New York Bight Site Assessment Plan

Attentive Energy LLC

12 E. 49th Street, 11th Floor, New York, NY 10017

Lease Area OCS-A 0538

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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Revision	Date	Status	Prepared	Checked	Approved
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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
ASV	autonomous surface vessel
Attentive Energy	Attentive Energy LLC
BMP	Best Management Practices
BA	Biological Assessment
BCA	benthic community assessment
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CFR	Code of Federal Regulations
Commercial Lease	Lease OCS-A 0538
CTD	Conductivity, Temperature and Depth/Pressure
COP	Construction and Operations Plan
CVA	Certified Verification Agent
DMA	Dynamic Management Area
EA	Environmental Assessment
ESA	Endangered Species Act
ft	foot
GIS	geographic information system
GPS	global positioning system
HRG	high-resolution geophysical
HSE	Health, Safety, and Environmental
Installation Area	The area within the Commercial Lease where the Met Facility will be deployed
kHz	kilohertz
km	kilometer
LiDAR	light detection and ranging
m	meter
Met Facility	Fugro SEAWATCH™ LiDAR Buoy
NAAQS	National Ambient Air Quality Standards
NARW	North Atlantic right whale

Acronym/Abbreviation	Definition
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries, NMFS	NOAA's National Marine Fisheries Service
New York Bight EA	Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf of the New York Bight, Final Environmental Assessment
OCS	Outer Continental Shelf
OCS-A 0538	Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf
PDC	Project Design Criteria
PFF	Packed File Format
Project	Attentive Offshore Wind Project
PSO	Protected Species Observer
QMA	Qualified Marine Archaeologist
RAMS	Risk Assessment and Methods Statement
s	Second
SAP	Site Assessment Plan
SBF	Seabed Frame
SMA	Seasonal Management Area
SPI/PV	Sediment Profile Imagery and Plan View
Survey Area	The Met facility deployment area
Tetra Tech	Tetra Tech, Inc.
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USGS	U.S. Geological Survey

1.0 INTRODUCTION

Attentive Energy LLC (Attentive Energy) has prepared this Site Assessment Plan (SAP) in support of the installation and operation of a Fugro SEAWATCH™ light detection and ranging (LiDAR) buoy (Met Facility) to be located within Official Protraction Diagram Hudson Canyon NJ18-03 Outer Continental Shelf (OCS) Block 6313 Aliquot D (Installation Area; Figure 1). The Installation Area is contained within the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf OCS-A 0538 (the Commercial Lease), issued April 13, 2022, with an effective date of May 1, 2022. This SAP has been prepared in accordance with the requirements under 30 Code of Federal Regulations (CFR) §§ 585.105(a), 606(a), 610(a) and (b), and 611(a) and (b) (see Table 1), the Guidelines for Information Requirements for a Renewable Energy SAP issued by the Bureau of Ocean Energy Management (BOEM) from June 2019, the final Environmental Assessment (EA) of Commercial and Research Wind Lease and Grant Issuance and Associated Site Assessment Activities issued by BOEM in December 2021 (New York Bight EA)the Offshore Wind Site Assessment Programmatic ESA Consultation from June 2021 (see Table 4), the Project Design Criteria and Best Management Practices for Protected Species Associated with Offshore Wind Data Collection from November 2021 (see Table 4), and in accordance with stipulations in the Commercial Lease (see Table 5).

This SAP will detail the methods and procedures Attentive Energy will use to collect and analyze meteorological data and information on the conditions of the marine environment within the Commercial Lease. Prior to the deployment of the proposed Met Facility, Attentive Energy will obtain other regulatory permits and approvals from various jurisdictional agencies as identified in Table 2. Attentive Energy will include copies of all final agency authorizations as part of the SAP (see Appendix A) and copies will be provided to BOEM prior to the initiation of SAP activities in 2023. All installation, operation, and decommissioning activities will be conducted in compliance with any additional requirements stipulated in the final permits to be issued by other regulatory agencies.

The Met Facility described in this SAP will monitor environmental conditions in support of development of Attentive Energy's Offshore Wind Farm Project (the Project) within the Commercial Lease area.

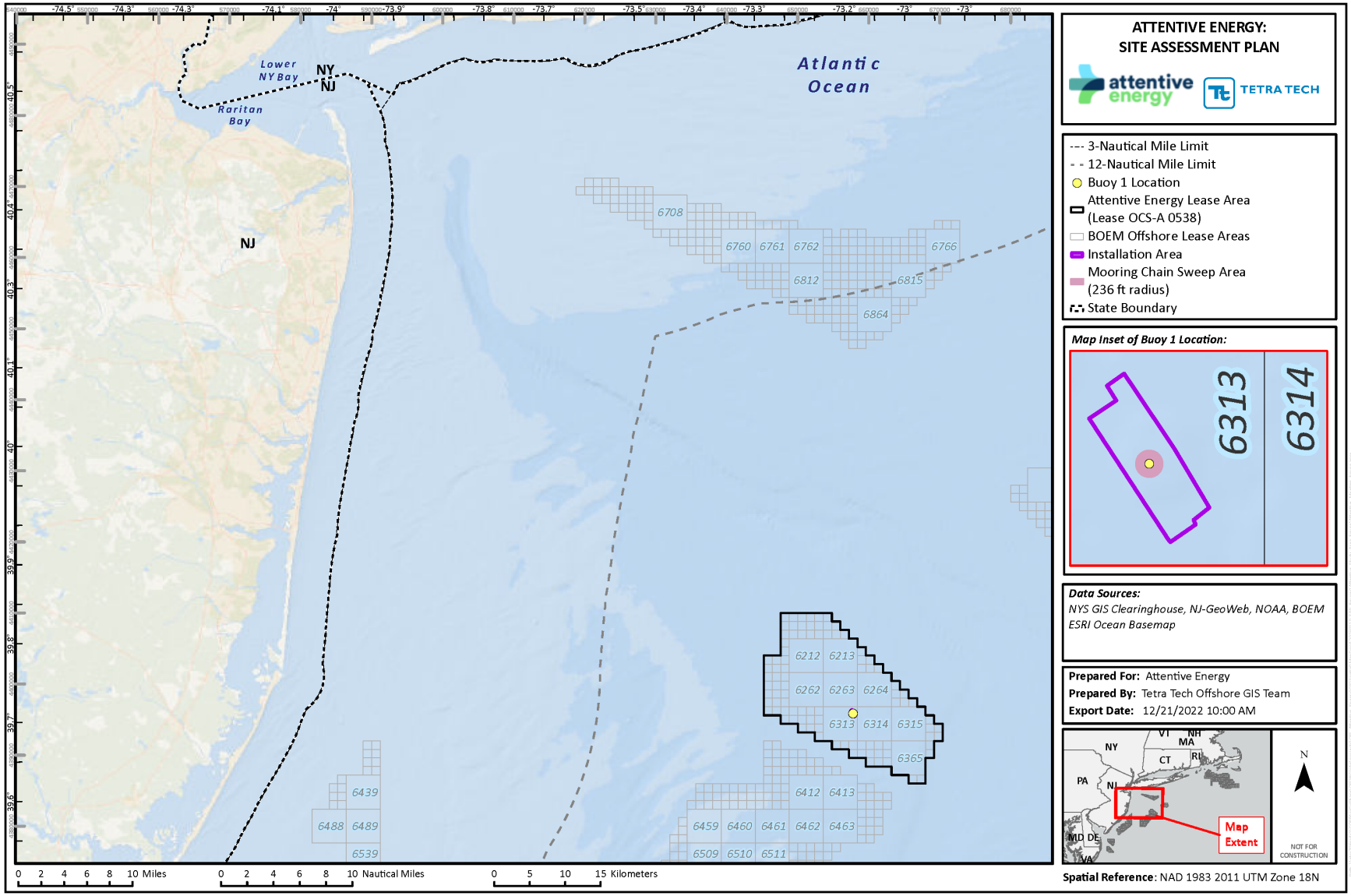

Figure 1. Met Facility Installation Area

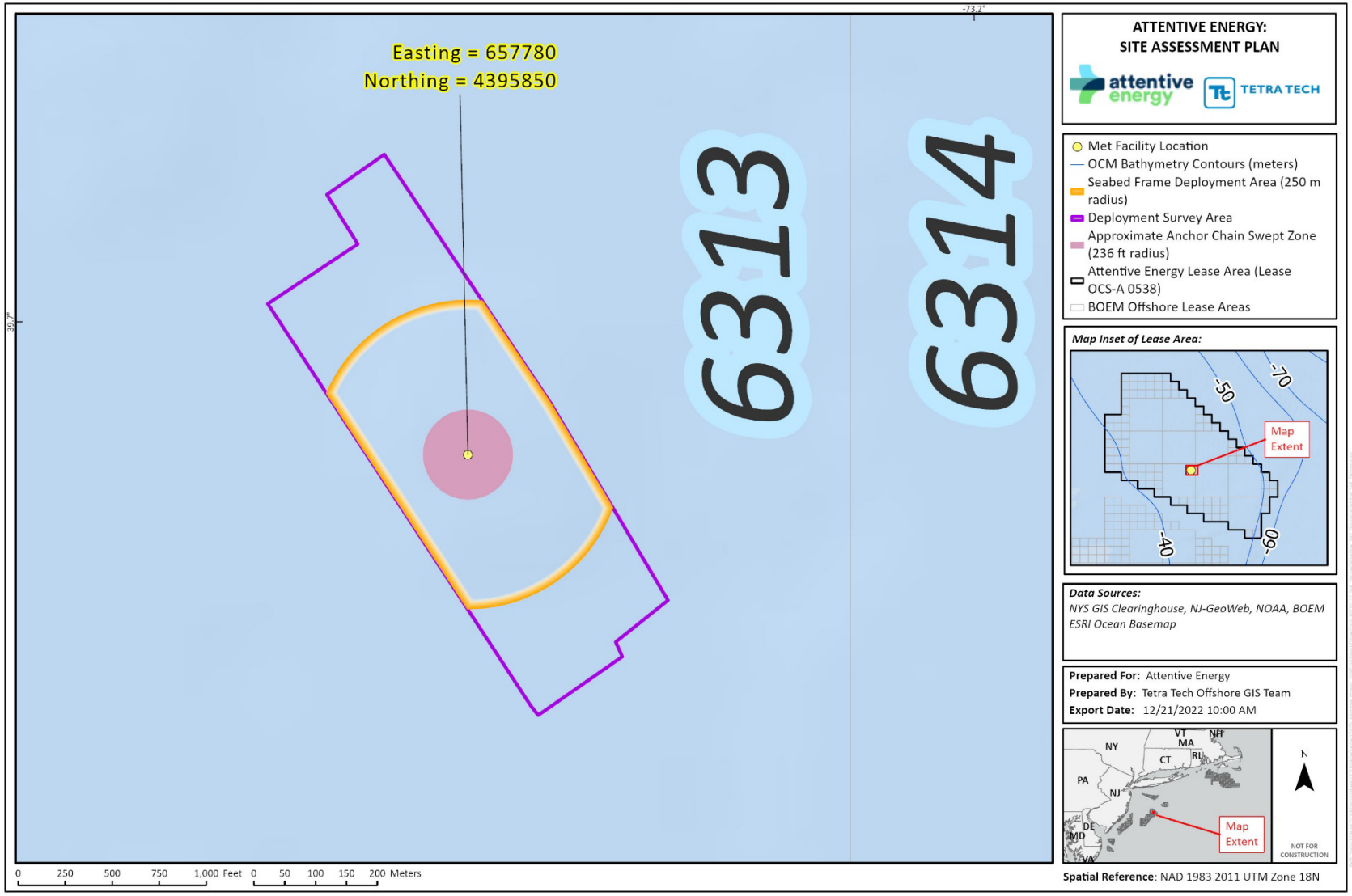

Figure 2: Met Facility Installation Area Details

Table 1. Site Assessment Plan Requirements §§ 585.105(a), 606(a), 610(a) and (b), and 611(a) and (b)

Requirement	Compliance Statement
§585.105(a)	
1) The design of the environmental monitoring buoys and conduct of planned activities ensures safety and will not cause undue harm or damage to natural resources and will take measures to prevent unauthorized discharge of pollutants into the offshore environment.	Attentive Energy will comply with this requirement, as evidenced in this SAP.
§585.606(a)	
1) The Project will conform to all applicable laws, regulations, and lease provisions.	Attentive Energy will comply with this requirement. See Table 1, Table 2, Table 4, and Table 5.
2) The Project will be safe.	Attentive Energy will comply with this requirement. See Section 4.7. As stated in Section 4.7, SAP activities will be supported by a detailed Health, Safety, and Environmental (HSE) Plan. This plan is included as Appendix D.
3) The Project will not unreasonably interfere with other uses of the OCS, including national security or defense.	Attentive Energy will comply with this requirement. See Table 5 for specific activities to ensure compliance.
4) The Project will not cause undue harm or damage to natural resources; life; property; the marine, coastal, or human environment; or historical or archaeological resources.	See Section 7 for an analysis of site characteristics and avoidance and mitigation measures.
5) The Project will use best available and safest technology.	Attentive Energy will comply with this requirement. See Section 3.1 and Appendix B for a description of the technical specifications on the Met Facility including a representative mooring design included in appendix B.
6) The Project will use best management practices.	Attentive Energy will comply with this requirement. Best management practices are described in Sections 1.3 and 7. Attentive Energy will use its standard internal project execution structure to manage activities described in the SAP.
7) The Project will use properly trained personnel.	Attentive Energy will ensure that all personnel meet the project partners' technical as well as health, safety, and environmental standards for the work being conducted.
§585.610(a)	
1) Contact Information & Authorized Representative	Christen Wittman, Vice President Project Development 12 E. 49th Street, 11th Floor, New York, NY 10017 +1 (508) 272-6987

Requirement	Compliance Statement
2) Site assessment concept	Meteorological and metocean data collection using a Met Facility.
3) Designation of operator	Fugro will own and operate the Met Facility.
4) Commercial lease stipulations and compliance	See Table 5
5) A location plan	See Section 2.3
6) General structural and project design, and installation information	See Sections 2, 3, and 4
7) Deployment activities	See Section 4
8) Measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts	This SAP has been prepared in accordance with the Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf of the New York Bight, Final Environmental Assessment (New York Bight EA) and stipulations in the Commercial Lease (Table 5). Specific efforts to avoid, minimize, reduce, eliminate, or monitor environmental impacts can be found in Section 7.
9) Certified Verification Agent nomination	Attentive Energy is requesting a waiver from this requirement. See Section 1.2
10) Reference information	See Section 8
11) Decommissioning and site clearance procedures	See Section 6
12) Air quality information	See Section 7.5
13) A listing of all federal, state, and local authorizations or approvals required to conduct site assessment activities on your lease	See Table 2
14) A list of agencies and persons with whom you have communicated, or with whom you will communicate, regarding potential impacts associated with your proposed activities	See Appendix A
15) Financial assurance information	To be provided by Attentive Energy prior to initiation of deployment activities.
§585.610(b)	
1) Geotechnical	
(i) A description of all relevant seabed and engineering data and information to allow for the design of the foundation for that facility.	See Section 7.1 and Appendix E
2) Shallow Hazards	
(i) Shallow faults;	See Section 7.1 and Appendix E

Requirement	Compliance Statement
(ii) Gas seeps or shallow gas;	See Section 7.1 and Appendix E
(iii) Slump blocks or slump sediments;	See Section 7.1 and Appendix E
(iv) Hydrates; or	See Section 7.1 and Appendix E
(v) Ice scour of seabed sediments.	See Section 7.1 and Appendix E
3) Archaeological Resources	
(i) A description of the results and data from the archaeological survey;	See Section 7.8 and Appendix H
(ii) A description of the historic and prehistoric archaeological resources, as required by the NHPA of 1966, as amended.	See Section 7.8 and Appendix H
4) Geological Survey	
(i) Seismic activity at your proposed site;	See Section 7.1 and Appendix E
(ii) Fault zones;	See Section 7.1 and Appendix E
(iii) The possibility and effects of seabed subsidence; and	See Section 7.1 and Appendix E
(iv) The extent and geometry of faulting attenuation effects of geologic conditions near your site.	See Section 7.1 and Appendix E
5) Fisheries and Benthic Resources Biological	
(i) Live bottoms	See Section 7.2 and Appendix F
(ii) Hard bottoms	See Section 7.2 and Appendix F
(iii) Topographic features; and	See Section 7.1 and Appendix E
(iv) Surveys of other marine resources such as fish populations (including migratory populations), marine mammals, sea turtles, and sea birds.	See Section 7.2 and Appendix F
§ 585.611(a) and (b) Requirements	
1) Hazard information	See Section 7.1 and Appendix E
2) Water quality	See Section 7.6
3) Biological resources	
(i) Benthic communities	See Section 7.2 and Appendix F
(ii) Marine mammals	See Section 7.3
(iii) Sea turtles	See Section 7.3
(iv) Coastal and marine birds	See Section 7.4
(v) Fish and shellfish	See Section 7.2
(vi) Plankton and seagrasses	See Section 7.2

Requirement		Compliance Statement
(vii) Plant life		See Section 7.2
4)	Threatened or endangered species	See Sections 7.2, 7.3 and 7.4
5)	Sensitive biological resources or habitats	See Sections 7.2, 7.3, and 7.4
6)	Archaeological resources	See Section 7.8 and Appendix H
7)	Social and economic resources	See Section 7.7
8)	Coastal and marine uses	See Section 7.7.1
8)	Consistency Certification	See Table 2
8)	Other resources, conditions, and activities	Not Applicable

Table 2. Permit Matrix

Permitting Agency	Applicable Permit or Approval	Statutory Basis	Regulations	Applicant Requirements
Bureau of Ocean Energy Management (BOEM)	National Historic Preservation Act (NHPA) Section 106 Consultation	NHPA 54 U.S.C § 33011 et seq.	36 CFR §§ 60 and 800 et seq.	The activities proposed in the SAP are within the scope of BOEM's prior consultations with New York and New Jersey SHPOs, Advisory Council on Historic Preservation (ACHP), Tribes and BOEM's Programmatic Agreements pursuant to Section 106 of the NHPA. Attentive Energy used site specific data collected during 2022 Geophysical & Geotechnical I surveys to prepare the Marine Archaeological Resources Assessment (MARA) included as Appendix H. The MARA identifies any potential or known historic resources, including shipwreck locations; these locations will be avoided for installation of the metocean buoy. In addition, the SAP implements post-review discovery clauses identified in Lease Stipulation 5.3.7 of Addendum C and other avoidance measures identified in coordination with BOEM. No additional action from Attentive Energy is expected

Permitting Agency	Applicable Permit or Approval	Statutory Basis	Regulations	Applicant Requirements
	ESA Section 7 Consultation	16 U.S.C. Sections 1531-1544	50 CFR §§ 402 et seq.	The activities proposed by Attentive Energy in the SAP are within the scope of BOEM's prior consultation with NMFS and USFWS. In addition, the SAP implements mitigation, monitoring, and reporting conditions outlined the June 29, 2021, Letter of Concurrence from NMFS to BOEM. Additionally, Attentive Energy received an Incidental Harassment Authorization to support its geophysical and preliminary geotechnical survey campaign on August 16, 2022. No additional action from Attentive Energy is expected.
	Magnuson-Stevens Fishery Conservation and Management Act Consultation	16 U.S.C. §§ 1801 et seq.	50 CFR § 600 et seq.	The activities proposed by Attentive Energy in the SAP are within the scope of BOEM's prior consultation with NMFS. In addition, the SAP implements conservation measures suggested by NMFS during consultation to minimize impacts on essential fish habitat and sensitive habitats. No additional action from Attentive Energy is expected.
	Abandoned Shipwreck Act/Consultation and Determination	Abandoned Shipwreck Act 43 U.S.C. §§ 2101 et seq.		The MARA prepared to support this SAP (Appendix HI) indicates the Met Facility deployment will have no impact on submerged pre- or post-contact period archaeological properties or archaeologically sensitive paleosols. No additional action from Attentive Energy is expected.
U.S. Army Corps of Engineers (USACE)	Nationwide Permit No. 5 – Scientific Measuring Devices	Clean Water Act 33 United States Code (U.S.C.) § 1344	33 CFR §§ 320 et seq.	Attentive Energy will file a Preconstruction Notification (PCN) with the USACE documenting conformance to Nationwide Permit No. 5 conditions at least 45 days prior to deployment.

Permitting Agency	Applicable Permit or Approval	Statutory Basis	Regulations	Applicant Requirements
U.S. Coast Guard (USCG)	Approval for Private Aids to Navigation	14 U.S.C. § 81	33 CFR § 66 et seq.	Attentive Energy must file an application (form CG-2554), either in paper form or electronically, with the Commander USCG Fifth District to establish a private aid to maritime navigation (PATON) for any metocean and/or FLiDAR buoy, per 33 CFR Part 66. Upon receipt of the application, the Commander USCG Fifth District will provide an information sheet outlining the Lessee's responsibilities for the establishment, operation, maintenance, and discontinuance of the private aid to maritime navigation (PATON) to include an Automated Information System (AIS) signal. The Fifth District requires no less than 60 days notice.
National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries)	Incidental Harassment Authorization (IHA)/ Letter of Concurrence	Marine Mammal Protection Act (MMPA)	16 USC §§ 1361 et seq.	No action required. As detailed in Sections 4, 5, and 6, installation, operation, and decommissioning of the Met Facility will not result in the harassment of marine mammals protected under the MMPA. In addition, as demonstrated in Section 1.4, Attentive Energy will comply with Lease stipulations and the 2021 Programmatic Consultation between BOEM and NOAA Fisheries. Additionally, Attentive Energy received an Incidental Harassment Authorization to support its geophysical and preliminary geotechnical survey campaign on August 16, 2022.
New Jersey and New York Department of State, Division of Coastal Resources	Coastal Zone Program consistency certification	Coastal Zone Management Act	15 CFR § 930 Subpart C	The activities proposed in this SAP are within the scope of BOEM's prior consultation with the states of New Jersey and New York and the consistency determination (CD) for site assessment activities in the New York Bight wind energy areas as part of the 2021 New York Bight EA (see 6.2.3 of the New York Bight EA). No additional action from Attentive Energy is expected. See Appendix A for a copy of the concurrence letter from the New Jersey Department of Environmental Protection and the Consistency Statement prepared by BOEM.

1.1 Authorized Representative / Point of Contact

Fugro will be the operator of the Met Facility. The contact information for the Authorized Representative is provided in Table 3.

Table 3. Authorized Representative

Name of Authorized Representative	B. Williams
Affiliation	Metocean Director Americas, Fugro
Phone Number	+1 713 346 3606 / +1 713 206 9891
Email	BWilliams@fugro.com
Address	6100 Hillcroft Ave, Houston, TX 77081 USA

1.2 Certified Verification Agent

Pursuant to 30 CFR § 585.610(a)(9), BOEM may require a Certified Verification Agent (CVA) to certify to BOEM that the Met Facility are designed to withstand the environmental and functional load conditions for the intended life of the Met Facility in the Installation Areas.

Attentive Energy requests a waiver from the CVA requirement per 30 CFR § 585.705(c) because the Met Facility is a commercially available technology that has been successfully deployed in similar conditions on many occasions and the technology is not considered significant or complex. The Met Facility will undergo factory acceptance testing prior to delivery to Fugro, which includes verification against an onshore fixed reference mast certified by DNV-GL. The Met Facility will be validated against an offshore platform on the island of Frøya, in Titran, Norway. Additionally, Attentive Energy will have a Fugro Engineer perform duties similar to those of a CVA. The Fugro Engineer will inspect the equipment prior to deployment and will prepare the Installation Report described in Section 4.1.

1.3 Best Management Practices

Best management practices (BMPs) are described in Section 7. Attentive Energy will use its standard internal project execution structure to manage activities described in the SAP. As stated in Section 4.5, SAP activities will be supported by a detailed Health, Safety, and Environmental (HSE) Plan, which is included as Appendix D.

In addition, Attentive Energy will use many of the BMPs identified in Appendix B of *Guidelines for Information Requirements for a Renewable Energy Site Assessment Plan* (BOEM 2019), which references the BMPs from the *Establishment of an OCS Alternative Energy and Alternate Use Program*, Record of Decision, December 2007 (BOEM 2007), as well as the *Project Design Criteria and Best Management Practices for Protected Species Associated with Offshore Wind Data Collection* (BOEM 2021a). See Table 4 for a summary of the BMPs that are applicable to deployment of a buoy (conditions related to installation of a met tower have not been included as they are not relevant to this activity). Additionally, numbering in Table 4 for BMPs related to the *Establishment of an OCS Alternative Energy and Alternate Use Program,* Record of Decision,

December 2007 corresponds to the numeric order of the BMP table in Appendix B of the SAP Guidelines).

Table 4. Best Management Practices

Best Management Practices	Location in SAP Document
Establishment of an OCS Alternative Energy and Alternate Use Program, Record of Decision, December 2007	
Pre-Construction Planning	
1. Minimize the area disturbed by preconstruction site monitoring and testing activities and installation.	Section 3
2. Contact and consult with the appropriate affected Federal, state, and local agencies early in the planning process.	Table 1, Table 2, Table 5, Section 4.1 and Appendix A
Seafloor Habitats	
5. Conduct seafloor surveys in the early phases of a project to ensure that the alternative energy project is sited appropriately to avoid or minimize potential impacts associated with seafloor instability or other hazards.	Section 7.1
6. Conduct appropriate pre-siting surveys to identify and characterize potentially sensitive seafloor habitats and topographic features.	Section 7.1 and 7.2
7. Avoid locating facilities near known sensitive seafloor habitats, such as coral reefs, hard-bottom areas, and chemosynthetic communities.	Section 7.2
8. Avoid anchoring on sensitive seafloor habitats.	Section 7.2
Marine Mammals	
13. Vessels related to project planning, construction, and operation shall travel at reduced speeds when assemblages of cetaceans are observed, and maintain a reasonable distance from whales, small cetaceans, and sea turtles as determined during site-specific consultations.	Section 4.3 and 7.3
14. Minimize potential vessel impacts to marine mammals and turtles by requiring project-related vessels to follow the National Marine Fisheries Service (NMFS) Regional Viewing Guidelines while in transit. Operators shall be required to undergo training on applicable vessel guidelines.	Section 4.3 and 7.3
15. Use the best available mooring systems using buoys, lines (chains, cables, or coated rope systems), swivels, shackles, and anchors that prevent any potential entanglement or entrainment of marine mammals and sea turtles, while ensuring the safety and integrity of the structure or device.	Section 4.3 and 7.3
Fish Resources and Essential Fish Habitat	
18. Conduct pre-siting surveys (may use existing data) to identify important, sensitive, and unique marine habitats in the vicinity of the projects and design the project to avoid, minimize, or otherwise mitigate adverse impacts to these habitats.	Section 7.2
20. Minimize seafloor disturbance during construction and installation of the facility and associated infrastructure.	Section 4.1

Best Management Practices	Location in SAP Document
Sea Turtles	
21. Minimize potential vessel impacts to marine mammals and sea turtles by requiring project-related vessels to follow the NMFS Regional Viewing Guidelines while in transit. Operators shall be required to undergo training on applicable vessel guidelines.	Section 4.3 and 7.3
23. Use the best available mooring systems using buoys, lines (chains, cables, or coated rope systems), swivels, shackles, and anchors that prevent any potential entanglement or entrainment of marine mammals and sea turtles while ensuring the safety and integrity of the structure or device.	Section 4.3 and 7.3
Avian Resources	
25. Evaluate avian use in the project area and design the project to minimize or mitigate the potential for bird strikes and habitat loss. The amount and extent of ecological baseline data required will be determined on a project-to-project basis.	Section 7.4
26. Take measures to reduce perching opportunities.	Section 7.4
27. Comply with Federal Aviation Administration (FAA) and USCG requirements for lighting while using lighting technology (e.g., low-intensity strobe lights) that minimize impacts to avian species.	Table 2 and Sections 3.5 and 7.4
Acoustic Environment	
29. Work cooperatively with commercial/recreational fishing entities and interests to ensure that the construction and operation of a project will minimize potential conflicts with commercial and recreational fishing interests.	Section 7.2
30. Review planned activities with potentially affected fishing organizations and port authorities to prevent unreasonable fishing gear conflicts. Minimize conflict with commercial fishing activity and gear by notifying registered fishermen of the location and time frame of the project construction activities well in advance of mobilization with updates throughout the construction period.	Section 7.2
31. Use practices and operating procedures that reduce the likelihood of vessel accidents and fuel spills.	Section 7.2
32. Avoid or minimize impacts to the commercial fishing industry by marking applicable structures (e.g., wind turbines, wave generation structures) with USCG-approved measures (such as lighting) to ensure safe vessel operation.	Section 7.2
33. Avoid hard-bottom habitats, including seagrass communities and kelp beds, where practicable, and restore any damage to these communities.	Section 4.3 and 7.2
34. Implement turbidity reduction measures to minimize effects to hard-bottom habitats, including seagrass communities and kelp beds, from construction activities.	Section 5.2 or 7.2
35. Minimize effects to seagrass and kelp beds by restricting vessel traffic to established traffic routes.	Section 7.2
Transportation and Vessel Traffic	
36. Site alternative energy facilities to avoid unreasonable interference with major ports and United States Coast Guard (USCG)-designated Traffic Separation Schemes.	Section 7.3

