie*

APPENDIX F: RETICLE BINOCULAR CALIBRATION TABLES

R/V Fugro Enterprise 2022

Week #	Date	Observer Name	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)	Wind Force (knots)	Swell (m)	Comments
1	18-May-2022	Jo-Ann Sookar	9000	11112	2	8	<2	Distance to cargo vessel
1	20-May-2022	Neftali Bonfil	850	896	2	3	<2	Sport foshing vessel
2	26-May-2022	Ana Lira	932	1067	3	11	<2	Cargo vessel
2	28-May-2022	Jordan Boliver	730	698	3	9	<2	Fishing vessel Joey D
3	1-Jun-2022	Ana Lira	1642	1570	3	10	<2	F/V Mary Vee
3	3-Jun-2022	Jordan Boliver	655	710	3	7	<2	Recreational boat
4	7-Jun-2022	Jordan Boliver	1289	1310	4	13	<2	F/V Mary Vee
4	11-Jun-2022	Ana Lira	2135	2015	2	5	<2	survey vessel
5	12-Jun-2022	Ana Lira	1987	1930	3	7	<2	Fugro Brasilis
6	18-Jun-2022	Jordan Boliver	1250	1310	5	23	<2	Cargo vessel
7	20-Jun-2022	Ana Lira	856	900	4	18	<2	Fishing vessel
8	4-Jul-2022	Ana Lira	1120	1196	3	12	<2	Head boat
12	22-Jul-2022	Keishan Ramsaran	400	370	2	6	<2	
13	27-Jul-2022	Keishan Ramsaran	860	950	2	5	<2	Container ship
16	14-Aug-2022	Keishan Ramsaran	2000	1850	1	4	<2	container ship
18	24-Aug-2022	Pedro Westendarp	540	400	2	10	<2	
19	10-Sep-2022	Cassandra Frey	4271	4074	3	6.7	<2	
20	13-Sep-2022	Cassandra Frey	2614	2241	3	11	<2	

R/V Fugro Enterprise 2023

Week #	Date	Observer Name	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)	Wind Force (knots)	Swell (m)	Comments
1	11-Aug-2023	Elsy Olivares	900	1200	2	9	<2	Navigation buoy
1	13-Aug-2023	Aline Hilado	832	901	2	6	<2	Fishing boat
1	14-Aug-2023	Elizabeth Flores	1500	1609	2	4	<2	Fishing boat
1	14-Aug-2023	Izchel Gomez	1249	1448	2	7	<2	Cargo vessel
2	20-Aug-2023	Aline Hilado	555	651	3	10	<2	Fishing boat as reference
2	21-Aug-2023	Elizabeth Flores	825	950	3	12	<2	Container ship

M/V Bella Marie 2022

Week #	Date	Observer Name	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)	Wind Force (knots)	Swell (m)	Comments
2	30-Apr-2022	Robert Mc Shane	430	500	1	12	<2	Estimate taken
3	5-May-2022	Tiffany Ramdoo	600	560	1	7	<2	Nearshore
3	5-May-2022	Robert Mc Shane	250	320	1	6	<2	Nearshore
5	21-May-2022	Tiffany Ramdoo	120	135	1	4	<2	Nearshore
5	21-May-2022	Robert McShane	230	320	1	7	<2	Nearshore
7	2-Jun-2022	Tiffany Ramdoo	600	710	1	5	<2	Nearshore
7	2-Jun-2022	Robert Mc Shane	450	500	1	7	<2	Nearshore
9	15-Jun-2022	Tiffany Ramdoo	600	650	1	5	<2	Nearshore
9	15-Jun-2022	Robert Mc Shane	275	300	1	6	<2	Nearshore
10	24-Jun-2022	Tiffany Ramdoo	400	350	1	1	<2	Nearshore
10	24-Jun-2022	Robert Mc Shane	325	300	1	1	<2	Nearshore

M/V Bella Marie 2023

Week #	Date	Observer Name	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)	Wind Force (knots)	Swell (m)	Comments
1	20-Jul-2023	Connor Reid	537	599	2	7	1	Used regulus as target
1	20-Jul-2023	Munir Mehsen	732	784	2	7	1	Used regulus as target
2	23-Jul-2023	Connor Reid	1213	1158	1	3	0.5	Cargo ship

APPENDIX G: NIGHT VISION EQUIPMENT SPECIFICATIONS

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



Figure 1: Night vision goggles with thermal clip.

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



Figure 2: Handheld thermal FLIR.