Best Management Practices	Location in SAP Document
37. Meet Federal Aviation Administration (FAA) guidelines for sighting and lighting of facilities.	Table 2 and Section 3.5
38. Place proper lighting and signage on applicable alternative energy structures to aid navigation per USCG circular navigation and vessel inspection circular 01-19 (USCG 2019) and comply with any other applicable USCG requirements.	Table 2 and Section 3.5
Operations	
45. Prepare waste management plans, hazardous material plans, and oil spill prevention plans, as appropriate, for the facility.	The Metocean Facility will not require a backup generator or any other fuel dependent equipment. As such, no Oil Spill Response Plan or Oil Spill Response Measures will be required.
Project Design Criteria and Best Management Practices for Protected Species Associated with Offshore Wind Data Collection, November 2021	
PDC 1. Avoid Live Bottom Features	
BMP 1.1 All vessel anchoring and any seafloor-sampling activities are restricted from seafloor areas with consolidated seabed features including pavement, scarp walls, and deep/cold-water coral reefs and shallow/mesophotic reefs as defined in the Coastal and Marine Ecological Classification Standard for geologic substrate classifications. All vessel anchoring and seafloor sampling must also occur at least 150 m from any known locations of threatened or endangered coral species. All sensitive live bottom habitats (eelgrass, cold-water corals, etc.) should be avoided as practicable. All vessels in coastal waters will operate in a manner to minimize propeller wash and seafloor disturbance and transiting vessels should follow deep-water routes (e.g., marked channels), as practicable, to reduce disturbance to sturgeon and sawfish habitat.	Section 4.3

Best Management Practices	Location in SAP Document
PDC 3: Marine Debris Awareness and Elimination	
BMP 3.1 Marine Debris Awareness Training. The Lessee must ensure that vessel operators, employees, and contractors engaged in offshore activities pursuant to the approved COP complete marine trash and debris awareness training annually. The training consists of two parts: (1) viewing a marine trash and debris training video or slide show (described below); and (2) receiving an explanation from management personnel that emphasizes their commitment to the requirements. The marine trash and debris training videos, training slide packs, and other marine debris related educational material may be obtained at https://www.bsee.gov/debris or by contacting Bureau of Safety and Environmental Enforcement (BSEE). The training videos, slides, and related material may be downloaded directly from the website. Operators engaged in marine survey activities must continue to develop and use a marine trash and debris awareness training and certification process that reasonably assures that their employees and contractors are in fact trained. The training process must include the following elements: Viewing of either a video or slide show by the personnel specified above; An explanation from management personnel that emphasizes their commitment to the requirements; Attendance measures (initial and annual); and Recordkeeping and the availability of records for inspection by DOI.	Section 4.3
BMP 3.2 Training Compliance Report. By January 31 of each year, the Lessee must submit to DOI an annual report that describes its marine trash and debris awareness training process and certifies that the training process has been followed for the previous calendar year. The Lessee must send the reports via email to BOEM (at renewable_reporting@boem.gov) and to BSEE (at marinedebris@bsee.gov).	Section 4.3
BMP 3.3 Marking. Materials, equipment, tools, containers, and other items used in OCS activities, which are of such shape or configuration that they are likely to snag or damage fishing devices, and could be lost or discarded overboard, must be clearly marked with the vessel or facility identification and properly secured to prevent loss overboard. All markings must clearly identify the owner and must be durable enough to resist the effects of the environmental conditions to which they may be exposed.	Section 4.3

Best Management Practices	Location in SAP Document
BMP 3.4 Recovery and Prevention. The Lessee must recover marine trash and debris that is lost or discarded in the marine environment while performing OCS activities when such incident is likely to: (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to marine trash or debris that could entangle or be ingested by marine protected species; or (b) significantly interfere with OCS uses (e.g., because the marine trash or debris is likely to snag or damage fishing equipment, or presents a hazard to navigation). The Lessee must notify DOI within 48 hours when recovery activities are: (i) not possible because conditions are unsafe; or (ii) not practicable because the marine trash and debris released is not likely to result in any of the conditions listed in (a) or (b) above. Notwithstanding this notification, DOI may still order the Lessee to recover the lost or discarded marine trash and debris if DOI finds the reasons provided by the Lessee in the notification unpersuasive. If the marine trash and debris is located within the boundaries of a potential archaeological resource/avoidance area, or a sensitive ecological/benthic resource area, the Lessee must contact DOI for approval before conducting any recovery efforts. Recovery of the marine trash and debris should be completed as soon as practicable, but no later than 30 calendar days from the date on which the incident occurred. If the Lessee is not able to recover the marine trash or debris within 48 hours, the Lessee must submit a recovery plan to DOI explaining the recovery activities to recover the marine trash or debris (Recovery Plan). The Lessee must submit the Recovery Plan no later than 10 calendar days from the date on which the incident occurred. Unless DOI objects within 48 hours of the filing of the Recovery Plan, the Lessee can proceed with the activities described in the Recovery Plan. The Lessee must request and obtain approval of a time extension if recovery activities cannot be completed within 30 calendar days from the date on which the incident occurred. The Lessee must enact steps to prevent similar incidents and must submit a description of these actions to BOEM and BSEE within 30 calendar days from the date on which the incident occurred.	Section 4.3

Best Management Practices	Location in SAP Document
BMP 3.5 Reporting. The Lessee must report to DOI (using the email address listed on DOI's most recent incident reporting guidance) all lost or discarded marine trash and debris. This report must be made monthly and submitted no later than the fifth day of the following month. The Lessee is not required to submit a report for those months in which no marine trash and debris was lost or discarded. The report must include the following: Project identification and contact information for the Lessee, operator, and/or contractor; The date and time of the incident; The lease number, OCS area and block, and coordinates of the object's location (latitude and longitude in decimal degrees); A detailed description of the dropped object, including dimensions (approximate length, width, height, and weight) and composition (e.g., plastic, aluminum, steel, wood, paper, hazardous substances, or defined pollutants); Pictures, data imagery, data streams, and/or a schematic/illustration of the object, if available; An indication of whether the lost or discarded item could be: a magnetic anomaly of greater than 50 nanoTesla; a seafloor target of greater than 1.6 feet (0.5 meters); or a sub-bottom anomaly of greater than 1.6 feet (0.5 meters) when operating a magnetometer or gradiometer, side scan sonar, or sub-bottom profile in accordance with DOI's most recent, applicable guidance; An explanation of how the object was lost; and A description of immediate recovery efforts and results. In addition to the foregoing, the Lessee must submit a report within 48 hours of the incident (48-hour Report) if the marine trash or debris could: (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to marine trash or debris that could entangle, or be ingested by, marine protected species; or (b) significantly interfere with OCS uses (e.g., because the marine trash or debris is likely to snag or damage fishing equipment, or presents a hazard to navigation). The information in the 48-hour Report must be the same as that listed for the monthly report, but only for the incident that triggered the 48-hour Report. The Lessee must report to DOI if the object is recovered and, as applicable, describe any substantial variance from the activities described in the Recovery Plan that were required during the recovery efforts. The Lessee must include and address information on unrecovered marine trash and debris in the description of the site clearance activities provided in the decommissioning application required under 30 C.F.R. § 585.906.	Section 4.3
PDC 5. Minimize Vessel Interactions with Protected Species	
BMP 5.1 Vessel captain and crew must maintain a vigilant watch for all protected species and reduce speed, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any listed species. The presence of a single individual at the surface may indicate the presence of submerged animals in the vicinity; therefore, precautionary measures should always be exercised. If pinnipeds or small delphinids of the following genera: Delphinus, Lagenorhynchus, Stenella, and Tursiops are visually detected approaching the vessel (i.e., to bow ride) or towed equipment, vessel speed reduction, course alteration, and shutdown are not required.	Section 4.3

Best Management Practices	Location in SAP Document
BMP 5.2 Anytime a survey vessel is underway (transiting or surveying), the vessel must maintain a 500 m minimum separation distance from ESA-listed species and a PSO must monitor a Vessel Strike Avoidance Zone (500 m or greater from any sighted ESA-listed species or other unidentified large marine mammal visible at the surface) to ensure detection of that animal in time to take necessary measures to avoid striking the animal. If the survey vessel does not require a PSO for the type of survey equipment used, a trained crew lookout may be used as required in 5.3. For monitoring around the autonomous surface vessels, regardless of the equipment it may be operating, a dual thermal/HD camera must be installed on the mother vessel facing forward and angled in a direction so as to provide a field of view ahead of the vessel and around the ASV. A dedicated operator must be able to monitor the real-time output of the camera on hand-held computer tablets. Images from the cameras must be able to be captured and reviewed to assist in verifying species identification. A monitor must also be installed in the bridge displaying the realtime images from the thermal/HD camera installed on the front of the ASV itself, providing a further forward view of the craft.	Section 4.3
BMP 5.3 The Lessee must ensure a PSO or crew lookout is posted during all times to avoid interactions with ESA-listed species when a vessel is underway (transiting or surveying) by monitoring in all direction.	Section 4.3
BMP 5.4 Regardless of vessel size, vessel operators must reduce vessel speed to 10 knots (18.5 mph) or less while operating in any Seasonal Management Area (SMA) and Dynamic Management Area (DMA) or Slow Zone triggered by visual detections of North Atlantic right whales. An exception to this requirement is for vessels operating in areas within a portion of a visually designated DMA or Slow Zone where it is not reasonable to expect the presence of North Atlantic right whales (e.g., Long Island Sound, shallow harbors).	Section 4.3
BMP 5.5 BOEM encourages increased vigilance through the required best management practices to minimize vessel interactions with protected species, by reducing speeds to 10 knots or less when operating within an acoustically triggered slow zone, and when feasible, avoid Slow Zones.	Section 4.3
BMP 5.6 The Lessee must ensure all vessel operators check for information regarding mandatory or voluntary ship strike avoidance (SMAs and DMAs (or Slow Zones that are also designated as DMAs) and daily information regarding North Atlantic right whale sighting locations. These media may include, but are not limited to: NOAA weather radio, U.S. Coast Guard NAVTEX and channel 16 broadcasts, Notices to Mariners, the Whale Alert app, or WhaleMap website.	Section 4.3
PDC 6: Minimize Risk During Buoy Deployment, Operations, and Retrieval	
BMP 6.1 The Lessee must ensure that any buoys attached to the seafloor use the best available mooring systems. Buoys, lines (chains, cables, or coated rope systems), swivels, shackles, and anchor designs must prevent any potential entanglement of listed species while ensuring the safety and integrity of the structure or device.	Section 4.3
BMP 6.2 All mooring lines and ancillary attachment lines must use one or more of the following measures to reduce entanglement risk: shortest practicable line length, rubber sleeves, weak-links, chains, cables, or similar equipment types that prevent lines from looping, wrapping, or entrapping protected species.	Section 4.3
BMP 6.3 Any equipment must be attached by a line within a rubber sleeve for rigidity. The length of the line must be as short as necessary to meet its intended purpose.	Section 4.3

Best Management Practices	Location in SAP Document
BMP 6.4 During all buoy deployment and retrieval operations, buoys should be lowered and raised slowly to minimize risk to listed species and benthic habitat. Additionally, PSOs or trained project personnel (if PSOs are not required) should monitor for listed species in the area prior to and during deployment and retrieval and work should be stopped if listed species are observed within 500 meters of the vessel to minimize entanglement risk.	Section 4.3
BMP 6.5 If a live or dead marine protected species becomes entangled, operators must immediately contact the applicable stranding network coordinator using the reporting contact details (see Reporting Requirements section) and provide any on-water assistance requested.	Section 4.3, 7.2 and 7.3
BMP 6.6 All buoys must be properly labelled with owner and contact information.	Section 4.1 and 4.3

1.4 Conformance with Commercial Lease OCS-A 0538

The activities and equipment proposed in this SAP will be covered by the appropriate bond or other approved security, as required by 30 CFR §§ 585.515 and 585.516. This information will be provided to BOEM prior to the deployment of the Met Facility.

Prior to installation of the Met Facility, Attentive Energy will obtain all required permits and approvals from agencies. A listing of these permits and approvals are identified above in

Table 2. Attentive Energy has included all available copies of the final agency authorizations acquired to date in Appendix A. Copies of agency authorizations that are not available at the time of this SAP submittal will be provided to BOEM prior to the initiation of SAP activities. All installation, operation, maintenance, and decommissioning activities will be conducted in compliance with any additional requirements stipulated in the final permits to be issued by other regulatory agencies.

In December 2021, BOEM issued a Finding of No Significant Impact (FONSI) based on the New York Bight EA (BOEM 2021b). The New York Bight EA analyzed the foreseeable consequences associated with issuing commercial leases in the five identified Wind Energy Areas, which are inclusive of the location of the Commercial Lease (Figure 1), as well as the site assessment activities including the installation of meteorological facilities. The selected Met Facility is consistent with the commercially available meteorological buoys analyzed in the New York Bight EA. BOEM identified several mitigation measures in the New York Bight EA for buoy installation, operation, and decommissioning. These mitigation measures were included as stipulations in the Commercial Lease. Unless otherwise noted in Table 5 below, Attentive Energy will implement these measures as described in this SAP.

Table 5. Conformance with the Commercial Renewable Energy Lease OCS-A 0538 Stipulations as Contained in ADDENDUM "C" to the Lease

Addendum C Stipulation	Description	Compliance Statement or location in SAP Document
4 National Security and Military Operations		
4.2.4 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 4.2.2 and 4.2.3	Christen Wittman, Project Director
4.2.5 Coordination with Command Headquarters	The Lessee must establish and maintain early contact and coordination with the appropriate command headquarters, in order to avoid or minimize the potential to conflict with and minimize the potential effects of conflicts with military operations.	Attentive Energy will establish contact with the United States Fleet Forces (USFF) N46 at 1562 Mitscher Avenue, Suite 250, in Norfolk, Virginia ([757]836-6206), as provided in the Commercial Lease.
4.3 Electromagnetic Emissions	The Lessee, 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 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.	Attentive Energy will provide the frequencies the Met Facility will use to transmit data to confirm electromagnetic emissions from the SAP activities will not conflict with military operations.
5 Standard Operating Conditions		
5.1.1 Briefing	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 (PSOs). New personnel must be briefed as they join the work in progress.	All personnel participating in operations will attend a pre-installation briefing. The briefing will include the following topics: HSE; emergency response; responsibilities, chain of command, communication procedures, planned installation activities; protected species avoidance, marine trash, and debris awareness; oil spill response procedures; Addendum C of the Lease.
5.1.2	The Lessee must ensure that all vessel operators and crew members, including PSOs, are familiar with, and understand, the requirements specified in Addendum C.	

Addendum C Stipulation	Description	Compliance Statement or location in SAP Document
5.1.3	The Lessee must ensure that a copy of Addendum C and the Project Design Criteria and Best Management Practices listed in Appendix B of the NMFS Letter of Concurrence issued by the National Marine Fisheries Service (NMFS) on June 29, 2021, is made available on every project-related vessel.	A copy of training materials including Addendum C, the PDCs and BMPs (most recently revised November 2021) will be located on every project-related vessel.
5.2.1 Protected Species	Unless otherwise authorized by BOEM, Lessee's OCS activities must comply with the standards in the Project Design Criteria and Best Management Practices found in BOEM's notice last revised on November 22, 2021. At the Lessee's option, the Lessee, its operators, personnel, and contractors may satisfy this requirement by complying with the NMFS approved measures to safeguard protected species that are most current at the time an activity is undertaken under this lease, including but not limited to new or updated versions of the 2021 BA or 2021 NMFS Letter of Concurrence, or through new or activity-specific consultations.	See Section 1.3, 4.3 and 7.
5.3.6 No Impact without Approval	In no case may the Lessee knowingly impact a potential archaeological resource without the Lessor's prior approval.	See Section 7.4 and Appendix H.
5.3.7 Post-Review Discovery Clauses:	If the Lessee, while conducting geotechnical exploration or any other bottom-disturbing site characterization activities in support of plan (i.e., SAP and COP) submittal and after review of the location by a Qualified Marine Archaeologist under 4.2.4, discovers an unanticipated 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) or evidence of a pre-contact archaeological site (e.g. stone tools, pottery or other pre-contact artifacts) within the project area, the Lessee must:	See Appendix H.
5.3.7.1	Immediately halt seafloor/bottom-disturbing activities within the area of discovery;	See Appendix H.
5.3.7.2	Notify the Lessor within 24 hours of discovery;	See Appendix H.
5.3.7.3	Notify the Lessor in writing via report to the Lessor within 72 hours of its discovery;	See Appendix H.

Addendum C Stipulation	Description	Compliance Statement or location in SAP Document
5.3.7.4	Keep the location of the discovery confidential and take no action that may adversely impact the archaeological resource until the Lessor has made an evaluation and instructs the applicant on how to proceed; and	See Appendix H.
5.3.7.5	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, conduct 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)). If investigations indicate that the resource is potentially eligible for listing in the National Register of Historic Places, the Lessor will inform 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, then, 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)).	See Appendix H.
5.4.4 Avian Annual Reporting	The Lessee must provide an annual report to the Lessor and USFWS using the contact information provided as an Enclosure to this lease, or updated contact information as provided by the Lessor. This report must document any dead or injured birds or bats found during activities conducted in support of plan submittal. The first report must be submitted within 6 months of the start of the first survey conducted in support of plan submittal, and subsequent reports must be submitted annually thereafter until all surveys in support of plan submittal have concluded and all such birds and bats have been reported. If surveys are not conducted in a given year, the annual report may consist of a simple statement to that effect. An annual report must be provided to BOEM and USFWS documenting any dead (or injured) birds or bats found on vessels and structures during construction, operations, and decommissioning. The report must contain the following information: the name of species, date found, location, a picture to confirm species identity (if possible), and any other relevant information. Carcasses with Federal or research bands must be reported to the United States Geological Survey Bird Band Laboratory, available at https://www.pwrc.usgs.gov/bbl/.	See Section 4.3.1.

2.0 PROJECT DESCRIPTION AND OBJECTIVES

2.1 Project Description

Attentive Energy will collect and analyze meteorological data, inclusive of wind speed and direction at multiple heights, and information on other meteorological and oceanographic conditions within the Commercial Lease as part of site assessment activities. Attentive Energy proposes that the collection of this data will be performed using a Fugro SEAWATCH™ Buoy. The proposed Metocean Facility represent state-of-the-art equipment that incorporates the best available technologies, mooring components, and mooring designs to ensure reliable, quality data collection, robust mooring integrity, safety and minimal environmental impacts. Design drawings of the technology proposed are provided in Appendix B.

The SEAWATCH™ Buoy will consist of instrumentation and supporting systems atop a floating moored buoy platform (Figure 3). The SEAWATCH™ Buoy is built on the SEAWATCH™ Wavescan platform, a versatile instrumentation platform, designed to provide less drag and large buoyancy, making it well-suited for deep offshore locations or areas of strong current forces. The software includes the power management GENI™ controller and the ZephIR300M LiDAR. The floating platform consists of a modular hull for easy transport and local assembly, an instrument container with processor, power management system and other electronics, LiDAR, a met mast, a sensor carrier arm (located at the top of the met mast), mooring chain, and chain weight anchor. The platform float with fenders has a diameter of 9.2 feet (2.8 meters). The unit is made out of a combination of polyethylene, aluminum, and stainless-steel, measuring 20 feet (6.1 meters) in overall height, 9.2 feet (2.8 meters) in diameter, and a weight of 3,748 pounds (1,700 kilograms). The vertical profile of the SEAWATCH™ Buoy, including instrumentation, will be approximately 11.5 feet (3.5 meters) from the sea surface to the top of the hull mast. The submerged portion of the hull will measure approximately 8.5 feet (2.6 meters) below the sea surface from the water line to the bottom of the keel weight. The Metocean Buoys will be decommissioned at the end of the data collection period as described in Section 6 (Figure 3).

2.2 Schedule

Attentive Energy plans to deploy the Met Facility within the SAP Survey Area (see Figure 1) no earlier than the third quarter of 2023, but as soon as all authorizations are in place thereafter. The collection of site-specific data via Met Facility is standard practice within areas designated for offshore windfarm development, with data collected being used for a variety of purposes including site characterization, project design, and wind resource assessment. The Met Facility will remain onsite for a minimum of one year, at which point Attentive Energy may elect to extend data collection up to an additional one year to gather additional data as the Project is constructed. The Met Facility will be fully decommissioned at the end of the site assessment data collection period as described in Section 6.

2.3 Site Location

The Met Facility will be deployed at the coordinates listed in Table 6 within the Installation Area at OCS Block 6313 Aliquot D (see Figure 1).

Table 6. Met Facility Location

Met Facility Location	Latitude (decimal degrees)	Longitude (decimal degrees)	Depth at Lowest Astronomical Tide
Buoy 1	39.698	-73.160	141 ft (43 m)

The Installation Area was chosen to ensure that the Met Facility are well exposed to representative metocean conditions within the Commercial Lease area.

BOEM and the Department of Defense will be notified if Attentive Energy elects to add any new sensors or instrumentation to the Metocean Facility.

3.0 PROJECT DESIGN

3.1 Buoy and Mooring Design

The SEAWATCH™ Buoy will be attached to the seafloor by means of a single point mooring design that allows free movement of the buoy to follow the waves over a radius (watch circle) of approximately 400 feet (122 meters) at a depth of 43 meters, dependent on the physical conditions of the environment and the final mooring design. The location of the buoy will be monitored in near real-time (10-minute updates) by the Automatic Identification System and a dual (differential) global positioning system from the buoy DPGS system. The mooring system has been designed to withstand the weather conditions at the specific location. Please see the site specific mooring analysis included in Appendix B

The mooring is comprised of a galvanized chain that connects the SEAWATCH™ Buoy to a stack of steel railway wheels on the seafloor. The steel railway wheel weight is also connected to a water level with acoustic modem atop a bottom weight via a galvanized chain (Figure 3). The steel railway wheel weight and bottom weight would weigh approximately 3 tons (2,722 kilograms) and 44 to 88 pounds (20 to 40 kilograms), respectively, and would sit on the seabed for a total area of up to 10 square feet (1.9 square meters). The chain would be attached to the base of the SEAWATCH™ Wavescan platform via the long keel structure. The link diameter in the chafe section of the mooring is 19 millimeters. The maximum area of the anchor chain sweep associated with the long-term operation of the SEAWATCH™ Buoy is anticipated to be approximately 4 acres (1.6 hectares) for the steel railway wheel weight (based on anchor chain radii of approximately 236 feet [72 meters]). The 10-square-foot (1.9-square-meter) bottom weight and sweep for the 164-foot (50-meter) long chain associated with the acoustic modem will be fully contained within the sweep area defined above. Vertical penetration of the steel railway wheel weight and bottom weight into the seabed is anticipated to be approximately 3.3 feet (1 meter).

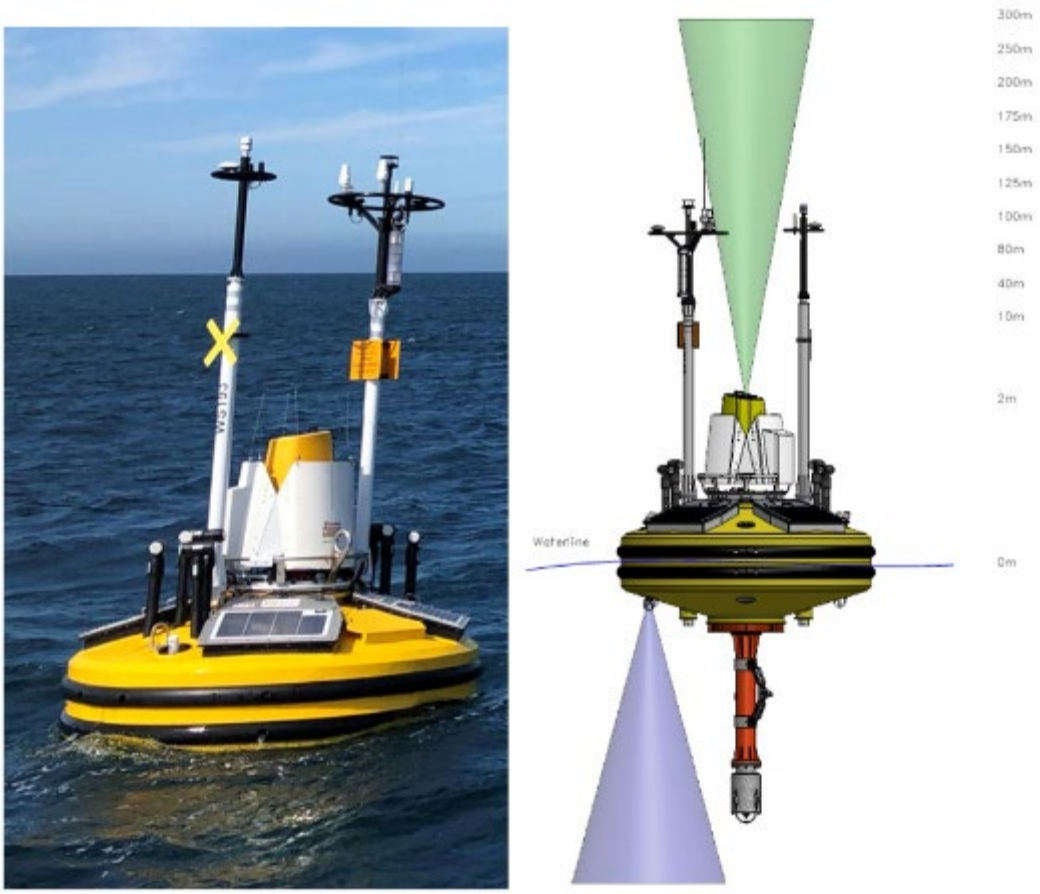

Figure 3. Left: SEAWATCH™ Buoy; Right: Schematic Indicating Beam from LiDAR and Current Profiler

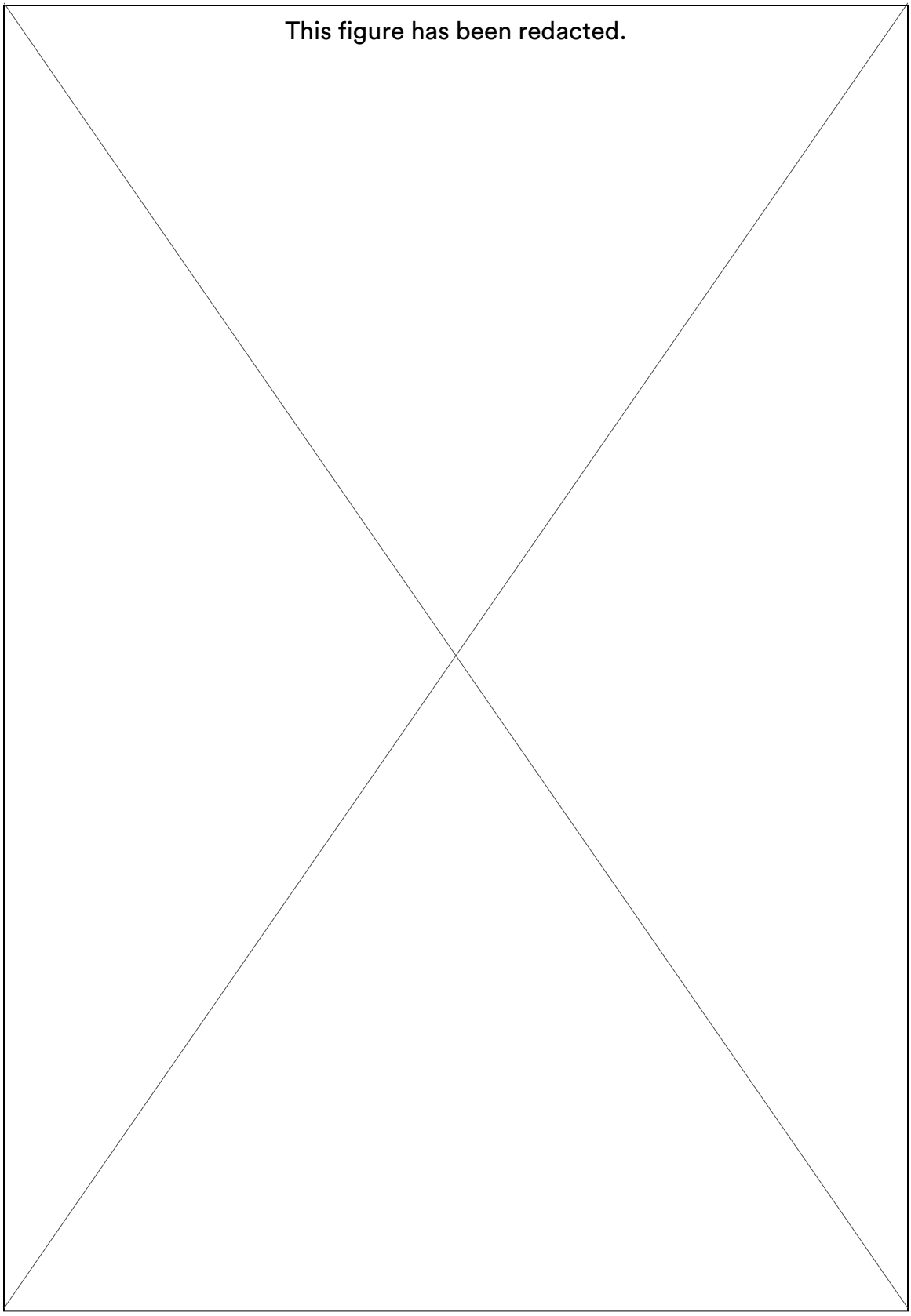

Figure 4. SEAWATCH™ Buoy General Dimensions

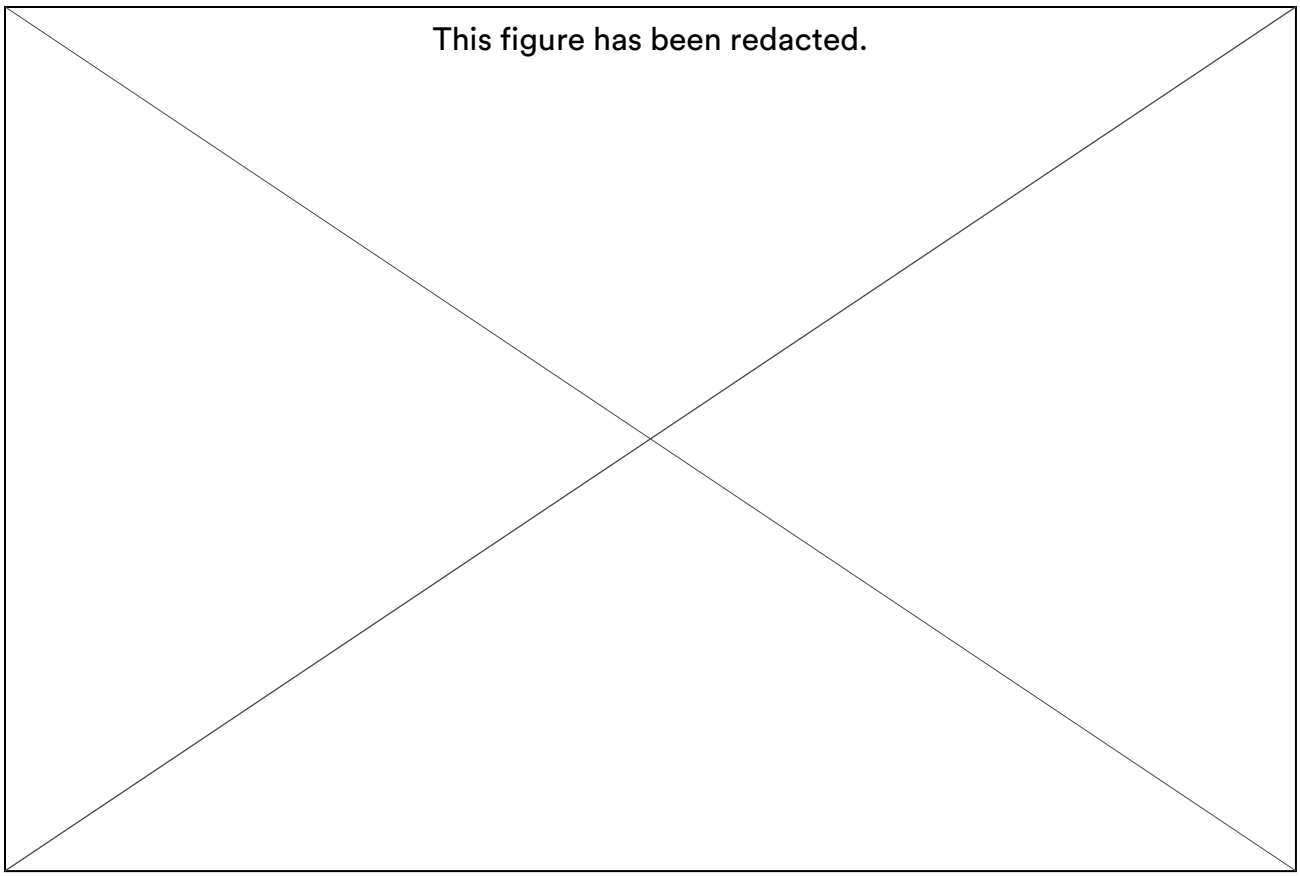

Figure 5. Representative Drawing of Single Point Mooring for the SEAWATCH™ Buoy

3.2 Power Equipment

The SEAWATCH™ instrumentation will be powered by four solar panels and rechargeable batteries. A lithium battery is included to provide backup power to critical functions such as metocean system, communication, and flash lamp in case of low energy level on the main batteries. Together with solar panels there are four methanol fuel cells located in the buoy hull, giving multiple redundancy in case of a fault. Failure of any subsystem (each fuel cell being one subsystem) impacts only its isolated contribution to the full deployment time. Through the extensive logging of system parameters, the state of the Power System is fully monitored remotely by alarm systems and operators. The SEAWATCH™ instrumentation would be capable of operating at full capacity for approximately 9 months.

The fuel cells are connected to solar panel on the lid of each fuel chamber. The four solar panels charge the batteries, and the batteries power all of the sensors and equipment. The fuel cells power the batteries in the event of a technical problem with the solar panels, and/or during a prolonged period of no sun. A back-up power supply includes a lead-acid battery bank of up to 248-amp hours for such critical functions such as metocean system, communication, and flash lamp in case of low energy level on the main batteries.

The Power Management Unit is the core component of the SEAWATCH™ Power System. It manages charging, power, and duty cycle of each on-board instrument, provides power consumption meter, a logging interface and low power fallback modes for battery protection.

It is built with secondary failover that watches the primary internal card for correct function and takes over in the uncommon event that the primary card fails. In terms of the core and low power fallback modes and the secondary failover, the Power Management Unit is an autonomous system. In the SEAWATCH™, the LiDAR is a third power mode controlled by the GENI data logger autonomously. The 3 power modes are:

- High (LiDAR, MetOcean and GENI T&C);
- Core (MetOcean and GENI T&C); and
- Low (Nav lights and Automatic Identification System).

For advanced behavior like measurement schedules, the Power Management Unit works in tandem with the GENI data logger; being commanded to turn instruments on and off before and after measurements. This interface is remotely available through the GENI Telemetry & Command system allowing monitoring and remote intervention (i.e., instrument power cycle).

With solar charging and four internal and independent fuel cells, the SEAWATCH™ Power System has multiple redundancy. Failure of any subsystem (each fuel cell being one subsystem) impacts only its isolated contribution to the full deployment time. Through the extensive logging of system parameters, the state of the Power System is fully monitored remotely by alarm systems and operators, giving confidence and the ability to plan ahead.

The buoy has several power systems that are managed by a power management system. Each independent system contributes a certain number of watt-hours over the deployment life cycle. If one of the independent systems malfunctions, the life expectancy may be reduced by the remaining watt hours on that system, although corrective action is planned (see monitoring). If intervention is not an option, it is possible to alter the measurement schedule to prolong the life expectancy.

The power management system is capable of shutting down power consumers to preserve core systems in the event of critical failure in power systems. The core systems include the two-way satellite system (see monitoring). If the power systems return to normal function, the power management system would restore power to all systems.

The buoy metocean system (wave, current, and metrological sensors) is self-sustained through the four solar panels and rechargeable batteries. A lithium battery is included to provide backup power to critical functions such as metocean system, communication, and flash lamp in case of low energy level on the main batteries. Together with solar panels, there are four methanol fuel cells providing energy to the LiDAR where each fuel cell has the capacity to power the entire buoy for approximately 70 days, or 280 days in total (approximately 9 months). In the event of a failure, the impact is limited to its contribution to the total energy and is highly fault tolerant as a result.

3.3 Instrumentation Equipment

The design of the Fugro SEAWATCH™ is comprised of two main components, both of which are described further below:

- A SEAWATCH™ equipped with ZX 300M LiDAR; complemented by

- A trawl-resistant Seabed Frame (SBF) to include a hydrophone, Conductivity, Temperature and Depth/Pressure (CTD) sensor, water level recorder, and turbidity sensor.

3.3.1 SEAWATCH™

A LiDAR instrumentation package, comprised of a ZephIR300M, will be installed atop the SEAWATCH™ Buoy. The ZephIR300M unit is a wind-profiling device capable of remotely measuring and collecting wind speeds and directions from 33 to 984 feet (10 to 300 meters) (656 feet [200 meters] validated). The SEAWATCH™ will also contain the following equipment:

- Wavesense 3 to measure wave height, period and direction/motion
- A Nortek Aquadopp Profiler 600 kHz to measure current velocity and direction profile
- A Gill Ultrasonic single point wind sensor to measure speed and direction, wind gusts
- A Vaisala PTB330 to measure air pressure
- A Vaisala HMP155 to measure air temperature and humidity
- A Seabird SBE37 to measure water temperature and sea conductivity
- An Automatic Identification System Chronos to track buoy location
- Bioplates (steel) to measure marine growth
- VEMCO VR2 receivers for marine life positioning and tag tracking
- MOTUS detection receivers for wildlife tracking and tag tracking
- SM4/SM4BAT Wildlife Acoustics for avian acoustic monitoring
- A dual (differential) global positioning system (GPS) for heading

Table 6 provides a list of the parameters measured by the SEAWATCH™, the associated instrumentation, as well as the range and accuracy of the measurements.

Table 7. Parameters Measured and Recorded by the SEAWATCH™

Parameter	Instrumentation	Range
Measurement height (configurable)	ZephIR 300 LiDAR	10 m – 300 m (200 m validated)
Probe length	ZephIR 300 LiDAR	±1 m, ±6 m and ±15 m at 40 m, 100 m, and 150 m
Number of simultaneous heights measured	ZephIR 300 LiDAR	10
Sampling rate	ZephIR 300 LiDAR	50 Hz LoS
Average period (configurable)	ZephIR 300 LiDAR	1 sec upwards
Scanning cone angle	ZephIR 300 LiDAR	30°
Wind Speed	ZephIR 300 LiDAR	<1 m/s to 70 m/s

3.3.2 Seabed Frame

The trawl resistant seabed frame measures 2.27 m^2 is held in place by a steel anchor that is part of the seabed frame structure. It is not attached to the FliDAR buoy. The SBF will contain the following equipment:

- Develogic Sono.Vault for marine acoustic monitoring
- Aanderaa Seaguard to measure current velocity
- Aquatec Aqualogger 310TY to measure turbidity on the seabed and at mid-depth
- Valport Midas Water Level Recorder to measure the water level
- Bioplates (steel) to measure Marine growth

3.4 Data Acquisition and Transfer

The Iridium satellite communication system will be used for data transmission. A GPS receiver is included in the Iridium modem. Global Systems for Mobile/General Packet Radio Service can be used as backup for data transmission assuming coverage at the measurement location.

The communication software handles the buoy messages and stores the data on the local computer. The data are then unpacked and ready for presentation or exportation. A WiFi access point would be included to download raw data during the 6-month service visits. However, the data logger would have sufficient data memory to store all data for 12 months. Processed data will be transmitted to an online web portal in near real time (10-minute intervals) for viewing by Attentive Energy.

In addition to environmental parameters, buoy housekeeping data, such as battery voltages and capacities, are transmitted to the Fugro SEAWATCH™ receiving station. A warning would be submitted if one of the sensors stops functioning. The included GPS receiver allows the position to be monitored. If drifting, the position can then be tracked, reducing the risk of loss of equipment.

An iridium position tracker integrated into the hull would be included as a backup in the event that the buoy stops sending data and position. The tracker would start sending the current position if the buoy drifts outside of the predefined watch circle.

3.5 Lighting and Marking

Attentive Energy will submit the required PATON to USCG as described in Table 2. All lighting and markings will be in compliance with USCG (including USCG circular navigation and vessel inspection circular 01-19) and FAA requirements.

Buoy lighting is described below:

Table 8. Buoy lighting specifications.

Light			Focal Plane Height	Structure	Remarks
Flash Period	Flash Length	Color		Type, Color, and Height Above Ground	
20	5	Yellow	4m	2.8m diameter yellow disc buoy	Flash cycle is 20 seconds. 5s (0.5 on / 0.5 off)

4.0 DEPLOYMENT / INSTALLATION

Installation of the Met Facility may take up to 2 days, barring weather delays. It is anticipated that the deployment activities will be staged out of the Miller's Launch in Staten Island, New York.

4.1 Overview of Installation and Deployment Activities

Attentive Energy will notify BOEM, Fleet Forces Atlantic Exercise Coordination Center at Naval Air Station Oceana, the U.S. Army Corps of Engineers (USACE), and the U.S. Coast Guard (USCG) prior to the installation mobilization supporting deployment of the Met Facility. Written notice will be provided to Fleet Forces Command via email prior to mobilization in order to avoid potential conflicts with military operations. Attentive Energy will update Fleet Forces Command on the installation schedule following approval of the SAP and detailed planning.

A Local Notice to Mariners advising of the installation of the Met Facility will be published and broadcast on Marine Channel 16 by the USCG prior to and during planned installation work. The USCG may choose to circulate the Private Aids to Navigation in a public forum as well. Additionally, the installation vessel will issue a very high frequency (VHF) broadcast on their short range radio describing, in brief, what their work plan will be as a courtesy to other mariners in the area (commercial fishermen, bulk shippers, tug and barge crews, military vessels, etc.). As is standard practice, this will be broadcast on the emergency band and Marine Channel 16, and any follow-up questions will be directed to a different, public frequency of the vessel captain's choice.

Within 30 days of completing the installation of the Met Facility, Attentive Energy will prepare an Installation Report for submission to BOEM to fulfill the requirements of 30 CFR § 585.615(a). This report will include a description of the equipment and the deployment, including final coordinates of the installation site, the results of all commissioning tests, the plans and schedule for upcoming inspections and maintenance, and any noted problems or issues to be addressed.

Attentive Energy will provide written notification to BOEM and the Department of Defense of any proposal to add new sensors to the Met Facility. Attentive Energy will include the technical specifications (manufacturer, model, spectrum requirements, etc.) for any proposed new sensors in the notification. The notification will be provided to the contacts listed in the Commercial Lease, or updated contact information as provided by BOEM.

4.1.1 Met Facility Deployment

The validation preparations and deployment will be performed by Fugro personnel. The met facility-mounted LiDAR will be validated against an onshore platform on the island of Frøya in Titran, Norway. At the completion of the validation, the Met Facility will be recovered, packed, and shipped to Miller's Launch in Staten Island, New York for assembly, testing, and commissioning.

Prior to installation, a Risk Assessment and Methods Statement (RAMS) will be developed to identify and mitigate risks to personnel, equipment and the environment during installation activities. All involved parties will review, comment and accept the RAMS prior to performing installations.

One workboat (the *Berto Miller* or the *Josephine Miller*) approximately 180 to 190 feet (55 to 58 meters) in length will be used for the deployment of the Metocean Facility. The Met Facility would be loaded on the back deck for transit to the work site at normal transit speed, depending on the sea conditions. Once on site, the vessel would deploy the SEAWATCH™ Buoy using the "anchor last" method, in which the instrumentation is deployed over the stern while the vessel maintains slow speed. The anchor weight would be chained to the stern of the vessel using certified components prior to commencement of the deployment. The mooring would be deployed in reverse order, commencing with the SEAWATCH™ Buoy already in the water. The mooring line and midwater floatation would be attached to the anchor weight and, with the vessel on position, the anchor would be released using a SeaCatch release. The anchor weights would then free-fall to the bed, bringing the mooring into the vertical position.

The deployment of the SBF would follow similar procedures described above. Upon arrival at the offshore deployment site, the following tasks will be performed:

- When approaching the planned deployment location, the SBF is lowered to the bed on the rated rope attached to an acoustic release;
- Once on the seabed, the acoustic release is fired releasing the SBF to the seabed; and
- The deployment line and acoustic release are recovered to deck and secured.

Once deployed, the SBF would be "boxed-in" by taking four ranges to the acoustic release to establish an accurate location. Fugro would make every effort to ensure that the frame is deployed within the expected deployment range zone. Additionally, the SBF will be deployed outside the watch radius of the buoy.

The deployment would be restricted to daylight only. Installation of the Met Facility is anticipated to take no more than 12 hours from arrival on site at the Installation Area to the time of departure from the Installation Area. Transit time from vessel homeport to the Commercial Lease area is expected to be approximately 5.5 hours one way; therefore, the buoy deployments are anticipated to take a total of approximately 23 hours to complete (dock to dock).

All personnel participating in the installation will attend a pre-installation briefing.

4.2 Vessel Descriptions

Installation of the Met Facility and moorings will use one vessel, departing from Miller's Launch in Staten Island, New York. Fugro will use the *Berto Miller* or *Josephine Miller,* or a similar vessel. The *Berto Miller* is a supply vessel with twin Cat 3512 engines. The vessel measures 180 feet (55 meters) in length with a 44-foot (13.4-meter) beam and a maximum 12-foot (3.7-meter) draft. The maximum speed is 12 knots and cruising speed is 10 knots. The *Josephine Miller* is a supply vessel with twin Cat 3508B engines. The vessel measures 190 feet (58 meters) in length with a 36-foot (11-meter) beam and a maximum 12-foot (3.7-meter) draft. The maximum speed is 12 knots and cruising speed is 10 knots. See Appendix C for vessel specifications.

4.3 Pre-Installation Briefing

Prior to the installation of the Metocean Buoys, all personnel will attend a pre-installation briefing as required by Lease Stipulation 5.1.1. The pre-installation briefing will include a Tool-Box Talk as well as an HSE and hazard identification presentations. The purpose of this briefing will be to review the HSE requirements and associated emergency response requirements for the proposed work, identify the responsibilities of each person, define the chains of command, discuss communication procedures, and provide an overview of planned installation activities. Additional topics for the briefing will include protected species avoidance, marine trash and debris awareness, and oil spill response procedures.

If change in personnel is required during installation activities, the new personnel will be briefed as they join the work in progress.

4.4 Protected Species Avoidance

All whales, dolphins, and porpoises in the northeast region are federally protected by the Marine Mammal Protection Act of 1972. In addition, oceanic white tip sharks, sturgeon, giant manta ray, many large whales in the area, as well as sea turtles, are further protected under the Endangered Species Act of 1973 (ESA).

On June 29, 2021, NMFS completed consultation pursuant to section 7 of the ESA concerning the effects of certain site assessment and site characterization activities to be carried out to support the siting of offshore wind energy development projects off the U.S. Atlantic coast over a ten-year period (June 2021 – June 2031). Per the NMFS letter (Appendix I), activities addressed within this SAP were considered as part of the consultation:

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

NMFS also addressed specific ESA-listed species considered within Table 9 of its June 29, 2021, consultation.

Table 9. ESA-listed species that may be affected by the proposed action.

Common Name	Scientific Name	ESA Status
Marine Mammals – Cetaceans		
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Sea Turtles		
Loggerhead turtle - Northwest Atlantic DPS	*Caretta*	Threatened
Green turtle - North Atlantic DPS and South Atlantic DPS	*Chelonia mydas*	Threatened
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Fishes		
Atlantic salmon	*Salmo salar*	Endangered
Atlantic sturgeon	*Acipenser oxyrinchus*	Endangered
New York Bight DPS		Endangered
Chesapeake Bay DPS		Endangered
Carolina DPS		Endangered
South Atlantic DPS		Endangered
Gulf of Maine DPS		Threatened
Giant Manta Ray	*Manta birostris*	Threatened
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Smalltooth sawfish	*Pristis pectinate*	Endangered

BOEM made the following determination:

> BOEM has determined the proposed action is not likely to adversely affect any of these species. We concur with this determination based on the rationale presented below. More information on the status of the species and critical habitat considered in this consultation, as well as relevant listing documents,

status reviews, and recovery plans, can be found within the BA and on NMFS webpages accessible at:

https://www.greateratlantic.fisheries.noaa.gov/protected/section7/listing/index.html,

https://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/index.html, and

https://www.fisheries.noaa.gov/species-directory.

Lease stipulation 5.2.1 states the Lessee's OCS activities must comply with the standards in the PDCs and BMPs found in BOEM's Biological Assessment (BOEM 2021c) or 2021 NMFS Letter of Concurrence (NMFS 2021), which includes various mitigation measures to minimize risk to marine species. Installation of the Met Facility will not require pile-driving; accordingly, mitigations to reduce adverse impacts on protected species from pile driving do not apply to this installation. Lease stipulation 5.2.1 (Table 5) and the current PDCs and BMPs (Table 4) apply to activities associated with installation, operation, and decommissioning of the Met Facility and will be adhered to.

4.4.1 Reporting Requirements for Protected Species

4.4.1.1 Injured or Dead Protected Species

During all phases of marine activities, sightings of any injured or dead protected species (sea turtles and marine mammals) will be reported as soon as feasible and within 24 hours, regardless of whether the injury or death was caused by Met Facility-related activities. If the injury or death was caused by a Met Facility-related vessel or project-related equipment or material/activity (e.g., support vessel, entanglement, buoy, etc.), the Detected or Impacted Protected Species Report will be submitted as soon as practicable, but no later than 24 hours from the time the incident took place.

The Protected Species Incident Report will be submitted to the NMFS Protected Resources Division (nmfs.gar.incidental-take@noaa.gov), NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622), BOEM (renewable_reporting@boem.gov), and BSEE (protectedspecies@bsee.gov), and will include the following information:

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

4.4.1.2 Vessel Strikes

In the event of a vessel strike of a protected species by any survey vessel, Attentive will immediately report the incident to BOEM (renewable_reporting@boem.gov) and NMFS (nmfs.gar.incidental-take@noaa.gov) and the NOAA stranding hotline (866-755-6622). The report must include the following information:

- Name, telephone, and email or the person providing the report;
- The vessel name;
- The Lease Number;
- Time, date, and location (latitude/longitude) of the incident;
- Species identification (if known) or description of the animal(s) involved;
- Vessel's speed during and leading up to the incident;
- Vessel's course/heading and what operations were being conducted (if applicable);
- Status of all sound sources in use;
- Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;
- Environmental conditions (wave height, wind speed, light, cloud cover, weather, water depth);
- Estimated size and length of animal that was struck;
- Description of the behavior of the species immediately preceding and following the strike;
- If available, description of the presence and behavior of any other protected species immediately preceding the strike;
- Disposition of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, last sighted direction of travel, status unknown, disappeared); and
- To the extent practicable, photographs or video footage of the animal(s).

4.4.1.3 North Atlantic Right Whales

Attentive Energy will immediately report sighting information on right whales to the North Atlantic Right Whale Sighting Advisory System (866-755-6622). North Atlantic right whale sightings in any location will also be reported to the USCG via Channel 16.

4.5 Reporting

Attentive Energy will submit a semi-annual Progress Report to BOEM every 6 months (or upon request) throughout the site assessment term as required by the Commercial Lease (Stipulation No. 3.1). The progress reports include a brief summary of engagement since the last progress report, or in the case of the first report, since the lease effective date (May 1, 2022). As applicable, SAP-related activities, including engagement, deployment, maintenance, and

inspection, will be summarized in progress reports. Additionally, Attentive Energy will submit an annual report on November 1 and an annual certification of compliance each year of the site assessment term as required by 30 C.F.R. 585.615(b) and 30 C.F.R. 585.615(c), respectively.

4.5.1 Avian and Bats

Attentive Energy will provide an annual report to BOEM and USFWS documenting any dead (or injured) birds or bats found on vessels and structures during construction, operations, and decommissioning. The submission of the report (submission timeline, recipient) will follow the criteria outlines in Lease Stipulation 5.4.4. The report must contain the following information:

- The name of species
- Date found
- Location
- A picture to confirm species identity (if possible)
- Any other relevant information

Additionally, carcasses with federal or research bands must be reported to the United States Geological Survey Bird Band Laboratory, available at https://www.pwrc.usgs.gov/bbl/.

4.6 Oil Spill Response

The Met Facility will be equipped with fuel cells as a back-up power source to the solar and battery systems. Because the Met Facility will utilize fuel cells that do not contain any oil or fuel, Oil Spill Response Measures are not required.

4.7 Health and Safety

Attentive Energy will implement a Project-specific HSE Plan to ensure the health and safety of all personnel involved in the deployment, operations and maintenance, and decommissioning of the Met Facility. An example of this plan is included in Appendix D.

5.0 OPERATIONS AND MAINTENANCE

5.1 Data Collection and Operations

The operational state of the Met Facility and quality of data recovery will be measured in near real-time throughout the data collection period. The measured parameters are packed into a binary string together with message identification, time tag and several buoy metadata parameters; comprising the buoy message in Packed File Format (PFF) format. This binary format ensures minimum satellite traffic cost.

The binary bit pattern in the PFF buoy message is described in the buoy configuration files, determining which data to be stored in the buoy and the storage interval as well as the telemetered data. Thus, the buoy configuration files must be imported into the meta-data base on shore servers, enabling proper unpacking along with the buoy message arriving at the receiving server. The supplied Fugro software would append the incoming buoy message to the

appropriate PFF file. There will be one PFF file corresponding to each buoy message ID. The meta-data file is a Microsoft Access database residing in the same directory as the PFF files.

All raw data are stored on the buoys and retrieved manually during maintenance trips. A proprietary post-processing algorithm is used to mitigate the impact of the Met Facility's movement on the data quality.

5.2 Maintenance Activities

The Met Facility will be subject to an offshore visual inspection approximately every 6 months, which will include preventive maintenance on the systems. Prior to the servicing of the Met Facility, all personnel will attend a safety briefing as described above.

Two Fugro technicians will mobilize to site to undertake the maintenance operations. A spare SEAWATCH™ Buoy will be prepared to be towed or carried on deck to the site for a hot swap of the system with the spare. Vessel lifting equipment of minimum 3.5T, such as an A Frame or stern crane, will be needed for the retrieval of the system. Once on site, the vessel will back up to the SEAWATCH™ Buoy and a line will be secured to the lifting point. The SEAWATCH™ Buoy will be lifted by the A-Frame/crane to the deck of the boat and the mooring line chain will be attached to a tugger winch. The SEAWATCH™ Buoy then will be disconnected from the mooring line and prepared for towing or carrying on deck back to port. The spare SEAWATCH™ Buoy unit will be reconnected to the mooring line chain attached to the tugger winch and released in the water. The typical maintenance visit for the seabed frame will involve the following actions:

- Recover the SBF by activating the acoustic release for the popup float and using the vessel winch and/or crane to haul in the line;
- Fully clean the equipment and remove biofouling;
- Download all data stored on the device's internal data logger and replace batteries;
- Service the instruments;
- Replace any worn element of the mooring system (if required);
- The mooring line chains, including anchor, will be checked and replaced as needed.
    - Mooring line chain will be inspected for excessive corrosion and also wear between the links (especially the 'chafe' section).
- Replace acoustic release rope, if present;
- Visual checks for water ingress and corrosion on all components;
- Test for data collection from the current measuring device using radio interference;
- Note battery levels of acoustic beacon and locator beacon and replace if necessary;
- Provide recommendations for the next service visit; and
- Redeploy.

Onshore maintenance of the buoys would be required after one year of operation if Attentive Energy elects to extend data collection. Maintenance will be performed by the *Berto Miller* or

Josephine Miller out of Miller's Launch in Staten Island, New York, and is anticipated to take approximately 12 working hours for a total of 23 hours.

5.3 Unscheduled Visits

In addition to the planned biannual maintenance activities, in exceptional circumstances, an unscheduled visit to a deployment location may be required if there is evidence of damage (such as partial or total loss of data transmissions). Examples of events that could cause such damage or buoy displacement include, but are not limited to, hurricane-strength tropical or "nor'easter" storms, heavy snow accumulation, heavy icing in the event of extremely low temperatures, or a vessel strike. It has been assumed that up to one unscheduled round trip per year may be needed.

6.0 DECOMMISSIONING

BOEM requires decommissioning of facilities described in the SAP in accordance with 30 CFR § 585.901. Attentive Energy will submit a decommissioning application to BOEM as required by 30 CFR § 585.902(b) prior to removal of the Met Facility. Following BOEM approval of the decommissioning application, Attentive Energy will submit a decommissioning notice to BOEM as required by § 585.902(d) at least 60 days prior to vessel deployment.

6.1 Overview of Decommissioning Activities

Attentive Energy's decommissioning application will describe the specific activities to be conducted. In general, decommissioning will follow a similar process as installation. As with the deployment, a RAMS will be issued prior to recovery activities to cover any potential risks and associated management of those risks. The Met Facility's mooring would be recovered and then the Met Facility and mooring would be towed to port. After recovery, all equipment will be returned directly to the Miller's Launch in Staten Island, New York, where the system will be demobilized. All data products stored on board will be delivered to Attentive Energy within 2 days of decommissioning. The demobilized Met Facility will be shipped back to the Norway (for post-deployment validation prior to being redeployed on other projects.