Night Vision Goggle Technical Specifications

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

Thermal Acquisition Clip-On Technical Specifications

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

Forward-looking Infrared (FLIR) Monocular Technical Specifications

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

APPENDIX I: PHOTOGRAPHS OF PROTECTED SPECIES DETECTED DURING THE SURVEY

Visual Detections from *R/V Fugro Enterprise* (2022)



Figure 1: VD#001 - Unidentified dolphin - 20 April 2022



Figure 2: VD#002 - Bottlenose dolphin - 20 April 2022



Figure 3: VD#003 - Bottlenose dolphin - 27 April 2022



Figure 4: VD#004 - Humpback whale - 02 May 2022



Figure 5: VD#005 - Humpback whale - 02 May 2022



Figure 6: VD#007 - Unidentified dolphin - 04 May 2022



Figure 7: VD#010 - Humpback whale - 05 May 2022



Figure 8: VD#011 - Humpback whale - 05 May 2022



Figure 9: VD#012 - Unidentified whale - 06 May 2022



Figure 10: VD#013 - Humpback whale - 06 May 2022



Figure 11: VD#014 - Humpback whale - 06 May 2022



Figure 12: VD#015 - Bottlenose dolphin - 12 May 2022



Figure 13: VD#018 - Unidentified dolphin - 03 June 2022



Figure 14: VD#019 - Humpback whale - 04 June 2022



Figure 15: VD#020 - Bottlenose dolphin - 09 June 2022



Figure 16: VD#021 - Bottlenose dolphin - 09 June 2022



Figure 17: VD#022 - Loggerhead sea turtle - 10 June 2022



Figure 18: VD#023 - Bottlenose dolphin - 11 June 2022



Figure 19: VD#026 - Humpback whale - 20 June 2022



Figure 20: VD#029 - Bottlenose dolphin - 21 June 2022



Figure 21: VD#031 - Loggerhead sea turtle - 03 July 2022



Figure 22: VD#033 - Unidentified sea turtle - 04 July 2022



Figure 23: VD#034 - Humpback whale - 05 July 2022



Figure 24: VD#035 - Bottlenose dolphin - 06 July 2022



Figure 25: VD#036 - Loggerhead sea turtle - 08 July 2022



Figure 26: VD#037 - Loggerhead sea turtle - 08 July 2022



Figure 27: VD#038 - Loggerhead sea turtle - 08 July 2022



Figure 28: VD#039 - Loggerhead sea turtle - 12 July 2022



Figure 29: VD#042 - Loggerhead sea turtle - 16 July 2022



Figure 30: VD#044 - Loggerhead sea turtle - 16 July 2022



Figure 31: VD#047 - Loggerhead sea turtle - 22 July 2022



Figure 32: VD#048 - Loggerhead sea turtle - 22 July 2022



Figure 33: VD#049 - Loggerhead sea turtle - 22 July 2022



Figure 34: VD#050 - Bottlenose dolphin - 27 July 2022



Figure 35: VD#054 - Loggerhead sea turtle - 10 August 2022



Figure 36: VD#058 - Loggerhead sea turtle - 19 August 2022



Figure 37: VD#061 - loggerhead sea turtle - 29 August 2022



Figure 38: VD#063 - Humpback whale - 10 September 2022



Figure 39: VD#064 - Humpback whale - 11 September 2022



Figure 40: VD#065 - Humpback whale - 11 September 2022



Figure 41: VD#066 - Humpback whale - 12 September 2022



Figure 42: VD#067 - Humpback whale - 12 September 2022



Figure 43: VD#068 - Humpback whale - 12 September 2022



Figure 44: VD#069 - Humpback whale - 12 September 2022



Figure 45: VD#070 - Humpback whale - 12 September 2022



Figure 46: VD#072 - Humpback whale - 12 September 2022

Visual Detections from *R/V Bella Marie* (2022)



Figure 47: VD#001 - Unidentified dolphin - 19 May 2022



Figure 48: VD#002 - Bottlenose dolphin - 20 May 2022



Figure 49: VD#006 - Bottlenose dolphin - 31 May 2022



Figure 50: VD#007 - Bottlenose dolphin - 01 June 2022



Figure 51: VD#008 - Bottlenose dolphin - 01 June 2022



Figure 52: VD#009 - Bottlenose dolphin - 06 June 2022



Figure 53: VD#010 - Bottlenose dolphin - 06 June 2022



Figure 54: VD#011 - Bottlenose dolphin - 06 June 2022



Figure 55: VD#012 - Bottlenose dolphin - 06 June 2022



Figure 56: VD#018 - Bottlenose dolphin - 24 June 2022

Visual Detections from R/V Bella Marie (2023)



Figure 57: VD#004 - Bottlenose dolphin - 31 July 2023



Figure 58: VD#005 - Unidentified whale - 01 August 2023



Figure 59: VD#006 - Bottlenose dolphin - 02 August 2023



Figure 60: VD#007 - Humpback whale - 02 August 2023



Figure 61: VD#008 - Humpback whale - 02 August 2023



Figure 62: VD#009 - Humpback whale - 03 August 2023



Figure 63: VD#010 - Humpback whale - 06 August 2023



Figure 64: VD#011 - Humpback whale - 06 August 2023



Figure 65: VD#012 - Humpback whale - 06 August 2023



Figure 66: VD#013 - Unidentified dolphin - 10 August 2023



Figure 67: VD#014 - Humpback whale - 14 August 2023



Figure 68: VD#015 - Humpback whale - 14 August 2023



Figure 69: VD#016 - Unidentified whale - 15 August 2023



Figure 70: VD#017 - Unidentified whale - 16 August 2023



Figure 71: VD#021 - Minke whale - 21 August 2023



Figure 72: VD#022 - Humpback whale - 23 August 2023

Visual Detections from *R/V Fugro Enterprise* (2023)