The vessel to be used for decommissioning will be dependent on vessel availability at the time of decommissioning. Attentive Energy currently anticipates that a vessel similar to that used for deployment and maintenance will be used for decommissioning the buoy. Additional detail on vessel to be used for decommissioning will be provide in the decommissioning application to be submitted prior to decommissioning.

6.2 Site Clearance

After the program, Fugro will fully recover the Met Facility and mooring systems leaving no materials at the Installation Area. Once the Met Facility and anchoring equipment have been removed from the site, Attentive Energy will perform post-deployment/recovery site clearance activities consisting of a High-Resolution Geophysical (HRG) survey of the Met Facility Installation Area to ensure the seafloor has been cleared of all debris associated with the Met Facility. It is expected that any scour holes or draglines left by the anchor or mooring chain will quickly be covered through natural sediment transport processes. Additional detail on site

clearance surveys will be provided in the decommissioning application and decommissioning notice to be submitted to BOEM prior to decommissioning activities.

The vessel to be used for site clearance will be dependent on vessel availability at the time of decommissioning and subsequent site clearance. Attentive Energy currently anticipates that a vessel similar to that used for deployment and maintenance will be used for site clearance activities. Additional detail on vessel to be used for site clearance will be provide in the decommissioning application to be submitted prior to decommissioning.

6.3 Reporting

As specified in the Commercial Lease, Addendum C, Stipulation 3.1, Attentive Energy will submit SAP semi-annual progress reports to BSEE throughout the duration of the site assessment term. Within 60 days of decommissioning, Attentive Energy will also prepare and submit a Decommissioning Report in accordance with 30 CFR 285.900-913. (Note: Following implementation of the BOEM-BSEE Renewable Energy Split Rule (Docket No. BOEM-2022-0042), BOEM regulations 30 CFR 585.900-913 have been modified to be BSEE regulations 30 CFR 285.900-913.) This report will include a description of the process and equipment used for decommissioning the Met Facility and the results of the site clearance survey.

7.0 AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

The following sections describe the affected environment, impacts and proposed mitigation measures for geologic conditions, fisheries and benthic resources, marine mammals and sea turtles, and archaeological resources that have been developed through site surveys and analysis that were conducted from September 2022 through January 2023 in support of the SAP. Geophysical, geotechnical, and benthic site surveys and analysis completed to support the SAP followed detailed survey plans that included protocols and methods for conducting surveys and evaluating survey data. The survey plans also incorporated the use of data that represented the state of industry techniques and knowledge at the time of the study. The SAP-related geophysical and geotechnical survey plan and benthic survey plan were confirmed by BOEM on August 11, 2022, and September 29, 2022, respectively, to be consistent with applicable laws and lease stipulations.

The analysis focuses on the maximum area of potential disturbance associated with the installation, operation, and decommissioning of the Met Facility (site assessment activities): approximately 4 acres (1.6 hectares).

7.1 Geologic Conditions

Attentive Energy conducted surveys and site investigations within the Installation Area. All investigations followed protocols, methods, and/or used data that represented the state of industries techniques/knowledge at the time of the survey. Details of these survey investigations can be found in the Marine Site Characterization Report (Appendix E).

7.1.1 Affected Environment

Data from the high-resolution geophysical survey campaign conducted by TDI Brooks on October 8, 2022, were compiled and reviewed to describe the surface and subsurface geologic conditions of the Installation Area. The seabed in the Installation Area is comprised primarily of homogenous, sandy sediment with gravel, including shell particles.

Bathymetry at the Met Facility (Buoy 1) Installation Area revealed depths decrease from approximately 131.5 feet (40.1 meters) in the north to 137.1 feet (41.8 meters) to the southeast (Figure 5). The seabed morphology is relatively flat and featureless, gently sloping to the east-southeast at a slope of less than 1 degree.

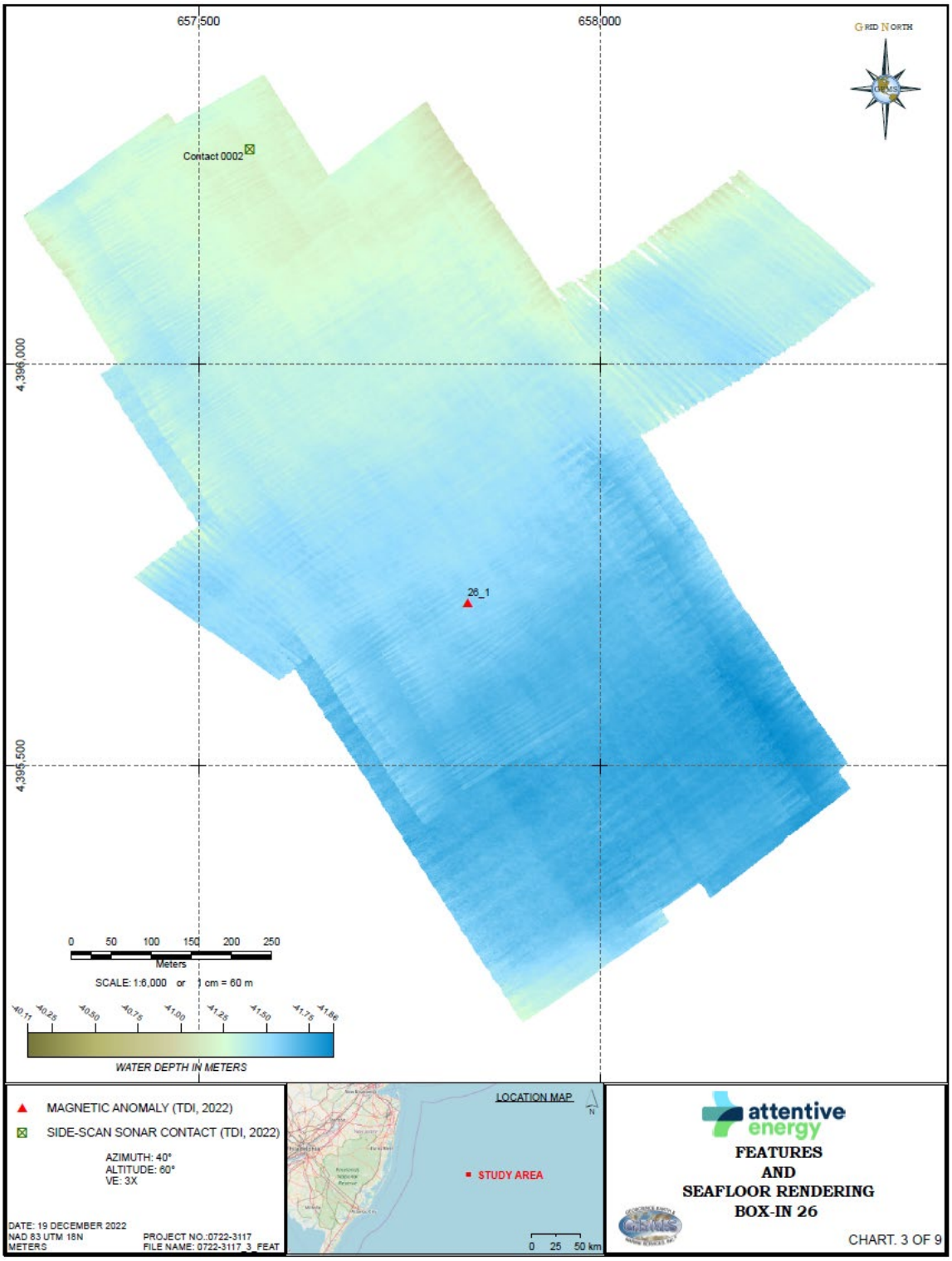

Figure 6. Bathymetry of the Installation Area (Box-in 26 refers to a sub-survey area from the MSCR survey and the complete survey area used for assessment of the Met Facility Installation Area)

7.1.2 Natural Seafloor and Sub-Seafloor Hazards

The geophysical datasets were analyzed for seafloor and sub-seafloor hazards, which could pose a potential risk to the installation, operation, and maintenance of the Met Facility. In the survey area of the Installation Area, there was one side-scan sonar contact 1,509 feet (460 meters) northwest of the Met Facility deployment location and one magnetometer anomaly 574 feet (175 meters) south-southeast of the Met Facility deployment location. The sidescan and multibeam bathymetry datasets were interpreted and found to contain no evidence of seafloor hazards. The subbottom dataset was interpreted and found to contain no evidence of sub-seafloor hazards. The geophysical datasets were used to confirm that additional geological hazards were not present.

The Installation Area was selected to avoid known hazards, both natural and man-made. Shallow hazards will not impact deployment, maintenance, or decommissioning of the Met Facility. Table 10 summarizes major types of seafloor hazards and associated details observed during the survey and desktop review, as necessary.

Table 10. Seafloor and Sub-Seafloor Hazards

Hazard	Definition	Identification and Description
Seafloor		
Scarp	An exposed face of soil above the head of a landslide.	No evidence of these features was observed in the dataset.
Channels	The deepest portion of a body of water through which the main volume or current of water flows.	No evidence of these features was observed in the dataset.
Ridges	A relatively narrow elevation which is prominent on account of steep angle at which it rises.	No evidence of these features was observed in the dataset.
Bedforms / Depressions	Features that develop due to the movement of sediment by the interaction of flowing water; critical angle and forces required for movement are dependent upon many factors.	No evidence of these features was observed in the dataset.
Exposed Rocky Area	Surface expression of bedrock outcropping on seafloor.	No evidence of these features was observed in the dataset.
Boulders	Glacial erratics (boulders) greater than 30 centimeters in diameter; outcropping coarse till/drift or lag deposit.	No evidence of these features was observed in the dataset.
Buried Boulders	Glacial erratics (boulders) greater than 30 centimeters in diameter; subsurface coarse till/drift or lag deposits.	No evidence of these features was observed in the dataset.
Pock Marks	Craters in the seabed caused by fluids (gas and liquids) erupting /streaming through the seabed sediments.	No evidence of these features was observed in the dataset.
Seabed Scars, Ice Scour, Drag Marks	Incisions or cuts into the seafloor may be associated with glacial advances/retreats or bottom fishing activity.	No evidence of these features was observed in the dataset.
Faults, Faulting Expression, Fault Activity	Physiographic feature (surface expression) related to a fracture, fault, or fracture zone along which there has been displacement of the sides relative to one another.	No evidence of these features was observed in the dataset.

Hazard	Definition	Identification and Description
Slumping, Sliding Seafloor Features	Large scale structures that result from the downslope movement of sediments due to instability and gravity. In the submarine environment these structures are often found in slope environments along coastal margins.	No evidence of these features was observed in the dataset.
Steep/Unstable Seafloor Slopes	Large scale feature/stretch of ground forming a natural or artificial incline, with a slope that approaches the angle of repose (maximum angle at which the material remains stable).	No evidence of these features was observed in the dataset.
Scour/Erosion Features	Erosion of material due to water flow. Often associated with erosion adjacent to larger natural and man-made structures.	No evidence of these features was observed in the dataset.
Sensitive Benthic Habitats	Shallow water habitats of chemosynthetic communities or submerged aquatic vegetation including macroalgae and sea grasses.	No evidence of these features was observed in the dataset.
Manmade Features	Anthropogenic debris caused by offshore activities.	No evidence of these features was observed in the dataset.
Mounds	Rounded area of topographically higher elevation than the surrounding seafloor.	No evidence of these features was observed in the dataset.
Brine Seeps and Pools	Areas with very high salinity that leaks from the seafloor and/or creates small pools due to water denser than surrounding ocean	No evidence of these features was observed in the dataset.
Liquefaction	Failure or loss of strength that causes sediment or soil to behave as a viscous liquid	No evidence of these features was observed in the dataset.
Soil Sensitivity	Ratio of peak to remolded shear strength. Mostly large strength losses on disruption, resulting in catastrophic failure, liquefaction, and long run-out distances.	No evidence of these features was observed in the dataset.
Volcanic Activity	Presence of emission of gases, non-explosive lava emissions to extremely violent explosive related to volcanic events	No evidence of these features was observed in the dataset.
Soft Soils	Clay or silty clay soil which is geologically young and come to an equilibrium under its own weight without undergoing any form of consolidation	No evidence of these features was observed in the dataset.
Mobile Sediment	Sediments that are loosely held and actively being transported by water current. Mostly found on the seafloor and water column	No evidence of these features was observed in the dataset.
Creep	Slow, steady, downward movement of slope-forming sediment or rock caused by shear stress sufficient to produce permanent deformation	No evidence of these features was observed in the dataset.

Hazard	Definition	Identification and Description
Sub-Seafloor		
Buried Channels	Former fluvial drainage pathways during sea level low stands, usually only deepest portion of the waterway in-filled and preserved. Mark ancestral patterns of glacier meltwater runoff or river outflow.	No evidence of these features was observed in the dataset.
Submarine Canyons	Steep-sided valley cut into the seafloor of the continental slope, sometimes extending well onto the continental shelf.	No evidence of these features was observed in the dataset.
River Channel	Outline of a path of relatively shallow and narrow body of fluid.	No evidence of these features was observed in the dataset.
Deformation and Consolidation	Volumetric changes in sediment or soil in response to change in pressure	No evidence of these features was observed in the dataset.
Exposed Hard-bottom Surfaces	Any semi-lithified to solid rock strata exposed at the seafloor; in this area, may include bedrock or a nearly continuous pavement of fragmented rock or boulders.	No evidence of these features was observed in the dataset.
Shallow Gas	Subsurface concentration of material in gaseous form that has accumulated by the process of decomposition of carbon-based materials (former living organisms).	No evidence of these features was observed in the dataset.
Gas Hydrates	Subsurface gas deposits that were formed at or near the seafloor in association with hydrocarbon seeps.	No evidence of these features was observed in the dataset.
Gas/Fluid Expulsion Features	Upward movement of gas/fluid via low resistance pathways through sediments onto the seafloor; may be related to other hazards diapirs, faults, shallow water flows).	No evidence of these features was observed in the dataset.
Diapiric Structure Expressions	The extrusion of more mobile and ductile-deformable material forced onto the seafloor from pressure below.	No evidence of these features was observed in the dataset.
Karst Areas	Landscape formed from the dissolution of soluble rocks.	No evidence of these features was observed in the dataset.
Shallow Faults	Physiographic feature (subsurface expression) related to a fracture, fault, or fracture zone along which there has been displacement of the sides relative to one another.	No evidence of these features was observed in the dataset.
Buried Slumping	Buried large scale structures that result from the downslope movement of sediments due to instability and gravity. In the submarine environment these structures are often found in slope environments along coastal margins	No evidence of these features was observed in the dataset.
Shallow Rock or Buried Hard Ground	Any semi-lithified to solid rock strata buried beneath the seafloor; in this area, may include bedrock or a nearly continuous pavement of fragmented rock or boulders.	No evidence of these features was observed in the dataset.

Hazard	Definition	Identification and Description
Diapiric Structures	A geological structure formed when a mass of material of high plasticity and low density, such as salt, gypsum, or magma, pushes upward into overlying strata	No evidence of these features was observed in the dataset.

7.2 Climate and Weather

Attentive Energy compiled information related to meteorological and oceanographic conditions at the Project area to prepare the document provided in Appendix J: Basis for Design Data – Preliminary Metocean Design Criteria. The Basis for Design Data report outlines the Preliminary Metocean Design Criteria for the New York Bight Project offshore the USA, in support of conceptual design. The criteria in the Basis for Design Data report will be updated once a Metocean survey and subsequent high-resolution modelling of the areas have been undertaken. Operational and extreme conditions are extracted from the Preliminary Metocean Design Criteria report by Woods Hole Group (Woods Hole Group 2023). Attentive Energy compiled this data using the location of OCS-A-0538 as the Location of Interest.

7.2.1 General

Located in the middle latitudes, the climate offshore New Jersey is characterized by four distinct seasons with a relatively uniform distribution of precipitation through the year. Winter is cold but temperatures, to some extent, are moderated by the Atlantic Ocean, although the prevailing westerly winds minimize this effect. Spring and fall are changeable transition seasons and occasioned by a rapid succession of warm and cold fronts associated with cyclones that generally move from a westerly direction. Summers are warm to hot with generally high atmospheric humidity.

7.2.2 Winds

The area offshore New Jersey is located within the global belt of winds known as the Ferrel Cell. Rising air near 60°N flows equatorward at high altitudes and sinks near 30°N. Returning air near the surface flows poleward but is deflected by the Coriolis effect, forming the prevailing westerlies. Winds at any given time depend on the frequency and intensity of anticyclones and cyclones that persist or move over the area. An anticyclonic circulation over the northern portion of North America in winter brings a high percentage of northwesterly winds to the region. This pattern changes in summer as the Bermuda High, a semi-permanent high-pressure area in the North Atlantic Ocean, moves northwestward and produces primarily southwesterly winds over the eastern United States.

Winds offshore New Jersey have a significant seasonal variability. Lowest wind speeds occur in the summer months, averaging 3m/second (s) to 8m/s, with the wind blowing primarily from the southwest. During winter, wind speeds are highest, averaging 8m/s to 12m/s, and the wind direction is generally from the northwest. Spring and autumn months show moderate wind speeds with greater directional variability. The highest mean wind speeds are associated with the frequent passages of well-developed cyclones and anticyclones. Refer to Appendix J for more detailed wind speed data.

All		10m Wind Direction (From)																
10 m WindSpeed (m/s)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total %
	< 1.0	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	1.10
	2	0.51	0.51	0.53	0.56	0.60	0.61	0.59	0.63	0.67	0.74	0.74	0.67	0.61	0.57	0.53	0.54	9.59
	4	0.93	0.87	0.91	1.02	0.96	0.91	0.92	1.04	1.38	1.78	1.90	1.57	1.26	1.10	1.01	0.98	18.53
	6	1.11	1.03	1.09	1.08	0.92	0.74	0.70	0.88	1.37	2.51	3.11	2.12	1.53	1.44	1.39	1.32	22.33
	8	1.09	0.87	1.04	0.95	0.67	0.45	0.42	0.53	0.97	2.42	3.25	1.76	1.34	1.55	1.70	1.51	20.52
	10	0.72	0.58	0.72	0.73	0.40	0.24	0.23	0.30	0.51	1.67	1.99	0.88	0.89	1.61	1.75	1.25	14.45
	12	0.31	0.34	0.48	0.39	0.22	0.13	0.12	0.16	0.27	0.80	0.75	0.29	0.54	1.23	1.29	0.71	8.03
	14	0.14	0.16	0.25	0.19	0.10	0.06	0.06	0.08	0.13	0.30	0.25	0.10	0.27	0.69	0.68	0.27	3.74
	16	0.05	0.08	0.09	0.07	0.04	0.03	0.02	0.04	0.06	0.09	0.05	0.03	0.11	0.25	0.20	0.07	1.29
	18	0.02	0.02	0.03	0.02	0.01	<0.01	<0.01	0.01	0.02	0.02	<0.01	<0.01	0.04	0.05	0.05	0.02	0.34
	> 20	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.09
	Total %	4.96	4.54	5.20	5.09	3.99	3.24	3.13	3.75	5.46	10.38	12.13	7.50	6.65	8.55	8.69	6.74	100.00

Legend
Percentage
100
10

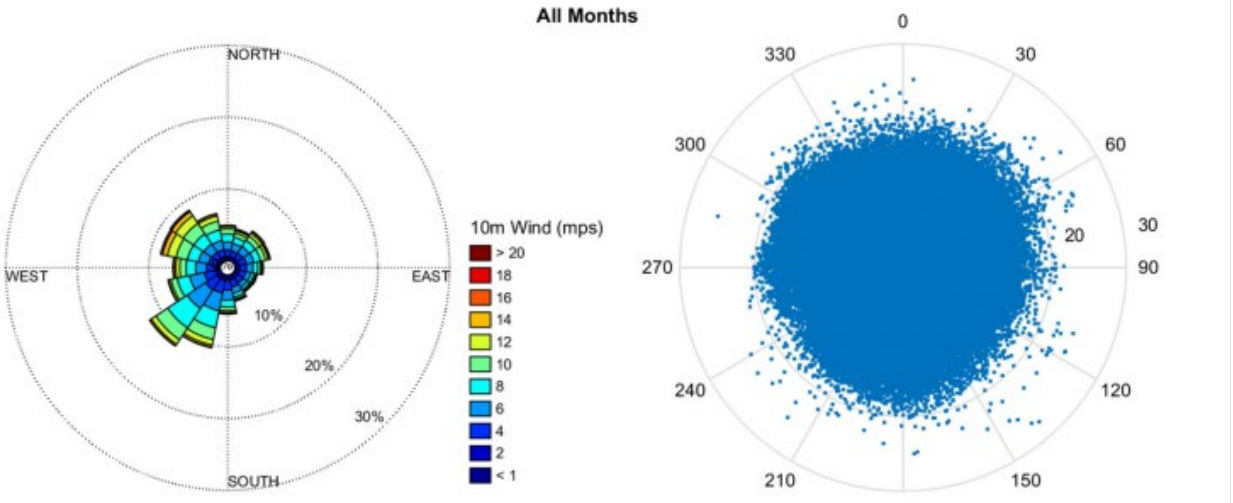

Figure 7. Wind speed.

7.2.3 Waves

Although winds are strongest during winter, the largest waves occur in autumn. This is because remotely generated swell waves have larger amplitudes during this time of year. The smallest waves occur in summer, as wind forcing is weakest for this season. Summer mean significant wave height values are between 0.75m and 1.25m, while autumn values are between 1.25m and 1.5m.

Shorter peak wave periods occur during winter and the longest wave periods during autumn with values of 6.5s and 8s, respectively. Longer periods in autumn are again associated with strong remote swell from the open ocean. Shorter offshore wave periods for the winter indicate younger wind-driven seas, which is consistent with winter significant wave heights and the wind forcing. Summer sea states are dominated by the presence of longer-period, remotely generated swell with relatively low wave heights. Spring wave periods average around 6.5s. Refer to Appendix J for more detailed wave height data.

All months		Mean Wave Direction (From)																
SWH (m)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total %
	<0.5	0.04	0.06	0.07	0.10	0.16	0.26	0.39	0.32	0.18	0.11	0.05	0.04	0.03	0.03	0.02	0.03	1.88
	0.75	0.57	0.67	0.86	1.58	3.03	4.28	5.21	5.77	5.58	3.22	1.17	0.64	0.56	0.53	0.58	0.60	34.85
	1.25	0.79	0.72	0.89	2.00	3.32	2.72	2.51	2.88	4.16	4.05	1.33	0.79	0.85	0.89	1.05	0.95	29.90
	1.75	0.47	0.43	0.62	1.42	1.67	0.96	0.93	1.07	1.55	2.09	0.77	0.51	0.63	0.92	0.96	0.76	15.75
	2.25	0.23	0.22	0.38	0.78	0.76	0.40	0.42	0.51	0.73	0.89	0.38	0.28	0.45	0.66	0.69	0.46	8.23
	2.75	0.11	0.13	0.21	0.49	0.37	0.21	0.20	0.25	0.41	0.42	0.16	0.15	0.29	0.43	0.41	0.23	4.48
	3.25	0.05	0.07	0.15	0.32	0.18	0.10	0.12	0.14	0.21	0.18	0.07	0.08	0.15	0.21	0.21	0.12	2.38
	3.75	0.03	0.04	0.10	0.20	0.11	0.05	0.06	0.08	0.11	0.08	0.04	0.05	0.09	0.10	0.09	0.05	1.28
	4.25	0.01	0.03	0.08	0.09	0.05	0.03	0.03	0.04	0.06	0.04	0.02	0.03	0.04	0.05	0.05	0.02	0.65
	4.75	<0.01	0.01	0.04	0.04	0.01	0.01	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.30
	>5.25	<0.01	0.01	0.05	0.07	0.02	0.01	0.02	0.02	0.03	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.30
	Total %	2.32	2.38	3.45	7.10	9.69	9.04	9.90	11.11	13.06	11.09	4.01	2.58	3.10	3.83	4.10	3.23	100.00

Legend
Percentage
100
10

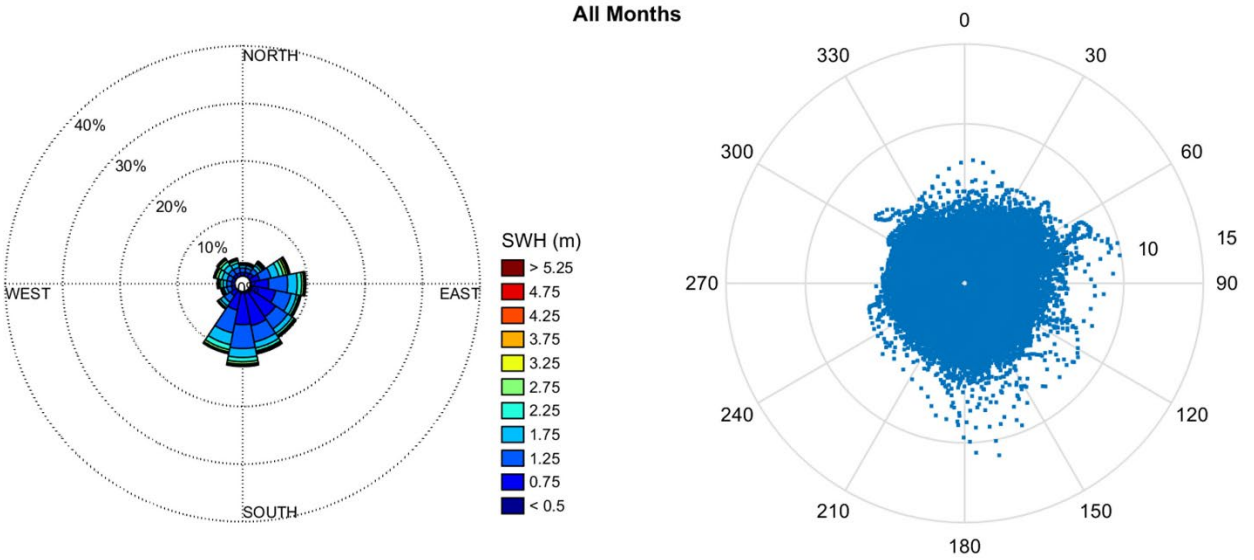

Figure 8. Multi-annual (all months) joint distributions of significant wave height (coming from).

7.2.4 Currents

The Gulf Stream is the primary ocean circulation feature along the eastern coast of the United States. It is the western portion of the North Atlantic Gyre, carrying warm water from the Gulf of Mexico northward to northeastward toward Europe. The Gulf Stream is one of the strongest ocean currents in the world, with peak velocities near 2m/s. The feature turns northeastward off the coast of North Carolina into the open Atlantic Ocean, remaining well to the southeast and east of the region offshore New Jersey.

Tides are the most dominant component of currents in the area of interest. Here, tides are semidiurnal, with M2 (semidiurnal lunar constituent) being the largest component. On the continental shelf, coastal currents are generally driven by local wind stress and freshwater buoyancy due to the presence of the Hudson River plume.

7.2.5 Hurricanes and Extreme Conditions

From June through November (annually), hurricanes and other tropical systems influence environmental conditions over the Western Atlantic Ocean. In the area of interest, hurricanes tend to track to the northeast after turning from their westward propagation through the Atlantic. Wind and wave directions at a particular site during these events will depend on the path of the hurricane and its proximity to the site. The strongest winds are generally within 100 km of the storm's track, with the most severe conditions in the northeastern quadrant of the storm.

According to historical records (NOAA IBTrACS), seven hurricanes have passed within 100km from the Location of Interest (from 1950 to 2021). The most intense hurricane that impacted the area was Hurricane Carol in August 1954. The storm reached Category 3 intensity just east of the Location of Interest, with sustained wind speeds peaking up to 51 m/s on August 31, 1954. The storm originated over the Atlantic to the east of Florida and the Bahamas, travelling north-northwest for a few days before turning westward off the coasts of Georgia and South Carolina. The storm then turned north-northeastward with its center travelling just east of the Atlantic seaboard before making landfall near East Hampton, New York and again just east of Groton Long Point, Connecticut on August 31st. The most recent event corresponds to Hurricane Sandy (2012). This storm developed in the Caribbean Sea on October 21, 2012, and travelled northward to north-northeastward, passing over Jamaica, Cuba, and the Bahamas. The storm progressed northward to northeastward to the east of Florida and the Carolinas during the last week of October in 2012 before turning northwestward offshore Virginia. The storm remained a Category 1 storm until it was approximately 100 km southwest of the Location of Interest, producing speeds around 30m/s. The storm made landfall as an extratropical storm just northeast of Atlantic City, New Jersey on October 29, 2012. Refer to Appendix J for more detailed hurricane and extreme conditions data.

7.3 Fisheries and Benthic Resources

7.3.1 Fisheries

As demonstrated in Sections 1 and 2, the equipment and methodologies proposed herein by Attentive Energy are consistent with the activity considered by BOEM in the New York Bight EA (BOEM 2021b). Sections 4.3.2 and 4.3.3 of the New York Bight EA describe the affected environment and potential impacts to fisheries that may result from site assessment activity. The information in the New York Bight EA (2021b) is incorporated by reference.

BOEM considered impacts to fish, invertebrates, essential fish habitat, and fishing industries from site assessment activities in renewable energy lease areas and other ongoing activities such as climate change, military use, marine transportation and other planned activities associated wind energy development. BOEM anticipates ongoing activities to remain stable over time while planned activities will continue to grow. During offshore wind energy development on existing leases or easements, the construction and presence of structures could lead to impacts on fish and commercial and recreational fishing through noise disturbance, vessel allisions, entanglement or gear loss/damage, fish aggregation, habitat conversion, navigation hazards (including transmission cable infrastructure), and space-use conflicts (BOEM 2021b). BOEM concluded in the New York Bight EA that the fisheries impacts related to ongoing

and planned activities in the region would be moderate, while those of just site assessment activities would be negligible to minor.

Attentive Energy has reviewed currently available literature and data regarding fisheries in the New York Bight, off the coast of New York and New Jersey, including the following:

- NEFSC Stock Assessments completed since 2021 (NEFSC 2022a; NOAA Fisheries n.d.)
- Presence of ESA-listed fish species in the Lease Area (NOAA Fisheries 2021a, b; 2022)
- Data Collection and Site Survey Activities for Renewable Energy on the OCS- Biological Assessment, Revised 2021 (BOEM 2021c)
- State of the Ecosystem 2022: New England (NOAA Fisheries 2022c)

Based on this data, Attentive Energy has determined that there is no substantive new information that would change BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant effects to fisheries.

While stock assessments for the Mid-Atlantic fisheries resources are regularly updated, the description of species assemblages and stock assessments in the New York Bight EA are considered representative of current conditions.

As described in the New York Bight EA, ESA-listed fish species that may occur in the Lease Area include Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), oceanic whitetip shark (*Carcharhinus longimanus)*, and giant manta ray (*Manta birostris*). All Distinct Population Segments of Atlantic sturgeon except the Gulf of Maine Distinct Population Segment remain listed as endangered, though designated critical habitat does not occur in the Lease Area (NOAA Fisheries 2022a; 82 FR 39160). BOEM's analysis is applicable and the determination that the proposed site assessment activity would not be likely to adversely affect Atlantic sturgeon is appropriate. The oceanic whitetip shark and giant manta ray remain listed as threatened throughout their ranges (NOAA Fisheries 2021a, b). Despite these species' presence in U.S. waters, NOAA Fisheries does not consider any areas within U.S. waters as critical habitat for the oceanic whitetip shark nor giant manta ray (85 FR 12898; 84 FR 66652). These species may occasionally occur in the mid-Atlantic Bight waters, typically further offshore than the Lease Area at the shelf break (BOEM 2021c). Due to the low potential for occurrence of these species in the Lease Area and low probability of encounter by vessels and site assessment equipment, the proposed activities are not expected adversely affect oceanic whitetip sharks and manta rays.

Attentive Energy has committed to implementing all applicable lease conditions, which include implementing BMPs during installation, operation, and decommissioning of the Met Facility to minimize impacts on fisheries, including species protected under the ESA. In accordance with Lease Stipulation 3.1.2.1 (Addendum D), Attentive Energy has developed a publicly available Fisheries Communications Plan, available at:

https://attentiveenergy.com/wp-content/uploads/2022/08/ATT-FSH-COM-PLN-ATT-000001_2_IFU_20220823_Attentive-Energy-Fisheries-Communication-Plan.pdf

The Fisheries Communication Plan describes Attentive Energy's commitments and strategies for communication and collaboration with fisheries stakeholders prior to and during activities in support of the submission of a plan (e.g., SAP or COP). Additionally, the Fisheries Liaison Officer to the Project, who will be the primary point of contact for fisheries stakeholders, will be:

Sebastian Velez
Attentive Energies
Sebastian.Velez@totalenergies.com
(731) 456-7715

Attentive Energy will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity. Attentive Energy also plans to voluntarily add a VEMCO VR2 receiver that will monitor for tagged marine wildlife, such as pelagic fish.

7.3.2 Benthic Site Assessment

The planned Met Facility deployment location surface sediments comprise homogenous, brownish tan, medium- to coarse-grained sand with fine to medium gravel including shells and shell fragments. The benthic community assessment (BCA) reported that the number of taxa at each grab sample location and the diversity at each site as follows: 9 taxa with H'=2.00 at FLiDAR A, 8 taxa with H'=1.58 at FLiDAR C, 12 taxa with H'=1.77 at FLiDAR D,14 taxa with H'=1.77 at FLiDAR E, and 8 taxa with H'=1.40 at FLiDAR G.

There are no anthropogenic obstructions present in the Met Facility Installation Area. No geologic hazards are apparent at the seafloor as the location is void of hardgrounds and evidence of sediment mobility or soft soils. The site contains no discernable faults at the seafloor. No geophysical anomalies were interpreted at the site and within a 100-meter radius. Only two anomalies were identified in the general vicinity. The seabed morphology is somewhat flat and featureless, gently sloping to the east-southeast at a slope of less than 1 degree.

7.3.2.1 Benthic Resources

Sediment profile imagery and plan view (SPI/PV) and sediment grab samples were collected at the installation site by INSPIRE aboard the marine vessel *Northstar Challenger* on October 6, 2022 (Figure 9). SPI/PV imagery provides information about the surface sediments and benthic habitats and the Van Veen grab samples were analyzed for BCA.

7.3.2.2 BCA Results

The SPI/PV image shows a homogenous medium- to coarse-grained sandy substrate with gravel-sized shell fragments and various taxa at the surface (Figure 10). The grab sample locations are documented in Table 11 and the BCA data are reported in Table 12 and Table 13.

Table 11. Grab Sample Locations in the Met Facility Installation Area. (Note: Biota were only present at Sites A, C, D, E, and G.)

Survey ID	Site	X (m) UTM 18N	Y (m) UTM 18N	Latitude WGS84 N	Longitude WGS84 W
AE_22B2	FLiDAR A	657778.72	4395848.65	39.69791752	-73.15974442
AE_22B2	FLiDAR B	657777.83	4395848.55	39.69791682	-73.15975487
AE_22B2	FLiDAR C	657778.07	4395851.69	39.6979451	-73.15975128
AE_22B2	FLiDAR D	657780.29	4395852.96	39.69795607	-73.15972506
AE_22B2	FLiDAR E	657781.91	4395846.64	39.69789889	-73.15970774
AE_22B2	FLiDAR F	657778	4395848.46	39.69791602	-73.15975292
AE_22B2	FLiDAR G	657776.64	4395846.92	39.69790236	-73.15976911

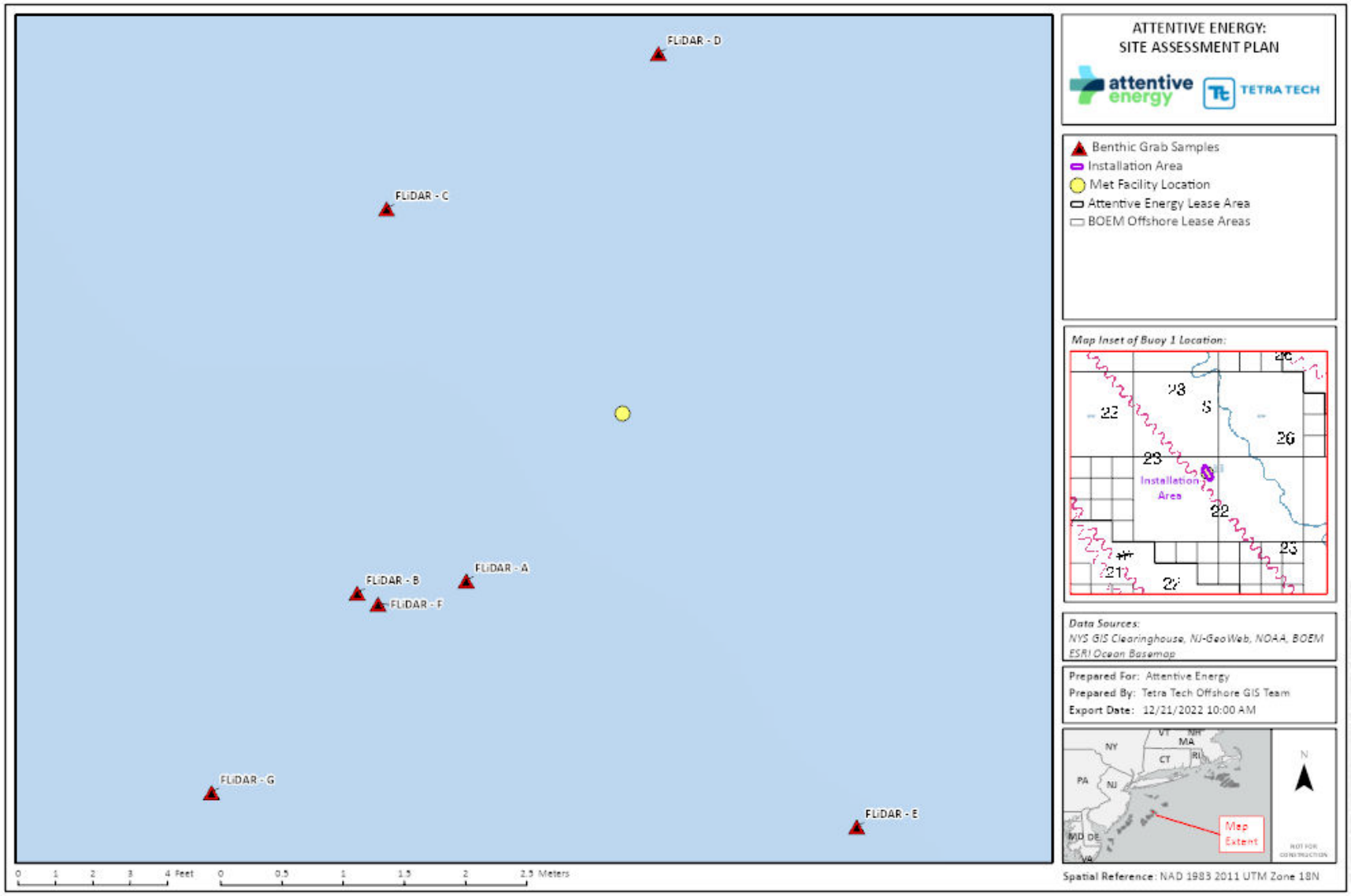

Figure 9. Grab Sample Locations in the Met Facility Deployment Area

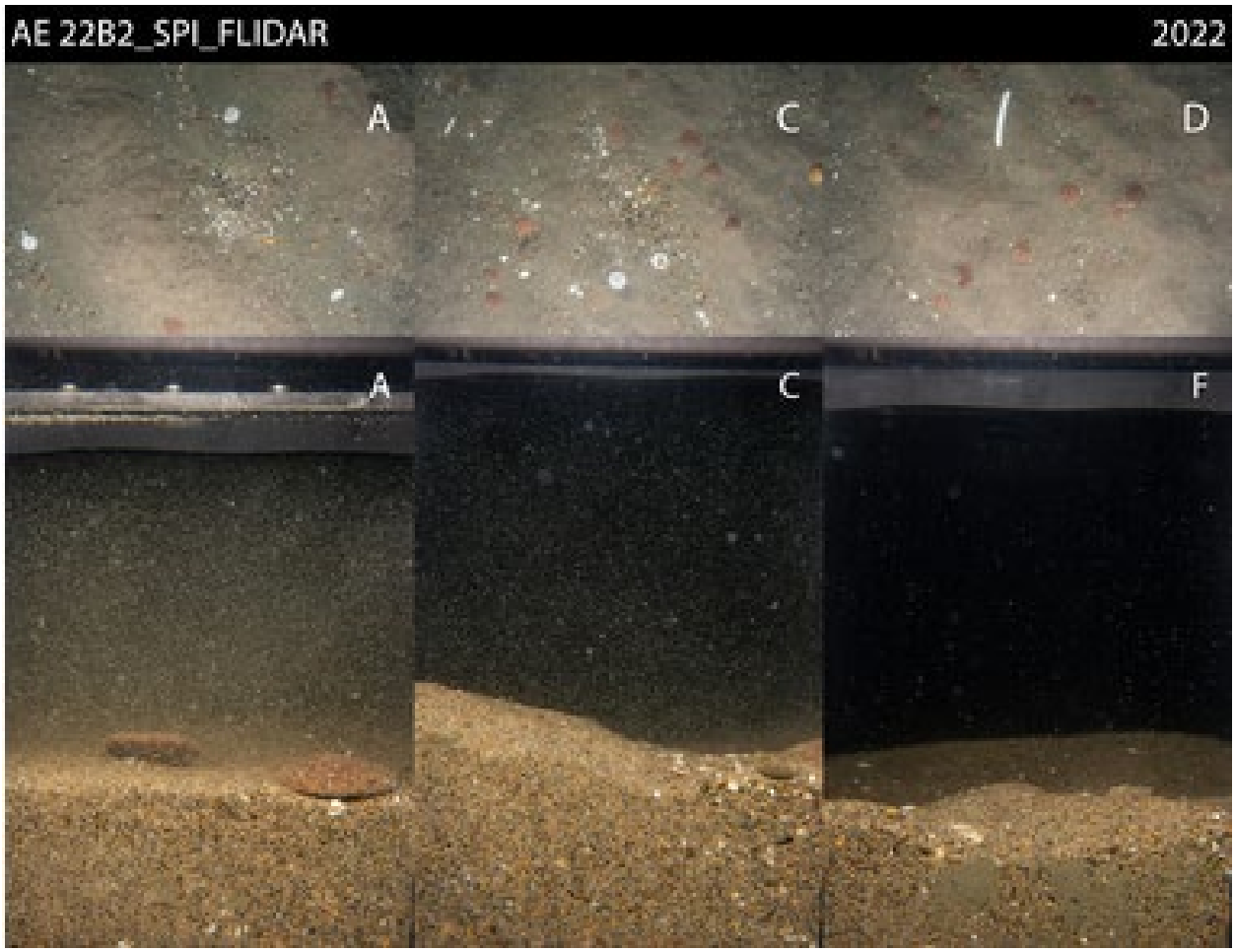

Figure 10. SPI/PV Imagery Showing Sediment Characteristics and Presence of Taxa (documented from grab samples in the vicinity, Table 9 and Table 10).

Table 12. Taxa Inventory at the Five Sample Locations where Biota were Present

Station	Biotic Community (Taxa)	Number
FLiDAR A	*Naididae* (LPIL)	1
FLiDAR A	*Polygordius* (LPIL)	3
FLiDAR A	*Scalibregma inflatum*	1
FLiDAR A	*Goniadella gracilis*	3
FLiDAR A	*Goniadidae* (LPIL)	1
FLiDAR A	*Aricidea catherinae*	1
FLiDAR A	*Echinarachnius parma*	2
FLiDAR A	*Echinodermata* (LPIL)	5
FLiDAR A	*Veneridae* (LPIL)	1

Station	Biotic Community (Taxa)	Number
FLiDAR C	*Polygordius* (LPIL)	2
FLiDAR C	*Protodorvillea kefersteini*	1
FLiDAR C	*Goniadella gracilis*	11
FLiDAR C	*Sigalion arenicola*	1
FLiDAR C	*Rhepoxynius hudsoni*	1
FLiDAR C	*Tanaissus psammophilus*	4
FLiDAR C	*Echinarachnius parma*	1
FLiDAR C	*Tubulanus sp.* A	1
FLiDAR D	*Enchytraeidae* (LPIL)	2
FLiDAR D	*Polygordius* (LPIL)	4
FLiDAR D	*Protodorvillea kefersteini*	2
FLiDAR D	*Lumbrineridae* (LPIL)	1
FLiDAR D	*Goniadella gracilis*	20
FLiDAR D	*Streptosyllis arenae*	2
FLiDAR D	*Aricidea* (LPIL)	1
FLiDAR D	*Paradoneis lyra*	1
FLiDAR D	*Cirratulidae* (LPIL)	1
FLiDAR D	*Tanaissus psammophilus*	2
FLiDAR D	*Veneridae* (LPIL)	1
FLiDAR D	*Haminoeidae* (LPIL)	1
FLiDAR E	*Naididae* (LPIL)	3
FLiDAR E	*Polygordius* (LPIL)	8
FLiDAR E	*Lumbrineridae* (LPIL)	5
FLiDAR E	*Drilonereis longa*	1
FLiDAR E	*Goniadella gracilis*	35
FLiDAR E	*Pisione remota*	1
FLiDAR E	*Aricidea catherinae*	2
FLiDAR E	*Paraonidae* (LPIL)	1
FLiDAR E	*Caulleriella* sp. J	1

Station	Biotic Community (Taxa)	Number
FLiDAR E	*Cirratulidae* (LPIL)	1
FLiDAR E	*Tanaissus psammophilus*	5
FLiDAR E	*Echinarachnius parma*	1
FLiDAR E	*Echinodermata* (LPIL)	2
FLiDAR E	*Tritia trivittata*	1
FLiDAR G	*Naididae* (LPIL)	10
FLiDAR G	*Polygordius* (LPIL)	19
FLiDAR G	*Lumbrineridae* (LPIL)	3
FLiDAR G	*Opheliidae* (LPIL)	1
FLiDAR G	*Goniadella gracilis*	51
FLiDAR G	*Aricidea catherinae*	2
FLiDAR G	*Rhepoxynius hudsoni*	3

Table 13. Taxa (individual number and number of taxa) Inventory and Distribution at Each Sample Location where Biota were Reported

Station Name	Individual Number	Taxa Number	Density (SD)	Diversity (H')	Evenness (J')
FLiDAR A	18	9	450.0	2.00	0.91
FLiDAR C	22	8	550.0	1.58	0.76
FLiDAR D	38	12	950.0	1.77	0.71
FLiDAR E	67	14	1675.0	1.77	0.67
FLiDAR G	94	8	2350.0	1.40	0.67

7.4 Marine Mammals and Sea Turtles

As demonstrated in Sections 1 and 2, the equipment and methodologies proposed herein by Attentive Energy are consistent with the activity considered by BOEM in the New York Bight EA (BOEM 2021b). Sections 4.3.4 and 4.3.6 of the New York Bight EA provide details on the species and seasonal occurrence of marine mammals and sea turtles that may be present during the proposed site assessment activity and are incorporated by reference.

BOEM considered impacts to marine mammals and sea turtles from site assessment activities in renewable energy lease areas as well as ongoing activities such as climate change, commercial marine vessels, and commercial and recreational fishing activities and other planned activities. Planned activities include other offshore wind energy development such as

anchoring/mooring activities, installation of associated undersea cables, installation of new wind turbines and offshore substation foundations, and vessel traffic, with additional impacts from lighting and noise associated with all the ongoing and planned actions. BOEM's analysis in the New York Bight EA concluded that impacts from planned offshore wind energy development to marine mammals would be moderate because the overall effect would be unavoidable, as some individuals will likely experience disturbances, but the majority of affected individuals would be expected to recover completely, and no population-level impacts will occur among marine mammals of the New York Bight.

Attentive Energy has reviewed currently available literature and data regarding marine mammals and sea turtles in the New York Bight, off the coast of New York and New Jersey, including the following:

- 2021 Annual Report of a Comprehensive Assessment of Marine Mammal, Marine Turtle, and Seabird Abundance and Spatial Distribution in U.S. waters of the Western North Atlantic Ocean- AMAPPS III (NEFSC 2022b).
- Tetra Tech and LGL Final Comprehensive Report for New York Bight Whale Monitoring Aerial Surveys, March 2017-February 2020 (Tetra Tech and LGL 2020).
- Distribution and density of six large whale species in the New York Bight from monthly aerial surveys 2017-2020 (Zoidis et al. 2021).
- A preliminary study on humpback whales lunge feeding in the New York Bight, United States (Smith et al. 2022).
- Acoustic presence and vocal activity of North Atlantic right whales in the New York Bight: Implications for protecting a critically endangered species in a human-dominated environment (Murray et al. 2022).
- Baleen whale distribution, behavior and overlap with anthropogenic activity in coastal regions of the New York Bight (King et al. 2021).

Based on these data, Attentive Energy has determined that there is no substantive new information that would change BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant or population-level effects to marine mammals or sea turtles. The potential impacts to described species are expected to be localized and temporary, resulting in minimal to negligible effects. This conclusion is consistent with Lease stipulations, the New York Bight EA, and BOEM's analysis and conclusion. Despite updated marine mammal occurrence data, this information presented on impacts to the described species in the 2021 New York Bight EA remains valid for this SAP. Even though the overall conclusion of no impact has not changed, Attentive Energy has provided new information regarding marine mammals and sea turtles below.

Based on survey records, the most common marine mammals in the New York Bight included humpback whales, North Atlantic right whales (NARW), minke whales, sei whales, fin whales, common dolphins, bottlenose dolphins, harbor porpoise, Atlantic white-sided dolphins, Risso's dolphins, gray seals and harbor seals (NFSC 2022; Murray et al. 2022; Smith et al. 2022; Zoidis et al. 2022; King et al. 2021; Tetra Tech & LGL 2020). Sea turtles were also present in the New

York Bight including leatherback sea turtles, green sea turtles, Kemp's ridley sea turtles, and loggerhead sea turtles (NEFSC 2022b; Tetra Tech & LGL 2020).

All marine mammals are protected under the Marine Mammal Protection Act. Additionally, three whale species are common in the New York Bight are listed as endangered under the ESA, including the NARW, sei whale, and fin whale (Hayes et al. 2022). In general, the large whale species are highly migratory and as such were historically thought to be present seasonally as the New York Bight may become an important feeding area (King et al. 2021). Foraging behaviors were most commonly observed in the New York Bight area by NARW, humpback whales, fin whales, and minke whales, suggesting that the New York Bight is becoming a significant feeding ground for migrating whales (Murray et al. 2022; King et al. 2021). A recent acoustic survey in the New York Bight spanning 4 years (2016-2020) indicates right whale presence has shifted beyond the seasonal management area that is active from November-April due to changes in prey availability (Murray et al. 2022). Right whale presence is expanding outside of these protected areas resulting in increased vessel strikes and unusual mortality events. Small vessel surveys during May-November 2017-2019 also documented a shift in humpback whale, fin whale, and minke whale presence in the New York Bight, as sightings took place within areas of high prey availability (King et al. 2021). Aerial surveys from 2017-2020 determined seasonality of whale presence in the New York Bight that coincided with observed feeding behaviors (Zoidis et al. 2021). Humpback whales were observed in all 3 years in all seasons with highest densities in the summer and fall in nearshore areas. Fin whales were observed in all three years in all seasons with highest densities in the summer. NARWs were observed in all 3 years with no sightings in the summer and highest densities in the spring. Four individual blue whales were sighted in January and February in the first year, and one individual in the fall in the third year. One individual sei whale was sighted in the spring of the second year and six individuals were sighted in the spring of the third year. These aerial sightings provide further insight into where and when large whale species are present in the New York Bight, an area where increasing vessel traffic is resulting in higher instances of vessel collisions.

Certain species of cetaceans have also been observed in the region during aerial surveys from 2017-2020 (Tetra Tech & LGL 2020). Sightings included 2,462 individuals of Risso's dolphins, 385 individuals of bottlenose dolphins, 3,867 individuals of common dolphins, 2 individuals of Cuvier's beaked whale, and 16 individuals of harbor porpoise. Harbor and gray seals are also common in the New York Bight, as Gotham Whale, a research and advocacy organization, has observed a shift in harbor and gray seals closer to New York City and Long Island during the winter months since 2001 as seals continue to expand southward (Farinacci 2018). In 2018, the Atlantic Marine Conservation Study (AMSEAS) conducted an aerial survey of haul out sites around Long Island, Connecticut, and Rhode Island. Gray and harbor seals were primarily seen hauling out in Moriches Bay, Shinnecock Bay, Montauk, Fisher's Island, Little Gull Island, Block Island, and Narragansett Bay (AMSEAS 2018).

As described in the New York Bight EA, three ESA-listed species of sea turtle occur in the New York Bight. Sea turtles are known to occur in coastal waters of the New York Bight from May through November, with the most common sea turtles being loggerhead and Kemp's ridley sea turtles. The loggerhead sea turtle is listed as threatened under the ESA while the Kemp's ridley and leatherback sea turtles are listed as endangered. During aerial surveys from 2017-2020 in

the New York Bight, sightings of Kemp's ridley, leatherback, and loggerhead sea turtles were documented (Tetra Tech & LGL 2020). Throughout the survey, 54 individual sea turtles were sighted including one Kemp's Ridley, 37 leatherback, and 16 loggerhead sea turtles (Tetra Tech & LGL 2020). Sea turtle sightings were highest in the summer for all species, followed by fall (Tetra Tech & LGL 2020). Kemp's ridley and leatherback sea turtles are listed as endangered, while the Northwest Atlantic Ocean Distinct Population Segment of loggerhead turtles are listed as threatened.

Anthropogenic impacts on marine mammal species are primarily caused by ship strikes and fishing entanglements (Hayes et al. 2022). Currently, NOAA Fisheries has declared unusual mortality events for the Right whale, minke whale, harbor or gray seals (pending closure) (NOAA Fisheries 2022a). In addition to ship strikes and fishing entanglements, sea turtles also face risks of cold stunning.

The New York Bight EA references NMFS biological opinion on assessment activities in the Commercial Lease area (NMFS, 2013a), and states that "The potential for marine mammals to interact with the buoy and become entangled in the buoy or mooring system is extremely unlikely given the low probability of a marine mammal encountering one buoy or mooring system within the [Attentive Energy Wind Lease Area], and the high tension of the chain which further reduces risk of entanglement". Appreciating the biological opinion relates to an all-chain mooring, the key points to note are the extremely unlikely possibility of that contact occurring, in addition to the reduced risk from a line under tension, which would be applicable to the polypropylene line under tension.

As stated above, the use of polypropylene rope in a taught and vertical section of the moorings is not deemed to be a significant entanglement risk, and alternative material such as chain or wire rope add risk to the safe and effective deployment and recovery procedures, while not necessarily adding any proportional value to mitigating extremely unlikely events. Other mitigation such as coating the rope section in plastic tubing have been explored but have also been deemed to add risk through potential wear and failure of the rope section, again at little or no proportional mitigating value.

Pile driving activity is not required for met buoy installation and therefore there will be no acoustic harassment associated with met buoy installation and mitigation measures are not applicable. Under this review, Attentive Energy has determined that there is no substantive new information that would change BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant or population-level effects to marine mammals or sea turtles. Attentive Energy has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Met Facility to further reduce the potential for interactions with or impacts on marine wildlife. Attentive Energy will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

Attentive Energy also plans to voluntarily add a VEMCO VR2 receiver that will monitor for tagged marine wildlife, such as sea turtles.

7.5 Avian and Bat Resources

As demonstrated in Sections 1 and 2, the equipment and methodologies proposed herein by Attentive Energy are consistent with the activity considered by BOEM in the New York Bight EA (BOEM 2021b). Section 2.3 of the New York Bight EA which summarizes previous released analyses and provides details on the species and seasonal occurrence of avian and bat resources that may be present during the proposed site assessment activity and is incorporated by reference.

BOEM considered impacts to avian and bats from activities including HRG surveys, geotechnical/benthic sampling, and biological surveys within the NY Bight. BOEM's analysis in the New York Bight EA concluded that impacts to avian and bats from the proposed activities would be negligible.

Attentive Energy has reviewed all current information on avian and bat species that could occur in the Project area. Given the available data, the deployment of the Met Facility is not expected to impact any avian or bat species found in or near the Lease Area. Additionally, changes in avian and bat listing statuses are not expected to have a significant impact on Met Facility deployment.

Attentive Energy has reviewed currently available literature and data regarding avian and bat resources in the New York Bight, off the coast of New York and New Jersey, including the following:

- 17-25d-OSW-Birds-and-Bats.pdf
- Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf of the New York Bight (boem.gov)
- Endangered and threatened wildlife and plants designation (fws.gov)
- Northern Long-eared Bat (*Myotis septentrionalis*) | U.S. Fish & Wildlife Service (fws.gov)

Based on this data, Attentive Energy has determined that there is no substantive new information that would change BOEM's analysis. The results of the New York Bight EA and BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant or population-level effects to avian and bat resources is applicable. Based on this review, the installation, operation, maintenance, and decommissioning of the Met Facility is not expected to result in the harassment of birds or bats protected under the Migratory Bird Treaty Act and ESA.

Attentive Energy has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Met Facility in order to further reduce the potential for interactions with or impacts on avian and bat resources. Attentive Energy will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.6 Air Quality

The closest points of land to the proposed site assessment activity are located in Borough of Barnegat Light, New Jersey and Robert Moses State Park/the Town of Islip, New York,

approximately 50 miles (80 kilometers [km]) to the west and 64 miles (103 km) to the north, respectively. Vessels traveling from Miller's Launch in Staten Island, New York, to service the Project will transit through the state waters of several counties in New Jersey and New York, depending on the chosen route: Monmouth County, New Jersey; Richmond County, New York (Staten Island); Kings County, New York (Brooklyn), and Queens County, New York. The counties through which vessels will transit are designated attainment/unclassified for all criteria air pollutants except for the following nonattainment designations:

- Ozone, Severe-15 classification, 2008 National Ambient Air Quality Standards (NAAQS); and
- Ozone, Moderate classification, 2015 NAAQS.