Figure 73: VD#301- Common dolphins – 09 August 2023



Figure 74: VD#302- Humpback whale- 09 August 2023



Figure 76: VD#305- Loggerhead sea turtle- 13 August 2023



Figure 75: VD#304- Humpback whale- 11 August 2023



Figure 78: VD #308- Loggerhead sea turtle- 15 August 2023



Figure 77: VD#307- Long finned pilot whale- 14 August 2023



Figure 79: VD#311- Kemp's ridley sea turtle- 20 August 2023



Figure 80: VD#313- Humpback whale- 23 August 2023

APPENDIX J: VESSEL STRIKE AVOIDANCE MANEUVERS

Vessel	Date	Detection Number	Species	Number of Animals	CPA Distance (M)	Strike Avoidance Maneuver
R/V Fugro Enterprise	2-May-2022	5	Humpback whale	5	800	alter course
R/V Bella Marie	15-Jun-2022	16	Loggerhead sea turtle	1	3	speed reduction, alter course
R/V Fugro Enterprise	4-Jul-2022	33	Unidentified sea turtle	1	15	kept course
R/V Fugro Enterprise	8-Jul-2022	37	Loggerhead sea turtle	1	30	kept course
R/V Fugro Enterprise	12-Jul-2022	39	Loggerhead sea turtle	1	5	kept course
R/V Fugro Enterprise	14-Jul-2022	41	Unidentified sea turtle	1	45	kept course
R/V Fugro Enterprise	22-Jul-2022	47	Loggerhead sea turtle	1	10	kept course
R/V Fugro Enterprise	22-Jul-2022	48	Loggerhead sea turtle	1	80	kept course
R/V Fugro Enterprise	22-Jul-2022	49	Loggerhead sea turtle	1	125	kept course
R/V Fugro Enterprise	23-Aug-2022	59	Humpback whale	1	250	speed reduction
R/V Fugro Enterprise	11-Sep-2022	65	Humpback whale	1	295	alter course
R/V Fugro Enterprise	9-Aug-2023	301	Common dolphin	20	5	kept course, maintain speed
R/V Fugro Enterprise	11-Aug-2023	304	Humpback whale	3	300	alter course
R/V Fugro Enterprise	14-Aug-2023	306	Minke whale	1	50	kept course, maintain speed
R/V Fugro Enterprise	15-Aug-2023	308	Loggerhead sea turtle	1	50	kept course, maintain speed
R/V Fugro Enterprise	20-Aug-2023	311	Kemp's ridley sea turtle	1	20	kept course, maintain speed
R/V Fugro Enterprise	22-Aug-2023	312	Unidentified whale	1	250	kept course, maintain speed
R/V Fugro Enterprise	23-Aug-2023	313	Humpback whale	1	200	speed reduction, alter course

R/V *Fugro Enterprise* PAM and Hydrophone Deployment

The PAM data processing unit with dual monitors for HF and LF modules was stationed in the survey lab located on the main deck (Figure 1). A GPS feed (GPGGA string) was provided via a serial cable feed from navigation GPS and was connected to the PAM system using a serial to USB converter.



Figure 1: Passive Acoustic Monitoring station in the survey room onboard R/V *Fugro Enterprise*

The hydrophone cable was guided from the secured wooden cable reels on the port stern and coiled around a bollard (Figure 2). Upon approach to the survey area, a 2-meter boom arm was deployed off the port stern. The hydrophone cable was secured to the boom arm and connected to the hydrophone cable by a Chinese finger (Figure 3). The Chinese finger was attached to the cable at the deployment point to prevent excessive strain on the cable or snapping. Pre-measured distances were marked on the hydrophone tow cable at 10-meter increments to assist with accurate deployment in relation to the source locations off the port side of the vessel should a change to hydrophone deployment distances become necessary. During deployment, the hydrophone cable was slowly put out manually from the port stern by two PAM operators. One operator slowly uncoiled the hydrophone cable from the bollard while feeding it to the other who ensured proper deployment off the stern. Upon reaching the desired deployment distance, the attachment point was led out to the end of the boom arm by the pulley system to avoid entanglement with the survey equipment (Figure 4).



Figure 2: Hydrophone cable deployed, and tow cable stowed on the bollard



Figure 3: Chinese finger attached to hydrophone cable tow point leading out



Figure 4: Deck cable, main and spare hydrophone cable and two cable secured

The Chinese finger installed for this project was placed in the cable at approximately 40 meters astern from the port quarter of the vessel. The hydrophone array is deployed astern of the vessel and will be secured by a rope with a c-clip connected to the Chinese finger at port side depending on the requirement.