In some cases, the counties are considered maintenance areas with respect to former nonattainment designations as follows:

- Particulate Matter with aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), 1997 annual NAAQS;
- $PM_{2.5}$, 2006 24-hour NAAQS;
- Carbon monoxide, 1971 NAAQS, New York counties only.

Finally, all of New Jersey and New York are within the Northeast Ozone Transport Region as designated by the Clean Air Act.

BOEM considered impacts to air quality from routine activities and nonroutine activities. Routine activities include vessels for site characterization activities and installation, operation, and decommissioning of up to 20 met buoys throughout the bight. The additional vessel activity was identified as temporary and negligible when compared with existing vessel traffic levels in the region, with ambient air quality impacts localized within the wind energy areas and in the vicinity of vessel activity. Air emissions from onshore activities were assumed to be negligible in comparison with existing activities because existing port facilities would be utilized, and no expansion would be needed of these facilities. BOEM estimated annual potential criteria pollutant emissions to be less than major source thresholds and those emissions would not lead to any violation of the NAAQS, concluding that ambient air quality impacts are expected to be negligible.

Nonroutine activities consist of the recovery of lost equipment through additional vessel traffic. Traffic associated with non-routine activities were characterized to be from a single vessel for a short duration; ambient air quality impacts were therefore expected to be negligible.

BOEM concluded the overall effect to ambient air quality is expected to be small, while planned wind projects could generate long-term, beneficial impacts by providing energy to the region from a renewable resource and reducing health events due to onshore criteria pollutant emissions.

Attentive Energy has reviewed the current attainment designation status of the counties through which vessel transits would occur, as noted above. Based on this review, Attentive Energy has determined there is no substantive new information that would change BOEM's

analysis. The results of the New York Bight EA and BOEM's conclusion that the proposed activity would result in negligible impact to air quality would remain valid for the proposed site assessment activities.

7.6.1 Potential Impacts and Proposed Mitigation Measures

The proposed site assessment activity has the potential to impact local air quality. Potential emission sources would however be limited to vessel trips associated with deployment, maintenance and decommissioning of the Met Facility. Impacts from pollutant emissions associated with this vessel would likely be localized within the immediate vicinity of the site assessment activity. No equipment with air emissions will be deployed on the SEAWATCH™ Buoy.

It is anticipated that the installation and decommissioning of the Met Facility would be completed over a period of up to 2 days with a single vessel round trip for each purpose. During the operations phase, Attentive Energy has assumed a single round trip to the Installation Area for a single work boat. After accounting for the 1-year operational life of the SEAWATCH™ Buoy, this results in a total of 3 round trips during the data collection campaign. If Attentive Energy elects to extend data collection beyond 1-year, onshore maintenance of the buoys would be required after the first year of operation and an additional 6-month maintenance trip would be needed during the second year of data collection. If Attentive Energy elects to extend data collection, an addendum to the air emissions estimates would be provided to BOEM prior to the end of the first year of data collection to account for the three additional trips associated with onshore maintenance and an additional 6-month maintenance event. Emissions are based on the use of the vessel *Josephine Miller* which has the greatest emissions of the vessels considered in the analysis (the other vessel considered being the *Berto Miller*).

A summary of the air emission estimates is presented in Table 14. The majority of these emissions would occur within the Installation Area and therefore would have negligible impact on local onshore ambient air quality in New Jersey or New York.

Table 14. Attentive Energy Met Facility Air Emissions Summary

Met Facility Activity	VOC (tons)	NO_X (tons)	CO (tons)	PM/PM_{10} (tons)	$PM_{2.5}$ (tons)	SO_2 (tons)	HAPs (tons)	GHG (tons CO_2e)
Deployment Activities (Yr. 1)	0.006	0.38	0.09	0.01	0.01	0.0002	0.0008	25.09
Maintenance Activities	0.006	0.38	0.09	0.01	0.01	0.0002	0.0008	25.09
Decommissioning Activities (end of Yr. 1)	0.006	0.38	0.09	0.01	0.01	0.0002	0.0008	25.09
Maximum Annual Emissions (tons) [1/]	0.02	1.14	0.26	0.04	0.04	0.0007	0.002	75.26
Total Project Lifetime Emissions (tons)	0.02	1.14	0.26	0.04	0.04	0.0007	0.002	75.26

Met Facility Activity	VOC (tons)	NO_X (tons)	CO (tons)	PM/PM_{10} (tons)	$PM_{2.5}$ (tons)	SO_2 (tons)	HAPs (tons)	GHG (tons CO_2e)
Note: 1/ The maximum annual emissions occur for Year 1 of the project, and include the initial deployment activities, one round of 6-month inspections, and decommissioning activities.								

Emissions associated with the site assessment activity are less than major source permitting thresholds for all pollutants. Because the emissions are associated exclusively with mobile sources, no air quality permitting will be required. Further, because the Met Facility would not be considered an OCS source, an OCS air permit for these activities will not be required. Mitigation measures are not required.

7.7 Water Quality

As demonstrated in Sections 1 and 2, the equipment and methodologies proposed herein by Attentive Energy are consistent with the activity considered by BOEM in the New York Bight EA (BOEM 2021b). Section 2.3 of the New York Bight EA summarizes previous released analyses and provides details on the potential impacts to water quality that result from the proposed site assessment activity and is incorporated by reference.

BOEM considered impacts to coastal and marine water from routine activities and nonroutine activities. Routine activities include vessel discharges (including bilge and ballast water, and sanitary waste), geotechnical and benthic sampling, and installation and removal of met buoys. Nonroutine activities include recovery of lost survey equipment. BOEM's analysis in the New York Bight EA concluded that impacts from vessel discharges, sediment disturbance from geotechnical/benthic sampling and met buoy installation and decommissioning, and recovery of lost equipment in coastal and marine water quality would be negligible or less, with any changes being small in magnitude, highly localized, and transient. Even if the dropping of a Met Facility anchor on the ocean floor suspends particles from the seabed, the impact would be small and short in duration, making the impacts insignificant.

Attentive Energy has reviewed currently available literature and data regarding water quality in the New York Bight, off the coast of New York and New Jersey, including the following:

- National Coastal Condition Report IV (EPA.gov)
- Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf of the New York Bight (boem.gov)
- Williams SJ, Arsenault MA, Pope LJ, Reid JA, Reid JM, Jenkins CJ, Surficial sediment character of the New York-New Jersey offshore continental shelf region: a GIS compilation, Reston (VA). 74 p. Report No.: 2006-1046, 2007
- New York Bight EA (boem.gov)

Based on this data, Attentive Energy has determined that there is no substantive new information that would change BOEM's analysis. The results of the New York Bight EA and

BOEM's conclusion that the proposed activity would not be anticipated to result in any significant impact to water quality would remain valid for this Project.

Attentive Energy has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Met Facility to further reduce the potential for impacts on water quality. Attentive Energy will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.8 Social and Economic Resources

As demonstrated in Sections 1 and 2, the equipment and methodologies proposed herein by Attentive Energy are consistent with the activity considered by BOEM in the New York Bight EA (BOEM 2021b). The New York Bight EA analyzed site assessment activities on the Atlantic outer continental shelf, northeast from Cape May in New Jersey to Montauk Point on the eastern tip of Long Island, New York. Section 6.2.3 and Appendix B of the New York Bight EA provides specific details on the affected environment and potential impacts to coastal and marine uses and socioeconomic resources that could result from proposed site assessment activities and is incorporated by reference here.

Attentive Energy has reviewed currently available literature and data regarding coastal and marine uses and socioeconomic resources in the New York Bight, off the coast of New York and New Jersey, including the following:

- BOEM's Socio-Economic Impact of Atlantic Offshore Wind Development (NOAA Fisheries 2022b)
- BOEM's Analysis of the Socio-Economic Impact of Outer Continental Shelf Wind Energy Development on Fisheries in the U.S. Atlantic (Kirkpatrick et al. 2017)
- NOAA Office for Coastal Management (NOAA 2022)
- Northeast Regional Ocean Council data (Northeast Regional Ocean Council 2022)

Based on this data, Attentive Energy has determined that there is no substantive new information that would change BOEM's analysis. The results of the New York Bight EA and BOEM's conclusion that the proposed activity would not be anticipated to result in any significant impact to coastal and marine uses and socioeconomic resources remains valid for this Project.

7.8.1 Coastal and Marine Uses

BOEM considered impacts coastal and marine uses including impacts to benthic resources; commercial and recreational fishing; military use and navigation/vessel traffic; and recreation and tourisms. BOEM's analysis in the New York Bight EA concluded that impacts would be negligible (military use and navigation/vessel traffic; recreation and tourism) or negligible to minor (benthic resources; commercial and recreational fishing). Additionally, BOEM prepared a Consistency Determination (CD) under 15 CFR 930.36(a) to determine whether issuing leases and site assessment activities (including the construction/installation, operation and maintenance, and decommissioning of met buoys) in the NY Bight wind energy areas were

consistent to the maximum extent practicable with the provisions identified as enforceable by the Coastal Zone Management Programs of New Jersey and New York.

Attentive Energy has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Met Facility in order to further reduce the potential for impacts on coastal and marine uses. Attentive Energy will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.8.2 Socioeconomics

BOEM considered impacts to demographics and employment; commercial and recreational fishing; recreation and tourism; environmental justice and visual resources. BOEM's analysis in the New York Bight EA concluded that impacts would be negligible (recreation and tourism; visual resources) or negligible to minor (commercial and recreational fishing), and also concluded that the Proposed Action would have no disproportionately high and adverse human health or environmental effects on minority or low-income populations (i.e., environmental justice impacts). Impacts to demographics and employment would be nominal (BOEM 2021b).

As discussed in the New York Bight EA, no significant adverse environmental impacts would be anticipated. Construction and operation of the Project would not disproportionately affect any population, including low-income and minority populations, and no environmental justice impacts would occur as a result of construction or operation of the Project.

Attentive Energy has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Met Facility in order to further reduce the potential for impacts on social and economic resources. Attentive Energy comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.9 Archaeological Resources

This section summarizes the analysis and findings described in the Marine Archaeological Resource Assessment (Appendix H).

Installation of the Met Facility has the potential to affect submerged archaeological resources within the Installation Area.

The Installation Area encompasses approximately 59 acres (24 hectares) of the U.S. OCS. It is situated on the New York Bight, the shoreline bend between Long Island and New Jersey. The location of the Installation Area suggests a potential for both historic and prehistoric archaeological sites. This potential is based on the historic maritime activity of the area and prehistoric occupation on the once exposed continental shelf.

A review of previous maritime archaeological investigations was conducted to determine whether submerged cultural resources have been documented within or adjacent to the Installation Area. Databases of reported shipwrecks and other submerged archaeological sites, cultural resources reconnaissance studies, and environmental assessments were consulted. No reported shipwrecks, submerged archaeological sites, or obstructions were identified within 1.0 mile (1.6 km) of the Installation Area.

Qualified marine archaeologists (QMAs) conducted an archaeological assessment of the raw and processed HRG survey data provided by Attentive which consisted of navigation, gradiometer, side-scan sonar, sub-bottom profiler, and multibeam echosounder datasets. The QMAs generated a geological and environmental background, including an initial paleoshoreline migration model utilizing existing data, reviewed previous archaeological investigations conducted in the area, and identified potential submerged cultural resources reported in the vicinity of the Installation Area to supplement and guide the HRG data analysis.

HRG data were processed and QMAs applied the knowledge gained from the background research when interpreting the HRG survey results. Per BOEM standards, an amplitude threshold of ±5 gammas was applied when analyzing magnetic anomaly significance. The presence of one side-scan acoustic contact and two magnetic anomalies (meeting the 5-gamma threshold) were identified within the Installation Area. None are located at the Met Facility deployment position, and none represent potential submerged cultural resources. The acoustic contact appears to be a boulder, and the magnetic anomalies are both relatively small, low amplitude monopoles likely indicative of modern debris. No paleolandscapes or potential Ancient Submerged Landscape Features were identified within the Installation Area.

The installation and operation of the proposed Met Facility would result in no impacts to marine archaeological resources.

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Appendix A: Agency Correspondence

U.S. Department of the Interior
Bureau of Ocean Energy Management

Coastal Zone Management Act, Consistency Determination (15 CFR § 930.36(a))

New York Bight Wind Energy Areas Offshore the States of New York and New Jersey

The purpose of this Consistency Determination (CD) is to determine whether issuing a commercial wind energy lease which, without the requirement of separate Bureau of Ocean Energy Management (BOEM) authorization, allows site assessment activities (including the installation, operation, and decommissioning of meteorological buoys) within the New York Bight (NY Bight) Wind Energy Areas (WEAs) offshore New York and New Jersey (*see* Figure 1) is consistent to the maximum extent practicable with the enforceable policies of the New York and New Jersey Coastal Management Programs (CMPs). This document is provided pursuant to the requirements of 15 CFR § 930.39(a) of the Coastal Zone Management Act (CZMA) Federal consistency regulations.

Section 307(c)(1) of the CZMA, as amended, requires that Federal agency activities affecting any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of federally-approved state management programs.

The States of New York and New Jersey share common coastal management issues and have similar enforceable policies as identified by their respective CMPs. Due to the proximity of the NY Bight WEAs to both states (*see* Figure 1), and their shared impacts on environmental and socioeconomic resources and uses, BOEM has prepared a single CD for the NY Bight WEAs.

BOEM is proposing to issue commercial wind energy leases within the NY Bight WEAs (as illustrated in Figure 1 and described below) and approve site assessment activities that would determine whether the lease is suitable for, and would support, commercial-scale wind energy production. The leases, by themselves, would not authorize the lessee(s) to construct or operate any wind energy facilities on the Outer Continental Shelf (OCS).

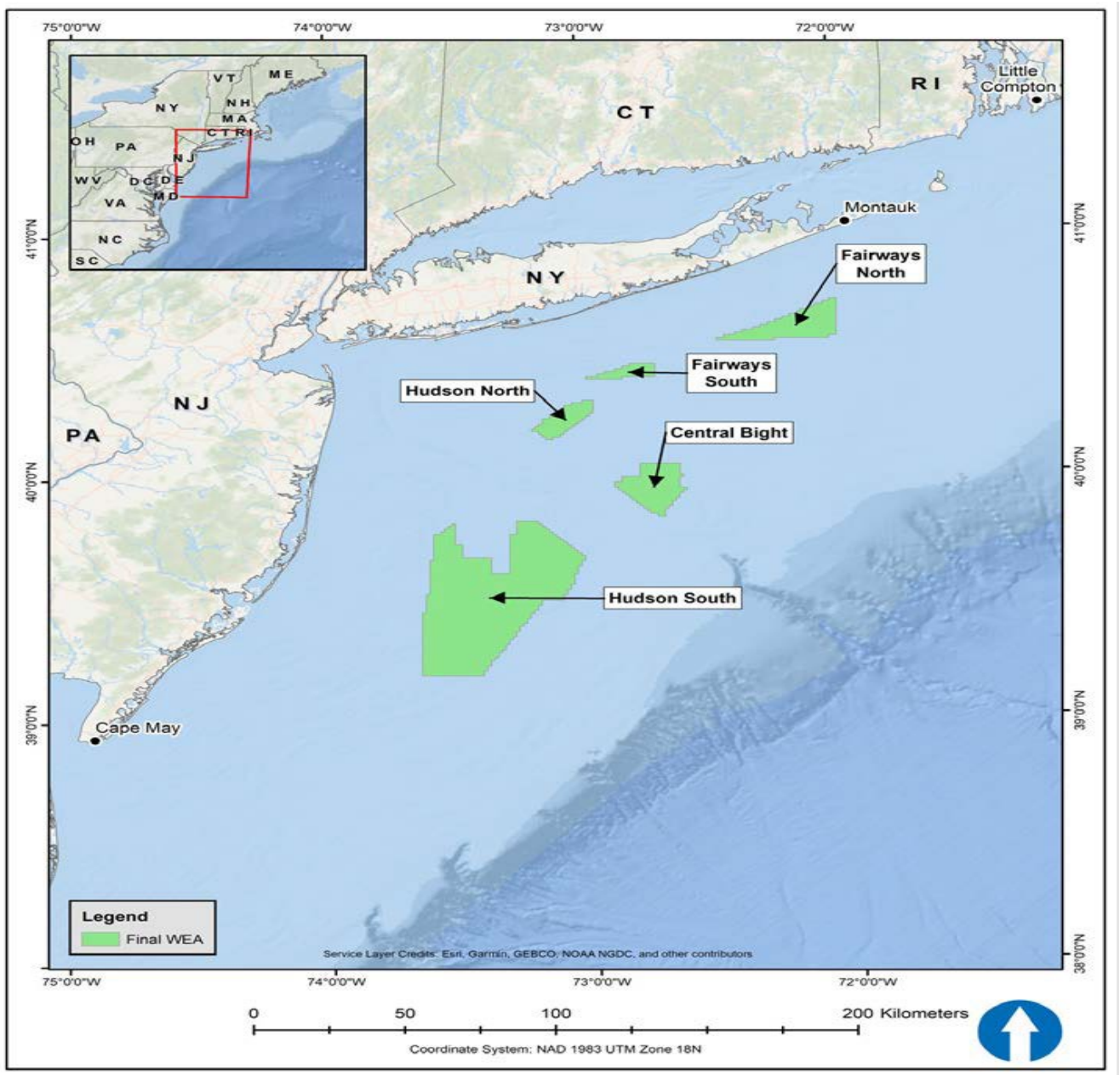

Figure 1: Wind Energy Area

On October 2, 2017, BOEM received a document by the State of New York entitled *State of New York's Area for Consideration*. This document recommended an area of the New York Bight that the state had determined, based on its compilation and analysis of scientific, stakeholder and analytical data, to be most desirable for future offshore wind development. BOEM took the state's recommendation into account in designating areas for the Call for Information and Nominations (Call), and considered the data and analyses generated by the state at subsequent stages of its planning and leasing process in the NY Bight area.

On April 11, 2018, BOEM published in the Federal Register (Docket ID: BOEM-2018-0004; 83 FR 15602-15617) a Call within the proposed area in the NY Bight. This region represents an

area of shallow waters between Long Island (to the north and east) and the New Jersey coast (to the south and west). The purpose of the Call was to seek nominations from companies interested in obtaining commercial wind energy leases within the Call Areas. In addition to nominations, BOEM sought public input on the potential for wind energy development in the Call Areas. This included site conditions, resources, and multiple uses in close proximity to, or within, the Call Areas that would be relevant to BOEM's review of any nominations submitted, as well as BOEM's subsequent decision whether to offer all or part of the Call Areas for commercial wind leasing.

In response to the NY Bight Call, BOEM received multiple nominations from commercial wind developers with the central portion of the Hudson South Call Area receiving the largest concentration of nominations as shown in Figure 1. BOEM received nominations from 8 qualified entities interested in obtaining commercial wind energy leases within the NY Bight Call Areas.

On March 29, 2021, BOEM released the Announcement of Area Identification (Area ID) (BOEM 2021a). The Area ID memorandum documents the analysis and rationale used to develop the WEAs in the NY Bight. The NY Bight WEAs are located on the OCS in the NY Bight and are delineated as Fairways North, Fairways South, Hudson North, Central Bight, and Hudson South. The five Areas include 222 whole OCS blocks and 172 partial blocks in total and comprise approximately 2,047 square miles (mi^2) [5,302 square kilometers (km^2)] or 807,383 acres (ac) [326,736 hectares (ha)]. The NY Bight WEAs are shown in Figure 1 above and described in Table 1 below.

Table 1
New York Bight Wind Energy Areas Descriptive Statistics

Descriptive Statistic	Fairways North WEA	Fairways South WEA	Hudson North WEA	Central Bight WEA	Hudson South WEA	Total
Acres	88,246	23,841	43,056	84,688	567,552	807,383
Maximum Depth (m)	56	46	45	61	59	--
Minimum Depth (m)	42	39	41	52	32	--
Closest distance to New York (nm)	15	15	21	38	45	--
Closest distance to New Jersey (nm)	69	45	36	53	23	--

Activities that may occur over the site assessment period of the lease (i.e., up to five years) include site characterization survey activities and site assessment activities involving the installation, operation, maintenance, and decommissioning of meteorological buoys. Site characterization surveys would inform a lessee about the site specifics of the lease area in order to prepare for submission of a site assessment plan (SAP) and, potentially, a construction and operations plan (COP). The projected site characterization and site assessment activities within the NY Bight WEAs are discussed in detail in Section 2 and summarized in Table 2 (below).

Table 2
Projected Site Characterization & Assessment Activities in the NY Bight WEAs Per Lease

Potential Leaseholds	Site Characterization Activities			Site Assessment Activities
	High Resolution Geophysical (HRG) Surveys (Total Trips)	Sub-bottom Sampling (Total Trips)	Marine Fauna Surveys	Installation, Maintenance, and Decommissioning of Met Buoys (Total Trips)
10	447	15	72	44-128

1. BACKGROUND

Pursuant to Section 388 of the Energy Policy Act of 2005 (EPAct), BOEM is authorized to issue leases on the OCS for the purposes of wind energy development. On April 22, 2009, BOEM promulgated regulations implementing this authority at 30 CFR Part 585. The regulations establish a program to grant leases, easements, and rights-of-way for orderly, safe, and environmentally responsible renewable energy development activities, such as the siting and construction of offshore wind facilities on the OCS, as well as other forms of renewable energy such as marine hydrokinetic (i.e., wave and current). BOEM's predecessor agency, the Minerals Management Service (MMS), prepared a programmatic Environmental Impact Statement (EIS) to evaluate the impact of establishing of a comprehensive, nationwide MMS Alternative Energy Program on the OCS (*Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf, Final Programmatic Environmental Impact Statement*, October, 2007) (Programmatic EIS) (MMS 2007). The final rule and the Programmatic EIS can be reviewed for reference on the BOEM website at: http://www.boem.gov/Renewable-Energy-Program/Regulatory-Information/Index.aspx and http://www.boem.gov/Renewable-Energy-Program/Regulatory-Information/Guide-To-EIS.aspx. In addition, BOEM published the *Atlantic Geological and Geophysical Activities Programmatic Final Environmental Impact Statement* (G&G Final PEIS) (BOEM 2014). The G&G PEIS can be viewed at: http://www.boem.gov/Atlantic-G-G-PEIS/.

On August 10, 2021, BOEM released the *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf of the New York Bight Draft Environmental Assessment (EA)* (BOEM 2021b), which is available online at: http://www.boem.gov/New-York/. The EA analyzes the reasonably foreseeable consequences associated with two distinct BOEM actions in the NY Bight WEAs:

(1) Lease issuance (including reasonably foreseeable consequences associated with shallow hazards, geological, geotechnical, archaeological resources, and biological surveys); and

(2) SAP approval (including reasonably foreseeable consequences associated with the installation and operation of meteorological buoys).

BOEM does not issue permits for shallow hazards, geological, geotechnical, archaeological resource, or biological surveys. However, since BOEM regulations require that a lessee include the results of these surveys in its application for SAP and COP approval, the EA treats the

environmental consequences of these surveys as reasonably foreseeable consequences of issuing a lease.

2. PROPOSED ACTION DESCRIPTION

Offshore Site Characterization Surveys

BOEM regulations require that a lessee provide the results of a number of surveys with both a SAP and a COP, including: a shallow hazards survey, a geological survey, biological surveys, a geotechnical survey, and an archaeological resource survey (30 CFR §§ 585.626(a)(1) to (a)(5), respectively). BOEM refers to these surveys as "site characterization" activities. Site characterization activities (e.g., locating shallow hazards, cultural resources, and hard-bottom areas; evaluating installation feasibility; assisting in the selection of appropriate foundation system designs; and determining the variability of subsurface sediments) would necessitate using high-resolution geophysical (HRG) surveys and geotechnical exploration. The purpose of the HRG survey would be to acquire geophysical shallow hazards data and information pertaining to the presence or absence of archaeological resources and to conduct bathymetric charting. The purpose of geotechnical exploration would be to assess the suitability of shallow foundation soils for supporting a structure or transmission cable under any operational and environmental conditions that might be encountered (including extreme events), and to document soil characteristics necessary for the design and installation of all structures and cables. The results of geotechnical exploration allow for a thorough investigation of the stratigraphic and geo-engineering properties of the sediment that may affect the anchoring systems of a meteorological buoy, which would be necessary for BOEM to consider in a SAP, or later a COP, for a given lease.

Site characterization activities would also necessitate vessel and/or aerial surveys to characterize three primary biological resource categories: (1) benthic habitats; (2) avian resources; and (3) marine fauna. BOEM does not anticipate the lessee needing to conduct separate surveys to characterize the benthic habitats which could be affected by their potential future leasehold activities because the geological and geotechnical surveys would provide enough detailed information for BOEM to adequately assess potential impacts on benthic habitats in the area. For the lessee to describe the state of the avian and marine fauna resources, resource surveys would generally involve simple visual observation, either from a vessel or aircraft. For avian and marine fauna surveys, multi-year assessment periods may be necessary to capture natural seasonal and inter-annual variability of marine fauna within the NY Bight WEAs and immediate surroundings if current data available is not sufficient to determine spatial and temporal distribution of species. It is generally envisioned that the fish, marine mammal, sea turtle, and bird aerial and shipboard surveys could be conducted simultaneously.

It is assumed that the site of meteorological buoys would be surveyed first, to meet the similar data requirements for a lessee's SAP (30 CFR §§ 585.610 and 585.611), and the site of a meteorological buoy would not be resurveyed when the remainder of the leasehold is surveyed to meet the data requirements for a lessee's COP (30 CFR § 585.626(a)). However, a lessee could conduct all of their surveys at the same time (to support both a SAP and a COP).

Meteorological Buoys

For existing BOEM leases, the vast majority of lessees have installed meteorological buoys. In that past, meteorological towers had been used for characterizing wind conditions, however, meteorological buoys are now used as an alternative to a meteorological tower for collecting wind, wave, and current data in the offshore environment. The EA assumes that a lessee would employ a maximum of two buoys instead of meteorological towers. These meteorological buoys would be anchored at fixed locations and would regularly collect observations from many different atmospheric and oceanographic sensors. There are three primary types of buoys BOEM anticipates could be used for meteorological resource data collection on the lease: discus-shaped hull buoys; boat-shaped hull buoys; and spar-type buoys. Discus-shaped and boat-shaped buoys are typically towed or carried aboard a vessel to the installation location. A discus-type buoy would use a combination of chain, nylon, and buoyant polypropylene materials, while a boat-shaped buoy would be moored using an all-chain mooring. Once at the installation site, the buoy would be either lowered to the surface from the deck of the transport vessel and the mooring anchor dropped. Transport and installation vessel anchoring would typically require one day for these types of buoys. The total area of bottom disturbance for boat-shaped and discus shaped buoys would be approximately 6 ft^2 (.55 square meters [m^2]) for the actual footprint and 370,260 ft^2 (34,398 m^2) for the anchor sweep. A spar-type buoy would require two distinct phases for installation, with typically a total of 2 to 3 days for installation. The total area of bottom disturbance associated with a spar-type buoy and installation vessel anchors would be roughly 784 ft^2 (73 m^2). See Section 3.2.4 of the EA for more information on meteorological buoys and their anchor systems.

To obtain meteorological data, scientific measurement devices consisting of anemometers, vanes, barometers, and temperature transmitters would be mounted directly on the meteorological buoy. A meteorological buoy also could accommodate environmental monitoring equipment, such as avian monitoring equipment (e.g., radar units or thermal imaging cameras), acoustic monitoring for marine mammals, data-logging computers, power supplies, visibility sensors, water measurements (e.g., temperature or salinity), communications equipment, material hoist, and storage containers.

To measure the speed and direction of ocean currents, Acoustic Doppler Current Profilers (ADCPs) would likely be installed on or near a meteorological buoy. An ADCP is a remote-sensing technology which transmits sound waves at a constant frequency and measures the ricochet of the sound wave off fine particles or zooplanktons suspended in the water column. The ADCPs may be mounted independently on the seafloor, to the legs of the platform, or attached to a buoy. A typical ADCP is about 1 to 2 ft tall (approximately 0.3 to 0.6 meters) and 1 to 2 ft wide (approximately 0.3 to 0.6 meters).

A SAP describes the activities (e.g., installation of meteorological buoys) a lessee plans to perform for the assessment of the wind resources and ocean conditions at its commercial lease (30 CFR § 585.605). No site assessment activities may take place on a lease until BOEM has approved a lessee's SAP (30 CFR § 585.600(a)). Once approved, the site assessment term for a commercial lease is five years from the date of SAP approval (30 CFR § 585.235(a)(2)). It is assumed that the lessee would install a data-collection device (e.g., meteorological buoy) on its lease area to assess the wind resources and ocean conditions of the leasehold. This information

would allow the lessee to determine whether the lease is suitable for wind energy development, where on the lease it would propose development, and what form of development to propose in a COP.

A lessee must submit a COP at least six months before the end of the site assessment term if the lessee intends to continue to the lease's operations term (30 CFR § 585.601(c)). If the COP describes continued use of existing facilities, such as a meteorological tower or buoy approved in the SAP, a lessee may keep such facilities in place on their lease during BOEM's review of the COP (30 CFR § 585.618(a)), which may take up to two years. If, after the technical and environmental review of a submitted COP, BOEM determines that such facilities may not remain in place throughout the operations term, a lessee must initiate the decommissioning process (30 CFR § 585.618(c)). BOEM anticipates that a meteorological buoy could be present for up to five years before the agency decides whether to allow the buoy to remain in place for the lease's operations term, or whether the buoy must be decommissioned immediately.

Coastal Activity

A lessee will likely determine specific ports used for site assessment and survey activities based primarily on proximity to the lease blocks, capacity to handle the proposed activities, and/or established business relationships between port facilities and the lessee. Existing ports or industrial areas in New York and New Jersey are adequate to support proposed action activities. BOEM therefore does not anticipate expansion of port facilities to meet lessee needs, and considers only existing facilities which can currently accommodate proposed site characterization and site assessment activities.

Installation of two meteorological buoys would require port facilities with the following requirements:

- Deep-water vessel access (greater than 15 ft [4.6 m]) to accommodate large vessels;
- Landing and unloading facilities in close proximity to fabrication yards for staging, assembly, and temporary materials storage; and
- Located within a reasonable travel distance to the NY Bight WEAs, which BOEM assumes to be 15-45 miles from the NY Bight WEAs boundaries to the ports in NY, and 23-69 miles from the NY Bight WEAs boundaries to the ports in NJ.

Surveying and operations and maintenance activities could be supported by smaller ports because these types of activities can use smaller vessels and don't need access to fabrication and storage yards for large infrastructure that would be required for installation. Vessels used for these activities are anticipated to be approximately 65 to 100 ft (20 to 30 meters) in length. These smaller ports would serve as staging areas and crew/cargo launch sites for the survey, and operations and maintenance vessels. While a variety of ports could be used for the survey, operations and maintenance activities, including some of the staging ports listed above, BOEM has identified the following existing commercial ports, harbors, or industrial areas composing the coastal infrastructure that could support the proposed activities such as:

- Staten Island, NY;
- Erie Basin, NY;

- Brooklyn, NY;
- Perth Amboy, NJ;
- Shark River, NJ; and
- Newark, NJ.

Vessel Traffic

Approximately 570-654 total vessel round trips are anticipated to occur as a result of the proposed action over a five-to-seven year period (*see* Table 4). Approximately 462 of these vessel trips (round trips) would be associated with all site characterization surveys as a result of the proposed action over five years, from 2021-2026. The total vessel traffic estimated as a result of the installation, decommissioning, and routine maintenance of the meteorological buoys that could be reasonably anticipated in connection with the proposed action would range from 44 to 128 round trips over a five-year period.

Table 4
Total Vessel Round Trips Per Lease

HRG Surveys	Cable surveys	Geotechnical Sampling Surveys	Avian, Marine Mammals, and Sea Turtles Surveys	Fish Surveys	Met Buoys	Total
192	255	15	36	28	44-128	570-654

The total vessel traffic estimated as a result of the HRG surveys, cable surveys, and geotechnical exploration work that could be reasonably anticipated in connection with the proposed action would be approximately 462 round trips over five years, and spread over existing and available port facilities in New York and New Jersey. In addition, BOEM presumes 64 extra independent surveys conducted to characterize marine fauna resources (i.e., avian, marine mammal, sea turtles, and fish surveys) under the proposed action.

Should the lessee decide to install meteorological buoys on its leasehold, it would typically take 1 to 2 days to install by one vessel, and 1 to 2 days to decommission by one vessel. Maintenance trips to each meteorological buoy may occur monthly to quarterly for each buoy. However, to provide for a conservative scenario per lease, total maintenance vessel trip calculations are based on quarterly or monthly trips for buoys over the entire 5-year period (*see* Table 5).

Table 5
Vessel Traffic for Meteorological Buoys Installation, Maintenance, and Decommissioning Per Lease

Site Assessment Activity	Round Trips	Formula
Meteorological Buoys		
Meteorological Buoy Installation	2-4	1-2 round trips x 2 buoys
Meteorological Buoy Maintenance – Quarterly/Monthly	40-120	4 quarters x 2 buoys x 5 years 12 months x 2 buoys x 5 years
Meteorological Buoy Decommissioning	2-4	1-2 round trips x 2 buoys
Total Buoy Trips Over 5-year period	**44-128**	

3. STATE ENFORCEABLE POLICIES

As part of this CD, BOEM has evaluated and documented in the enclosed table (*see* Table 6), policies identified by New York and New Jersey as enforceable, applicable offshore and coastal resources or uses, and CZMA "reasonably foreseeable coastal effects" that might be expected for activities conducted under the proposed action. While reviewing and making these determinations on the policies the states have identified as enforceable in this CD, BOEM has considered the common enforceable policies identified by each of the two states as enforceable in their CMP, as listed in Table 6.

4. CONSISTENCY DETERMINATION

BOEM has evaluated all applicable enforceable policies of New York and New Jersey, and the potential activities resulting from the proposed action. This CD has examined whether the proposed action described in Section 1 is consistent to the maximum extent practicable with the policies and provisions identified as enforceable by the CMPs of New York and New Jersey (*see* Table 6). Based on the preceding information and analyses, and the incorporated-by-reference Programmatic EIS, G&G Final PEIS, and EA, BOEM has determined the proposed action will be consistent to the maximum extent practicable with the policies that New York and New Jersey have identified as enforceable.

Table 6: Applicable Enforceable Policies for the Coastal Management Programs of New York and New Jersey		
CATEGORY	**ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES**	**REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)**
Coastal Habitats and Wetlands	Policy 44 (NY) 7:7E-3.6 Submerged vegetation habitat (NJ) 7:7E-3.16 Dunes (NJ) 7:7E-3.18 Coastal high hazard areas (NJ) 7:7E-3.22 Beaches (NJ) 7:7E-3.27 Wetlands (NJ)	No dunes, beaches, submerged vegetation habitat, or wetlands will be altered as a result of the proposed action. No direct impacts on wetlands or other coastal habitats would occur from routine activities in the New York Bight Wind Energy Areas (NY Bight WEAs) due to the distance of the NY Bight WEAs from shore. No cables would be installed to shore to support the meteorological buoys. Additionally, existing ports or industrial areas in New York and New Jersey are expected to be used in support of the proposed activities. No expansion of existing facilities is expected to occur as a result of the proposed action. Indirect impacts from routine activities may occur from wake erosion and associated added sediment caused by increased traffic in support of the proposed action. Given the volume and nature of existing vessel traffic in the area, a negligible increase of wake-induced erosion may occur. Existing channels could accommodate the vessels anticipated to be used, and no additional dredging would be required to accommodate different vessel size(s). For more information on ports and navigation, see the Ports, Navigation, and Waterfront section below. Should an incidental diesel fuel spill occur as a result of the proposed action, the impacts on coastal habitats, including dunes, beaches, and wetlands, are expected to be negligible. See Section 2.3 of the EA (BOEM 2021b) for additional information on potential impacts to coastal habitats.
Ports, Navigation, and Waterfront	Policy 2 (NY) Policy 3 (NY) Policy 4 (NY)	While a variety of ports could be used for the survey, operations, and maintenance activities, BOEM has identified the following ports as likely to support these activities associated with the NY Bight WEAs: Staten Island, NY; Erie Basin, NY; Albany, NY; Coeymans, NY; Brooklyn, NY; Perth Amboy, NJ; Shark River, NJ; and Newark, NJ. Wake erosion and sedimentation effects would be limited to approach channels and the coastal areas near ports and bays used to conduct activities. Given the existing amount and nature of vessel traffic, there would be a negligible, if any, increase to wake- induced erosion of associated channels based on the relatively small size and number of vessels

	Policy 5 (NY) Policy 24 (NY) Policy 25 (NY) Policy 35 (NY) 7:7E-3.7 Navigation channels (NJ) 7:7E-3.11 Ports (NJ) 7:7E-3.41 Special hazard areas (NJ) 7:7E-7.5 Transportation use rule (NJ) 7:7E-7.7 Industry use rule (NJ) 7:7E-7.9 Port use rule (NJ) 7:7E-7.10 Commercial facility use rule (NJ) 7:7E-8.14 Traffic (NJ)	associated with the proposed action. Moreover, all approach channels to these ports are armored, and speed limits would be enforced, which also helps to prevent most erosion. Several existing fabrication sites, staging areas, and ports in New York and New Jersey could support site characterization surveys and the construction, operation, and decommissioning of the meteorological buoys. No expansion of these existing onshore areas is anticipated. Existing channels could accommodate the vessels anticipated to be used, and no additional dredging would be required to accommodate different vessel size(s). In addition, no cables would be installed to shore to support the meteorological buoys. Project-related vessels traveling to or from the ports for survey activities, installation, maintenance, and decommissioning of the meteorological buoys could experience spills within a channel or bay that could potentially reach shoreline areas. The impacts on coastal habitats would depend on the type of material spilled, the size and location of the spill, the meteorological conditions at the time, and the speed with which cleanup plans and equipment could be employed. These impacts are expected to be minimal because vessels are expected to comply with the United States Coast Guard regulations at 33 CFR Part 151, relating to the prevention and control of oil spills. Based on the distance from shore where proposed action activities would occur, and the rapid evaporation and dissipation of diesel fuel, a spill occurring in the NY Bight WEAs would likely not contact shore. Collisions between vessels and allisions between vessels and the meteorological buoys are unlikely. However, if a vessel collision or allision was to occur, and in the unlikely event that a spill would result, the most likely pollutant to be discharged into the environment would be diesel fuel. Diesel dissipates very rapidly in the water column, then evaporates and biodegrades within a few days, resulting in negligible, if detectable, impacts on the area of the spill. For the proposed action, approximately 462 vessel trips from site characterization and assessment activities are projected to occur over a 5-year period if the entire NY Bight WEAs were leased and the maximum number of site characterization surveys were conducted in the lease areas (*see* Table 4 for vessel traffic calculations). For more information on ports, see Sections 2.3 and 3.3 of the EA. For more information on vessel traffic and navigation see Sections 4.2.4 and 4.3.5, and Appendix D of the EA.
Energy Facilities	Policy 12 (NY) Policy 14 (NY)	This analysis is limited to the effects of lease issuance, conducting site characterization activities (i.e., surveys of the lease area), and site assessment activities (i.e., construction and operation of two meteorological buoys) within the NY Bight WEAs. This analysis does not consider construction and

	Policy 17 (NY) Policy 27 (NY) Policy 29 (NY) 7:7E-7.4 Energy facility use rule (NJ)	operation of any commercial wind power facilities, which would be evaluated later in the process during the review of a construction and operations plan (COP). BOEM takes this approach based on several factors. First, issuance of a lease does not constitute an irreversible and irretrievable commitment of resources towards the authorization of a commercial wind power facility. Section 2 of the EA describes BOEM's phased planning and authorization process for offshore wind development. Under this process, the issuance of a lease only grants the lessee the exclusive right to use the leasehold to (1) gather resource and site characterization information, (2) develop its plans, and (3) subsequently seek BOEM approval of its plans for the development of the leasehold. The purpose of conducting the surveys and installing meteorological measurement devices is to assess the wind resources in the lease area and to characterize the environmental and socioeconomic resources and conditions. A lessee must collect this information to determine whether the site is suitable for commercial development and, if so, submit a COP with its project-specific design parameters, for BOEM's review. Should a lessee submit a COP, BOEM would consider its merits; perform the necessary consultations with the appropriate state, federal, local, and tribal entities; solicit input from the public and the Task Force; and perform an independent, comprehensive, site- and project specific National Environmental Protection Act (NEPA) analysis. This separate site- and project-specific NEPA analysis may take the form of an environmental impact statement (EIS) and would provide additional opportunities for public involvement pursuant to NEPA and the CEQ regulations at 40 CFR Parts 1500–1508. BOEM would use this information to evaluate the potential environmental and socioeconomic consequences associated with the lessee-proposed project, when considering whether to approve, approve with modification, or disapprove a lessee's COP pursuant to 30 CFR §585.628. After lease issuance, but prior to COP approval, BOEM retains the authority to prevent the environmental impacts of a commercial wind power facility from occurring. Secondly, BOEM does not consider development of a commercial wind power facility within the NY Bight WEAs, and its attendant environmental impacts, to be reasonably foreseeable at this time. Based on the experiences of the offshore wind industry in northern Europe, the project design and the resulting environmental impacts are often geographically and design specific, and it would, therefore, be premature to analyze environmental impacts related to the potential approval of any future COP at this time. There are a number of design parameters that would be identified in a project proposal, including foundation type, project layout, installation methods, and associated onshore facilities. However, the development of these parameters would be determined by information collected during site characterization and assessment activities conducted by the lessee after lease issuance. Each design

		parameter, or combination of parameters, would have varying environmental effects. Therefore, additional analyses under NEPA would be required before any future decision is made regarding construction of wind energy facilities on the OCS.
Protected Species	Policy 7 (NY) Policy 8 (NY) 7:7E-3.38 Endangered or threatened wildlife or plant species habitats (NJ) 7:7E-3.39 Critical wildlife habitats (NJ)	<u>Marine Mammals</u> More information on potential impacts to marine mammals can be found in Sections 4.2.4, 4.3.4, and 5 of the EA. There are 31 species of marine mammals that occur in the New York Bight. These 31 species include the following: • six mysticetes (baleen whales; five federally endangered); • 21 odontocetes (toothed whales, including: dolphins, a porpoise, beaked whales, dwarf and pygmy sperm whales, and federally endangered sperm whales); and • four pinnipeds (seals). The Endangered Species Act (ESA)-listed marine mammal species that occur in the New York Bight include five large whale species (fin, sei, North Atlantic right (NARW), blue, and sperm whales). Sperm, blue, and sei whales that are sighted in the New York Bight are generally found farther offshore and/or near the shelf edge. Thus, these species are not expected to occur in the action area. The blue whale, sei whale, and sperm whale are primarily found in deeper waters seaward of the NY Bight WEAs, while NARWs and fin whales are considered to be seasonally "common" in the NY Bight WEAs. Marine mammals listed as federally endangered or threatened under the ESA (i.e., listed) and marine mammals protected under the Marine Mammal Protection Act (MMPA; i.e., non-listed) are discussed together because the potential impact mechanisms are the same for all marine mammals. **Site Characterization** Impacts on marine mammals from site characterization were analyzed in the Atlantic G&G PEIS

		(BOEM 2014a), the Draft PEIS (MMS 2007), and the EA (BOEM 2021b) and are incorporated herein by reference and summarized below. Although the geographic boundary in the G&G Final PEIS (BOEM 2014a) was outside of the NY Bight WEAs (it included BOEM's Mid-Atlantic and South Atlantic planning areas: Delaware to Florida), many of the same species occur in the New York Bight area, and the conclusions on impact levels are applicable. The following conclusions for site characterization are made for the NY Bight WEAs, and are similar to those that were made in the Atlantic G&G Final PEIS (BOEM 2014a) for BOEM's Mid-Atlantic and South Atlantic planning areas: • Impacts from High Resolution Geophysical (HRG) survey sound sources are expected to be minor. Acoustic signals from nical survey equipment are within the hearing range for marine mammals and may cause "Level B" harassment (non-injurious harassment, as defined by the MMPA). However, standard operating conditions (SOCs) implemented to minimize acoustic impacts would include monitoring by a protected species observer (PSO) of a 1,640-ft (500-m) exclusion zone for North Atlantic right whales and a 328-ft (100-m) exclusion zone for all other marine mammals, clearance of the exclusion zone 30 minutes prior to equipment start-up, "ramp up" of equipment, and immediate shut down if a marine mammal is sighted at or within the exclusion zone (see Sections 4.2.4, 4.3.4, and 5 of the EA). Impacts from vessel and equipment noise, including geotechnical sampling (e.g., coring) are expected to be negligible to minor. BOEM based this finding on our conclusion that vessel and equipment source levels can be high enough to exceed threshold criteria for behavioral disturbance and undetected marine mammals may occur in the ensonified area during sampling activities. The following SOCs would minimize acoustic impacts: monitoring of the 1,640-ft (500-m) exclusion zone for North Atlantic right whales and the 328-ft (100-m) exclusion zone for other marine mammals by a PSO, clearance of the exclusion zone 30 minutes prior to activity, and immediate shut down if a marine mammal is sighted at or within the exclusion zone. Subsequent restart of geotechnical survey equipment may only follow clearance of exclusion zone for at least 30 minutes for all marine mammals (see Sections 4.2.4, 4.3.4, and 5 of the EA); and • Impacts from project-related vessel traffic are expected to be negligible because SOCs require that all vessel operators and crew maintain a vigilant watch for marine mammals throughout a monitoring zone of 1,640 ft (500 m) for North Atlantic right whales and 328 ft (100 m) for all other marine mammals (see Sections 4.2.4, 4.3.4, and 5 of the EA). Additional vessel strike

avoidance measures for North Atlantic right whales apply from November 1 to July 31. SOCs also require that all vessels underway do not divert to approach a delphinoid cetacean or pinniped.

Site Assessment

Impacts on marine mammals from site assessment activities are divided into two categories: underwater noise impacts and non-acoustic impacts. Impacts are assessed by relative potential of overlap, both spatially and temporally, between marine mammal species and impact-producing factor.

Underwater Noise Impacts

Marine mammals use sound for vital biological functions, including socialization, foraging, responding to predators, and orientation. It has been documented that some anthropogenic noise can negatively impact the biological activities of marine mammals in some instances. The response of marine mammals to sound depends on a range of factors, including (1) the sound pressure level; frequency, duration, and novelty of the sound; (2) the physical and behavioral state of the animal at the time of perception; and (3) the ambient acoustic features of the environment.

Noise can cause behavioral disturbance, including changes in feeding, vocalization, and dive patterns, or avoidance of the ensonified area (i.e., the area filled with sound). Auditory masking, defined as the obscuring of sounds of interest by interfering sounds, generally at the same or similar frequency, may also cause important behavioral changes to marine mammals exposed to sound.

In addition to behavioral disturbance, underwater noise can result in two levels of potential injury to marine mammal hearing: (1) Temporary Threshold Shift (TTS), a non-permanent decrease in hearing sensitivity, and (2) Permanent Threshold Shift (PTS), a physical injury that results in a permanent decrease in hearing sensitivity. Detailed discussions on underwater sound and its importance to marine mammals and their hearing capabilities can be found in the G&G Final PEIS (BOEM 2014a) and the EA (BOEM 2021b). No PTS is expected to result from the Proposed Action.

National Marine Fisheries Service's (NMFS) threshold criteria for PTS, based on received levels of sound for marine mammals during acoustic activities, are defined as follows:

Hearing Group		Impulsive Sound	Non-impulsive Sound
Low-Frequency (LF) cetaceans	PK	219 dB re 1 µPa	N/A
	SEL24h	183 dB re 1 µPa2 s	199 dB re 1 µPa2 s
Mid-Frequency (MF) cetaceans	PK	230 dB re 1 µPa	N/A
	SEL24h	185 dB re 1 µPa2 s	198 dB re 1 µPa2 s
High-Frequency (HF) cetaceans	PK	202 dB re 1 µPa	N/A
	SEL24h	155 dB re 1 µPa2 s	173 dB re 1 µPa2 s
Phocid pinnipeds (PW)	PK	218 dB re 1 µPa	N/A
	SEL24h	185 dB re 1 µPa2 s	201 dB re 1 µPa2 s

Source: NMFS 2018. µPa = micropascal; dB = decibel; N/A = not applicable; PK = zero-to-peak sound pressure level, the maximum absolute value of the amplitude of a pressure time series;
re = referenced to; SEL24h = sound exposure level over 24 hours; a measure of the total sound energy of an event or multiple events over a specified time period (i.e., 24 hours).

Although distinct exposure thresholds can be determined for injury, behavioral reactions follow a wider spectrum of variable responses, some which may be negligible, while others can have more severe consequences. The traditional threshold levels to predict behavioral reactions are:

- 120 dB re 1 µPa root mean square (RMS) for the potential onset of behavioral disturbance or harassment (Level B) from a continuous source of sound (e.g., vessel noise, geotechnical drilling, or vibratory pile driving); and
- 160 dB re 1 µPa RMS for the potential onset of behavioral disturbance (Level B) from a non-continuous source (e.g., impact pile driving, HRG surveys).

Only animals exposed to levels above the threshold have the potential to be disturbed. An increasing number of studies indicate that the effect of underwater sound on marine mammal behavior is quite variable between species, individuals, life history stage, and behavioral state. Additionally, some

		species (e.g., beaked whales and porpoises, or migrating baleen whales) or animals in certain behavioral states may be more sensitive to disturbance, while other species may be more tolerant to environmental noise. **Vessel Strike** Potential impacts to marine mammals include strikes from vessels used during the construction, operation, and decommissioning phases of the buoy installation. BOEM anticipates that up to approximately 462 round trips of various vessel types may occur during site assessment activities (see Appendix A of the EA). While the number of vessel trips anticipated is relatively low compared to the existing level of vessel traffic in the area, it is possible that underwater noise may cause behavioral changes for some whale species that could increase the chances for a collision between a marine mammal and a vessel. This is especially important for endangered whales (North Atlantic right and fin whales) due to vessel strikes being a major cause of mortality, which indicate that the behavioral response of some whale species to noise may secondarily increase the risk of vessel strike to large whales (e.g., changes in ascent behavior and rapid acceleration away from the source). Recent studies have also indicated that some whale species are more sensitive to sound during migration than during feeding and may show avoidance responses at greater distances if the noise can be heard by the animal. These studies suggest that North Atlantic right whales, known to migrate through the New York Bight could be susceptible to such behavioral reactions from project-related noise. However, considering the existing levels of vessel traffic noise generated in the general area of the NY Bight WEAs (between the two traffic separation schemes surrounding the NY Bight WEAs), it is unlikely that noise related to the construction, operation, or decommissioning phases of meteorological buoys would be detected at levels or durations that might result in an increase in risk of vessel strike to North Atlantic right whales. BOEM's SOCs were designed to minimize potential vessel strikes to marine mammals (see Section 5 of the EA). NMFS concluded that during site assessment activities, the potential for construction- and maintenance-related vessel strike to marine mammals is extremely low. Potential impacts to marine mammals from vessel strikes during site assessment activities are, therefore, expected to be negligible

		because of the low probability of such an event. Nonetheless, if vessel strikes did occur they could result in minor to moderate impacts to ESA-listed marine mammal species. Impacts from trash and debris are expected to be negligible. Potential impacts on marine mammals from fuel spills are expected to range from negligible (if the fuel does not contact individual marine mammals) to minor (if individual marine mammals encounter the slick). Overall, impacts to marine mammals are expected to be moderate due to potential vessel strikes; however, potential impacts covering site characterization and other site assessment activities would range from negligible to minor, depending on the activity being conducted. Vessel strike and noise are two of the most important factors that may affect marine mammals. Implementing the vessel strike avoidance measures in the SOCs (see Section 5 of the EA) would minimize the potential for vessel strikes. BOEM's SOCs related to site characterization surveys and site assessment (see Section 5 of the EA) would minimize the potential for noise impacts to marine mammals. <u>Sea Turtles</u> More information on potential impacts to sea turtles can be found in Section 4.2.6 and 4.3.6 of the EA. Four species of sea turtles occur in the New York Bight: loggerhead, green, Kemp's ridley, and leatherback. All four species are listed as threatened or endangered under the ESA. Of the four species, loggerhead turtles are sighted more frequently than any other sea turtle species in the vicinity of the NY Bight WEAs. Impact-producing factors associated with the proposed action that could have potential impacts on Kemp's ridley, loggerhead, leatherback, and green sea turtles include vessel traffic, vessel noise, HRG active acoustic sources, equipment noise, seafloor disturbance, dynamic positioning thruster use during vessel positioning, release of trash and debris, and accidental fuel spill. BOEM has developed SOCs for sea turtles that are designed to prevent or reduce any possible impacts during both site characterization and site assessment activities. These SOCs are described in detail in Sections 4.2.6, 4.3.6, and 5 of the EA.

		Potential impacts to sea turtles would range from negligible to moderate depending on the activity being conducted during site characterization and site assessment. Vessel strike and noise are two of the most important factors that may affect sea turtles. However, implementing the vessel strike avoidance measures in the SOCs (see Sections 4.2.6, 4.3.6, and 5 of the EA) would minimize the potential for vessel strikes and adverse impacts on sea turtles. Although there are large data gaps regarding behavioral and physiological responses of sea turtles to sound, implementation of the SOCs is expected to minimize the potential of hearing injury impacts and disruption of the behavior of sea turtles. Sea turtles that avoid the area due to noise are expected to successfully forage in nearby habitats with similar prey availability. There are no critical or otherwise important foraging habitats known to occur in the area of the NY Bight WEAs. Recommendations for future studies include the potential physiological (critical ratios, TTS, and PTS) and behavioral effects of exposure to sound sources. <u>Protected Fish Species</u> For information on protected fish species, see the Fisheries Management section below.
Fisheries Management	Policy 9 (NY) Policy 10 (NY) 7:7E-3.2 Shellfish habitat (NJ) 7:7E-3.3 Surf clam areas (NJ) 7:7E-3.4 Prime fishing areas (NJ) 7:7E-3.5 Finfish migratory pathways (NJ) 7:7E-8.2 Marine fish and	<u>Commercial and Recreational Fisheries</u> As a part of its EA (BOEM 2021b), BOEM examined the fishing grounds and corresponding revenue within the NY Bight area. Multiple fishing grounds are located within the NY Bight, including Cholera Bank, Middle Ground Bank, and Angler Bank. NOAA Fisheries maintains landings data for commercial and recreational fisheries based on year, state, and species. Fisheries that utilize the NY Bight to the greatest extent include the Atlantic sea scallop, squid, summer flounder, and surfclam/ocean quahog fisheries. The 2018 scallop revenue of $121,900,348 represented roughly 37 percent of the total fishing revenue sourced from the New York Bight WEAs landed in New York, New Jersey, and Rhode Island (see Table 11 in the EA). The squid fishery operates in and around the New York Bight WEAs primarily between June and September. The fishery is highly variable regarding where the squid will occur and where they will be caught. Although the New York WEAs are used as a squid fishery, the primary area fished by the squid fleet is in waters less than 16 fathoms (30 m) closer to Cholera Banks and waters off New York and New Jersey. In 2018, the annual longfin and shortfin squid revenues totaled $34,132,115 and $20,115,696, respectively.

	fisheries (NJ)	The NY Bight WEAs are adjacent to, and overlap with, multiple recreational fishing grounds. The major recreational fishing areas along the south coast of Long Island are roughly 10 to 25 nm (19 to 46 km) from the NY Bight WEAs. The State of New Jersey designated Cholera Bank as a sport and commercial fishing ground, and as a prime fishing habitat. The fisheries with the highest reported recreational landings in 2019 were striped bass, scup, and summer flounder (see Table 12, Section 4.2.2, and Appendix E in the EA). Additional details are available in the Draft Environmental Impact Statement issued for the Liberty Port Ambrose Deepwater Port Application (USCG 2014) and in the Memorandum for Area ID in the NY Bight (BOEM 2021a). Generally, the activity and value of fisheries are expected to remain fairly stable during the time frame considered in BOEM's EA. Commercial fisheries and recreational fishing in the NY Bight are subject to pressure from ongoing activities, including the regulated fishing effort, vessel traffic, other bottom disturbing activities, and climate change. For more extensive discussion, see Section 4.2.2 and 4.3.2 in the EA. Site characterization and site assessment activities would result in underwater noise from survey activity. The direct impact of these noise sources on fish is analyzed in Sections 4.2.3 and 4.3.3 of the EA. The analysis in that section concludes that impacts of low frequency sound on fish and fish populations is anticipated to be negligible. BOEM does not anticipate adverse impacts from noise on fish populations that are targeted by commercial and recreational fishing groups. However, noise generated from low frequency sound, like some survey equipment, may result in decreased catch rates of fish while the noise producing activity is occurring. Decreased catch rates may be most acute in hook and line fisheries, since behavioral changes may reduce the availability of the fish to be captured in the fishery. The increase in vessel traffic associated with installation, maintenance, and decommissioning of meteorological buoys could potentially deter commercial and recreational fishermen from using the area around the buoys while work-related vessels are in the area. Installation is expected to take approximately one to three days to complete depending on met buoy type (see Section 2.2.4 of the EA). To avoid collisions and gear entanglement with vessels, commercial and recreational fishermen may temporarily move to other locations. The buoys could provide previously unavailable habitat for species that prefer structured and hardbottom habitats, creating a temporary increase in these types of fish in the area of the buoy while the structure is in place. This could have a temporary beneficial effect to commercial and recreational fisheries, depending on the species of interest and the fishing gear used. Commercial fisheries in areas adjacent to the NY Bight WEAs are more productive than the commercial

		fisheries in the NY Bight WEAs (Kirkpatrick et al., 2015), so the temporary increased vessel traffic associated with site assessment is expected to be minor. Similarly, most coastal recreational fishing for New York and New Jersey takes place away from the NY Bight WEAs, and impacts of increased vessel traffic are anticipated to be negligible. Mollusks, such as scallops, would likely be adversely affected (buried or crushed) in the immediate area of the buoy moorings, and suffer from suspended sediment during the construction process. However, this area is small relative to the area available for commercial and recreational fishing. Exclusion zones are typically established around large and/or slow work-related vessels (referred to as "source vessels"; e.g., barges and tow vessels) to maintain safe passage of the source vessel, and by keeping it clear of other vessel traffic. Temporary adverse impacts expected to result from vessel traffic and/or vessel exclusion zones could be avoided by recreational anglers because these user groups tend to use smaller boats that are more maneuverable; therefore, avoidance of survey vessels could be achieved as needed. Impacts would be limited geographically to the vessel exclusion zone and would be temporary at any given location since the exclusion area would move along with the movement of the vessel. Impacts on recreational fishing could be greater if the exclusion zone is established over a popular and/or critical sport fishing location, such as one that may coincide with the migration route of a target fishing species. Impacts on recreational boating and fishing from temporary vessel exclusion zones are expected to be negligible, and impacts on recreational boating and fishing from temporary exclusion zones are expected to be minor. Lost survey equipment or accidental oil spills from damaged gear or machinery (e.g., vessels) associated with site assessment could directly affect commercial and recreational fisheries by contaminating fish and gear, and interfering during cleanup and recovery operations, or indirectly affect fisheries by temporarily degrading fishing habitat. Spills could result from severe weather damage to vessels or the buoys, from vessel collisions/allisions, or during generator refueling. However, the impact of a spill on commercial and recreational fishing activity would largely depend on the size of the spill. The effects would be detrimental to commercial and recreational fisheries if they led to declines in target species. While such spills are hard to predict, based on the structures and vessels associated with the activities, the potential for oil spills, the size of these spills, and the impact to commercial recreational fisheries from non-routine events is expected to be negligible. Overall, impacts to commercial and recreational fisheries under the proposed action would be minor. Impacts would range from negligible to minor depending on the fishery and proposed action activity. Minor impacts are expected based on the low level of vessel traffic activity associated with site

		characterization and site assessment activities, the fact that twenty meteorological buoys would be installed over a relatively large geographic area, the level and duration of sound produced from routine activities and events, and the low likelihood of potential impacts from disturbances and pollution. See Sections 4.2.2 and 4.3.2 of the EA for more information on potential impacts to commercial and recreational fisheries. <u>Finfish, Shellfish, and Essential Fish Habitat</u> Essential Fish Habitat (EFH) has been designated for 37 species in the NY Bight WEAs. No Habitat Areas of Potential Concern (HAPCs) have been designated in the NY Bight WEAs. EFH descriptions for several of the designated species in the NY Bight WEAs are provided in the G&G Final PEIS. EFH descriptions for species and life stages that were not discussed in the G&G Final PEIS are found in Appendix E of the EA. Surf clam concentrations in the NY Bight WEAs appear to be moderate or secondary (<1 bushel) concentrations. The NEFSC 2011 clam dredge survey data showed low catch rates (0 and 1 to 50 clams per tow) of total surf clams and prerecruits in the NY Bight WEAs. The Programmatic EIS (MMS 2007) identified potential impacts to fish resources and EFH that could occur in OCS WEAs in the Atlantic region during site characterization, including: G&G surveys; vessel and equipment noise; and meteorological buoy installation, operation, and decommissioning. The potential impacts of renewable energy site characterization on finfish resources and EFH have been analyzed in the G&G Final PEIS and were incorporated into the EA by reference and discussed in Appendix E of the EA. Although the geographic boundary in the G&G Final PEIS is outside of the NY Bight WEAs (it included BOEM's Mid-Atlantic and South Atlantic planning areas: Delaware to Florida), many species occur in both areas, and the conclusions on impact levels are applicable. The following conclusions for site characterization that were made in the G&G Final PEIS are expected to be the same in the NY Bight WEAs: • Impacts from acoustic sound sources from HRG surveys and geotechnical exploration are expected to be negligible. A boomer sub-bottom profiler is the only sound source expected to produce sounds within finfish and invertebrate hearing ranges; • Impacts from vessel and equipment noise are expected to be negligible; and

		• Impacts from seafloor disturbances are expected to be negligible. The G&G Final PEIS assessment of impacts on fish and EFH from acoustic sound sources, vessel and equipment noise, seafloor disturbance, and discharge of waste materials and accidental fuel releases was for G&G-related site characterization activities only. While the number of vessel trips and area of seafloor disturbance for activities covered in the EA differ from those in the G&G Final PEIS, the overall types of impacts to finfish, shellfish, and EFH —and the impact levels and conclusions—are anticipated to be the same. The SOCs required by BOEM (see Section 5 of the EA) to reduce the potential for adverse impacts to marine mammals and sea turtles are expected to also benefit fish. Underwater noise impacts (from all sources) to finfish and shellfish populations, and EFH, are expected to be negligible to minor. Installation of anchor systems associated with buoys may cause an increase in local suspended sediments. These impacts would be limited to the immediate area surrounding the piles or anchors, and of short duration. Depending on the currents, the suspended sediment is expected to disperse and settle on the surrounding seafloor, potentially coating or burying some benthic organisms. Effects on finfish and shellfish populations, and EFH, from suspended sediments would be negligible because these activities would be localized and of short duration. The installation of meteorological buoy anchor systems may result in the direct mortality of benthic invertebrates, the loss of benthic habitat, and the displacement of water column (pelagic) habitat. Sessile marine invertebrates, including molluscan shellfish (including surf clams), would be lost (buried or crushed) in the footprint. Although sea scallops are mobile molluscan shellfish, it is a conservative assumption that they would not be able to avoid sudden deployment of an anchor or foundation/mooring system, and for these analyses are considered to be sessile. The amount of habitat temporarily displaced or lost in the area is small compared to the amount of habitat available in the surrounding area. Overall, impacts from site characterization and site assessment activities to finfish and shellfish populations, and EFH, in the NY Bight WEAs would be minor. However, impacts would range from negligible to minor depending on the activity. A meteorological buoy anchor system installation and decommissioning would produce noise that could disturb normal fish behaviors. Fish are expected to avoid or flee from the noise source. The short duration (3 to 8 hours per day over 3 days) and the use of mitigation measures required by the SOCs (Section 5 of the EA) would minimize the possible exposure to injurious and lethal noise levels,

		resulting in minor effects to finfish and shellfish populations, and EFH. The increases in suspended sediments, loss of benthic habitat, and displacement or alteration of water column habitat due to site surveys and/or installation and operation of buoy anchor systems are expected to be small compared to the available habitat in the surrounding areas, and would, therefore, result in negligible effects to finfish and shellfish populations, and EFH. The potential increase in vessel collisions and allisions that could result in accidental fuel spills due to meteorological buoys is expected to be minimal. The overall impact on finfish and shellfish populations and EFH from a fuel spill that could result from such an occurrence is expected to be minimal and temporary, and would; therefore, be considered minor. See Sections 4.2.3 and 4.3.3 of the EA for more information on potential impacts to finfish, shellfish, and essential fish habitat.
Public Access	Policy 19 (NY) 7:7E-8.11 Public Access (NJ)	Short-term limitations on public access within the NY Bight WEAs may occur during certain activities under the proposed action. Exclusion zones are typically established around large and/or slow work-related vessels (referred to as "source vessels;" e.g., barges and tow vessels) to maintain safe passage of the source vessel and keep it clear of other vessel traffic. Recreational anglers can avoid temporary adverse impacts expected to result from vessel traffic and/or vessel exclusion zones because they tend to use smaller boats that are more maneuverable; therefore, avoidance of survey vessels could be achieved as needed. Impacts would be limited geographically to the vessel exclusion zone, and would be temporary at any given location since the exclusion area would move along with the movement of the vessel. Impacts on recreational fishing could be greater if the exclusion zone is established over a popular and/or critical sport fishing location, such as one that may coincide with the migration route of a target fishing species. Although recreational fishing and boating access may be limited by temporary exclusion zones, impacts on recreational boating and fishing from temporary vessel exclusion zones are expected to be negligible. In addition, impacts on recreational boating and fishing from temporary construction or decommissioning exclusion zones are expected to be negligible. See Appendix B of the EA for more information on potential impacts on recreational fishing. Impacts on recreation and tourism resulting from routine and non-routine activities would be negligible. Impacts would result primarily from vessel traffic restrictions in exclusion zones, potential for small scale spills, and from vessel traffic associated with installation of meteorological buoys. For more information on recreation and tourism, see the Recreation and Tourism section below.
Water Quality	Policy 30 (NY) Policy 33 (NY)	The routine activities associated with the proposed action, which would impact coastal and marine water quality, include mechanical disturbance of the seafloor and discharge of bilge water, ballast water, or sanitary/domestic wastewater, as well as non-routine events such as accidental spills of fuel and

	Policy 34 (NY) Policy 36 (NY) Policy 37 (NY) 7:7E-8.4 Water Quality (NJ)	maintenance materials, such as lubricants and solid debris. Additional information on water quality and impacts to coastal and marine water quality can be found in Section 2.3 of the EA. Routine activities that have the potential to adversely affect water quality include discharges from survey vessels and vessels servicing the buoys (i.e., bilge water, ballast water, sanitary waste, and debris). Bilge and ballast water discharges may contain small amounts of petroleum-based products and metals, and as such, are prohibited within 13 nm (24 km) of the shore. Any vessels conducting surveys or servicing buoys are likely to be equipped with holding tanks for sanitary waste and would not discharge untreated sanitary waste within state or federal waters. The regulations governing the relevant discharges are discussed in Section 3.2.1.5, *Operational Waste Associated with Site Characterization*, of the Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York. Revised Environmental Assessment (BOEM 2016). The instrumentation used for site characterization is self-contained, so there should be no discharges from instruments aboard the survey vessels that would impact water quality. Impacts to water quality would occur during construction and decommissioning, with water quality returning to its original state both during operation of the buoys and after decommissioning. The seabed would be disturbed locally during installation of meteorological buoys as a byproduct of anchoring and placement of scour protection devices. The resulting mobilization of sediments would produce minor, transient impacts to water quality in the immediate vicinity of the disturbance in the form of increased turbidity. Releases/spills (oils, lubricants, trash, debris, fuel) due to non-routine events are likely to be small and result in minor, transient impacts on water quality over a localized area in the immediate vicinity of the release/spill. Overall, activities associated with proposed action would have a minor impact on water quality, with any changes being small in magnitude, highly localized, and transient. Any operational discharges from vessels during surveying or servicing of buoys would be small and have a minor adverse effect. Seabed disturbances during construction, deployment, and decommissioning of buoys would result in minor, localized impacts on water quality in the area immediately adjacent to the structure or disturbance.
Air Quality	Policy 41 (NY) Policy 42 (NY)	Air quality impacts that could result from site characterization activities under the proposed action were evaluated in the G&G Final PEIS and found to be negligible. Appendix B.2.1 and B.3.1 of the EA includes an area-specific evaluation of air quality impacts associated with G&G activities, along with an evaluation of air quality impacts associated with site assessment activities.

	Policy 43 (NY) 7:7E-8.10 Air Quality (NJ)	Increased vessel traffic associated with site characterization surveys would add to current vessel traffic levels associated with the ports used by the vessel operators. The additional vessel activity associated with the proposed action is anticipated to be relatively small when compared with existing and future vessel traffic levels in the area. Impacts from pollutant emissions associated with these vessels would likely be localized within the NY Bight WEAs and in the vicinity of vessel activity. Appendix A of the EA provides further information on the anticipated numbers of project-related vessel trips and associated emission calculations. The onshore areas that are closest to the NY Bight WEAs are classified as nonattainment areas for O_3. Hudson, Queens, Kings (Brooklyn), Nassau, and Richmond (Staten Island) Counties are classified as maintenance areas for CO (*see* Table 4-1 of the EA). Federally approved activities that take place in nonattainment and maintenance areas are usually subject to the EPA General Conformity Rule (40 CFR 93, Subpart B). The rule establishes emissions thresholds, or *de minimis* levels, for use in evaluating an action's conformity with the applicable State Implementation Plan. If the net air pollutant emissions exceed these thresholds, a formal conformity determination may be required. If a submitted SAP indicates that project-related activities in the non-attainment and maintenance areas would emit more than the thresholds, then a General Conformity analysis would be performed. The *de minimis* levels for consideration in the project's conformity analysis are: • 100 tons/year (90.7 metric tons/year) of NO_x (O_3 precursor); • 50 tons/year (45.5 metric tons/year) VOCs (O_3 precursor); and • 100 tons/year (90.7 metric tons/year) CO. If the net increases in emissions are lower than the *de minimis* levels, the action is presumed to conform, and no further conformity evaluation is necessary. While BOEM's approval of SAPs is not subject to General Conformity, based on the emissions sources and assumptions listed above, estimated annual emissions associated with the proposed action for NO_x, VOCs, and CO were below *de minimis* levels. Although unlikely, a spill could occur in the event of vessel collision while in route to and from the NY Bight WEAs, or during surveys. Spills occurring in these areas, including harbor and coastal areas, are not anticipated to have significant impacts on onshore air quality due to the small estimated size and short duration of the spill. A diesel spill in the NY Bight WEAs would not be expected to have impacts on onshore air quality because of the estimated size of the spill, prevailing atmospheric conditions over the NY Bight WEAs, and distance from shore.

		Although the emissions estimates from site characterization and site assessment activities are measurable, they would not be distinguishable from other air emissions onshore or offshore; therefore, emissions associated with the proposed action would be negligible. As shown in Table 4-1 of the EA, air pollutant concentrations due to emissions from the proposed action are not expected to lead to any violation of the National Ambient Air Quality Standards.
Recreation and Tourism	Policy 21 (NY) Policy 22 (NY) 7:7E- 7.3 Resort/Recreational Use (NJ)	More information on recreation and tourism can be found in Appendix B.2.3 and B.3.3 of the EA. The coastal areas of New York and New Jersey are characterized by an abundance of coastal recreation and tourism opportunities. Coastal counties that may depend on their coastal setting for tourism and recreation include Monmouth and Kings counties in New Jersey, and Nassau, Suffolk, and Queens counties in New York. The following impact-producing factors from both site characterization and assessment activities have the potential to impact recreation and tourism opportunities: • Vessel traffic during site characterization and site assessment; • Vessel exclusion zones surrounding the meteorological buoys during deployment (no exclusion zones once buoys are operational); • Trash and debris from vessels; • Viewshed-related impacts associated with site characterization and site assessment from additional vessels, and nighttime lighting on the vessels that could be seen both from shore and from recreational boaters; and • Fuel spills. Information on potential exclusion zones can be found in the Public Access section above. The primary impact-producing factor for recreation and tourism associated with vessels used in support of the proposed action would be the potential for generation of trash and debris. Trash and debris, if accidentally released, could wash up on beaches and into harbors, bays, and coastal marshes, and other recreation and tourism destinations. Presence of trash/debris could adversely affect the aesthetic quality of the setting and alter the perception of affected areas, particularly for those areas valued for beach and near shore recreation (e.g., Gateway National Recreation Area and Jones Beach State Park), or those

		considered pristine wilderness. However, because of restrictions that prohibit the release of trash and debris provided by existing regulations (MARPOL 73/78 Annex V) impacts on recreation and tourism resulting from trash and debris are expected to be negligible. In addition, the NMFS identified best management practices (BMPs) to understand the type and amount of marine trash and debris generated, and to minimize the risk of entanglement and/or ingestion of marine debris by protected species. The BMPs include annual training of Lessee Representatives (i.e., vessel operators, employees, and contractors performing OCS survey activities on behalf of the Lessee). Marking of materials, equipment, tools, containers, and other items used in OCS activities must be clearly marked with the vessel or facility identification and properly secured to prevent loss overboard. The lessee must also recover marine trash and debris that is lost or discarded in the marine environment while performing OCS activities when an incident is likely to cause undue harm or damage to natural resources or significantly interfere with OCS uses. Lastly, the Lessee must report all marine trash and debris lost or discarded to DOI monthly as well as submit a report within 48 hours of an incident if the marine trash or debris could cause undue harm or damage to natural resources or significantly interfere with OCS uses. Potential impacts on recreation and tourism settings resulting from the visual contrast of the meteorological buoys and associated nighttime lighting would be negligible, as described in Appendix B.2.3 and B.3.3 of the EA. As noted in the G&G Final PEIS, potential impacts on recreation and tourism from a fuel spill would depend on the location of a spill, meteorological conditions at the time of the spill, and the speed with which cleanup occurred. Should a spill occur, access to recreation and tourism destinations could be temporarily limited by cleanup and response vessel activity. However, a spill would likely be relatively small in size (88 gallons [333 liters]) so a large-scale spill response involving multiple cleanup vessels is not expected. Therefore, impacts on recreational resources from a small diesel fuel spill are expected to be negligible. Impacts on recreation and tourism resulting from routine and non-routine activities would be negligible**.** Impacts would result primarily from vessel traffic restrictions in exclusion zones, potential for small-scale spills, and from vessel traffic associated with installation of meteorological buoys.

Historic, Cultural, and Subaqueous Areas Management	Policy 23 (NY) Policy 26 (NY) 7:7E-3.36 Historic and archaeological resources (NJ) 7:7E-3.6 Submerged vegetation habitat (NJ) 7:7E-3.12 Submerged infrastructure (NJ) 7:7E-4.14 Submerged pipelines (NJ) 7:7E-4.20 Submerged cables (NJ) 7:7E-4.21 Artificial reefs (NJ) 7:7E-4.22 Miscellaneous Water Area uses (NJ) 7:7E-8.12 Scenic Resources and Design (NJ)	<u>Offshore Historic Properties</u> A number of documents report on the potential for submerged cultural resources within the NY Bight Mid-Atlantic region, which are incorporated herein by reference (BOEM 2012; BOEM 2016; NYSERDA 2017; TRC Environmental Corporation [TRC] 2012). Submerged historic properties that may be located within the proposed NY Bight WEAs include indigenous archaeological sites, shipwrecks, downed aircraft, and submerged architectural or built resources (NYSERDA 2017). Although no submerged pre-Contact archaeological sites have been identified within the proposed NY Bight WEAs, it has been theorized that such do exist. Much of the Outer Continental Shelf (OCS) offshore NY and NJ was subaerial before sea levels began to rise following the Last Glacial Maximum approximately 20,000 before present (B.P.). The exposed landscape would have supported human populations from the Paleoindian through the Early Archaic periods before sea levels submerged much of the proposed NY Bight WEAs by 10,000 B.P. (BOEM 2016). Portions of the OCS closer to shore through which export cable routes might traverse were submerged later and thus would have supported more recent populations. A theorized paleoshoreline reconstruction included in Figure B-1 of the EA, depicts the timing of marine transgression through the NY Bight. The TRC (2012) study determined that much of the seabed covered by the proposed NY Bight WEAs is within and considered to possess high sensitivity for containing submerged indigenous archaeological sites. Since the advent of colonial expansion into North America, NY has served as a major regional and global commercial hub. Numerous vessels have plied the waters offshore NY and NJ and, consequently, shipwrecks are a type of historic submerged cultural resources expected to be found within the NY Bight and the navigation routes that filter vessel traffic to the ports of NY and NJ. Several shipwreck databases (i.e., Automated Wreck and Obstruction Information System, Electronic Navigation Charts, Global Maritime Wrecks Database, New Jersey Maritime Museum) were consulted to assess the number of shipwrecks in the vicinity of the NY Bight; the number of reported wrecks range from roughly 500 to over 950 shipwrecks. The frequency of shipwrecks increases dramatically in nearshore areas; the database recording the largest number of shipwrecks within the proposed NY Bight WEAs reports only 11 shipwrecks. Examples of other historic-era submerged cultural resources that may be encountered within the proposed NY Bight WEAs and nearshore are downed aircraft, subsea cables, and other infrastructure (BOEM 2016; NYSERDA 2017; TRC 2012). <u>Onshore Historic Properties</u> Historic property types that may be within the onshore affected environment could include districts,

		sites, buildings, structures, or objects within the viewshed of site characterization and site assessment activities. Klein et al. (2012) includes an overview of common coastal historic property types that could fall within the viewshed of these types of characterization and assessment activities in the NY Bight (Klein et al. 2012). The affected environment for onshore historic properties could include portions of both the NY and NJ coastlines between Barnegat Light, NJ, and Southampton, NY. The NY Bight WEAs vary from 23 to 69 nm off the coast of NJ, and from 15 to 45 nm off the coast of NY. Coastal properties with ocean views are potentially within the viewshed of site characterization and site assessment activities. Local topography is generally flat, and development in these areas is generally limited to 1 to 3 story buildings. Due to flat topography and consistent building heights, ocean views are generally limited to the first developed block along the coast. Beyond this area, views are blocked by intervening development. Outside of this area, the affected environment may also include resource types with elevated viewing platforms such as lighthouses or lifesaving stations. Some historic properties have already been identified in Klein et al. (2012); however, additional historic properties are expected to fall within the affected environment. <u>Impacts from Routine Activities</u> Expected impacts to offshore historic properties during routine activities would be similar to those described in previous EAs (Table 2; Section 2.1 of the EA). As noted, HRG surveys do not create bottom disturbances and thus impacts to historic properties during routine survey would not be expected. Subsurface geotechnical investigations, benthic sampling, and installation of met buoys will disturb the seabed. However, existing Programmatic Agreements (BOEM 2011; BOEM 2016), regulatory requirements (e.g., BOEM's Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585), and lease stipulations will require that a qualified marine archeologist identify historic properties through analysis of HRG data before bottom disturbance occurs. Consequently, those resources can be avoided during site characterization activities. Implementation of an Unanticipated Discovery Plan in the event submerged cultural resources are encountered during site characterization further reduces the risk of impacts to submerged resources. Accordingly, previous NEPA documentation developed for, or assessing, site characterization and site assessment campaigns have determined that the potential to impact historic properties are expected to negligible (BOEM 2013; BOEM 2014b; BOEM 2016). The Proposed Action is expected to include the temporary placement of meteorological buoys and other site characterization activities including geophysical, geotechnical, biological, and oceanographic surveys. These activities have the potential to impact the viewshed of coastal aboveground historic properties with open views in the direction of the NY Bight WEAs. The increased boat traffic associated with surveys may fall within the viewshed of these properties.

		Potential impacts from buoys are addressed in the 2016 Programmatic Agreement regarding Review of Outer Continental Shelf Renewable Energy Activities Offshore New Jersey and New York Under Section 106 of the National Historic Preservation Act (NHPA). In stipulation III-B of the Programmatic Agreement, stakeholder signatories agreed that the placement of met buoys should be exempt from Section 106 review. The Programmatic Agreement reasons that the buoys would have "no effect on onshore historic properties since they are temporary in nature and indistinguishable from lighted vessel traffic." This conclusion presented in the Programmatic Agreement demonstrates stakeholder concurrence that the placement of met buoys are expected to result in negligible impacts to aboveground historic properties. Potential increased vessel traffic associated with site characterization surveys will, like the buoys, be temporary in nature. These vessels will be indistinguishable from existing vessel traffic and only result in a nominal increase in vessel traffic over the 5- to 7-year span of activities. Since the vessel traffic is both temporary and indistinguishable in nature, it is expected to have a negligible impact to aboveground historic properties. <u>Section 106 Consultation</u> Section 106 of the NHPA (54 U.S.C. § 306108) and its implementing regulations (36 CFR 800) require federal agencies to consider the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment. BOEM has determined that issuing commercial or research leases within the NY Bight WEAs within the region constitutes an undertaking subject to Section 106 of the NHPA (16 U.S.C. § 470f) and its implementing regulations (36 CFR 800) as the resulting site characterization and site assessment activities have the potential to cause effects on historic properties. BOEM has implemented Programmatic Agreements pursuant to 36 CFR § 800.14(b) to fulfill its obligations under Section 106 of the NHPA for renewable energy activities on the OCS offshore NY, NJ, and RI. BOEM initiated consultation through letters on May 3, 2021, with the NY State Historic Preservation Office (SHPO), NJ SHPO, RI SHPO, the Advisory Council on Historic Preservation, and the following federally recognized tribes: Absentee-Shawnee Tribe of Indians of Oklahoma, Delaware Tribe of Indians, Mashantucket Pequot Tribal Nation, Mohegan Tribe of Connecticut, Narragansett Indian Tribe, Shawnee Tribe, Shinnecock Indian Nation, Stockbridge-Munsee Community, and the Delaware Nation. BOEM further identified potential consulting parties pursuant to 36 CFR § 800.3(f) through a May 3, 2021 letter to over 500 entities, including certified local governments, historical preservation societies, museums, and state-recognized tribes soliciting public comment and input

		regarding the identification of, and potential effects on, historic properties for the purpose of obtaining public input for the Section 106 review (36 CFR § 800.2(d)(3)) and inviting them to participate as a consulting party. On July 6, 2021, BOEM provided a Finding of No Historic Properties Affected, consistent with 36 CFR § 800.4(d)(1) to the consulting parties for review and comment.

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State of New Jersey

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
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SHAWN M. LATOURETTE
Commissioner

October 18, 2021

Bureau of Ocean Energy Management
Office of Renewable Energy Programs
Attn: Ms. Michelle Morin, Chief
45600 Woodland Road VAM-OREP
Sterling, VA 20166

RE: Federal Consistency Determination
DLUR File No. 0000-13-0021.1CDT210001
Bureau of Ocean Energy Management (BOEM)
Proposed Lease Issuance and Site Assessment Activities
New York Bight Wind Energy Areas (WEAs)
Outer Continental Shelf Offshore New York/New Jersey

Dear Ms. Morin:

The New Jersey Department of Environmental Protection, Division of Land Resource Protection, acting under Section 307 of the Federal Coastal Zone Management Act (P.L. 92-583) as amended, agrees with the certification that the above referenced project is consistent with the approved New Jersey Coastal Management Program. The Division has determined that the project is conditionally consistent with New Jersey's Coastal Zone Management Rules, N.J.A.C. 7:7-1.1 et seq., as amended on July 8, 2021, with the implementation of the below.

The proposed activities include:

1. Issuance of commercial and research leases within the New York Bight Wind Energy Areas ("WEAs") that BOEM has designated on the Outer Continental Shelf ("OCS") (including reasonably foreseeable consequences associated with shallow hazards, geological, geotechnical, archaeological resources, and biological surveys), and granting of rights-of-way (ROWs) and rights-of-use (RUEs) in the region in support of wind energy development. Up to 10 leases may be issued by BOEM within the WEAs, which also include the issuance of potential easements associated with each lease and the issuance of grants for subsea cable corridors and associated offshore collector/converter platforms.

2. Site Assessment Plan (SAP) approval (including reasonably foreseeable consequences associated with the installation and operation of meteorological buoys).

The NY Bight WEAs are located on the OCS in the NY Bight and are delineated as Fairways North, Fairways South, Hudson North, Central Bight and Hudson South. The WEAs location from New Jersey range in distance from 23 nautical miles (Hudson South) to 69 nautical miles (Fairways North). The ROWs, RUEs

and potential easements would all be located within the NY Bight and would include corridors that extend from the WEAs to the onshore energy grid. The lease, ROW and/or RUE issuance grants the lessee the right to use the leasehold to 1) gather resource and site characterization information, 2) develop its plan, and 3) subsequently seek BOEM approval of its plans for the development of the leasehold. This analysis does not consider construction and operation of any commercial wind power facilities, which would be evaluated later in the process during the review of a construction and operations plan ("COP") or general activities plan ("GAP") to BOEM.

Site assessment activities on leases include the temporary placement of meteorological buoys and oceanographic devices. Site characterization activities on the leases, grants and potential easements include geophysical, geotechnical, and biological surveys.

The Division has determined that the project is consistent with New Jersey's Rules on Coastal Zone Management N.J.A.C. 7:7-1.1 et seq., as amended on July 8, 2021.

Conditional Compliance:

To ensure consistency with the New Jersey Coastal Management Program, the following conditions must be met:

1. Prior to conducting any geotechnical, geophysical and/or sediment sampling within New Jersey State waters, the appropriate authorization and/or permit shall be obtained from the New Jersey Department of Environmental Protection's Division of Land Resource Protection.

2. This Federal Consistency Determination shall not affect any future review by the New Jersey Department of Environmental Protection of any commercial wind power facility nor should this Federal Consistency Determination be construed as an endorsement of any future facility.

3. All efforts shall be undertaken to avoid interactions with mobile and static fishing gears and to notify the fishing public of when and where deployments, surveying, and maintenance are taking place. All deployed gear shall be maintained regularly to avoid damage/loss that may interfere with transiting vessels or fishing gear.

4. Best management practices shall be followed to avoid and/or minimize any impacts to New Jersey State listed threatened or endangered species. These measures may include, but are not limited to, adhering to NOAA's mandatory speed restriction for all vessels 65 feet or longer (must travel 10 knots or less), use of licensed observers aboard vessels and passive acoustic monitoring with underwater recorders located in proximity to the work area.

5. To guarantee safety of fishing activities, it is recommended that all broken vibracore rods that cannot be retrieved be capped at 2 meters below the seafloor.

Pursuant to 15 CFR 930.44, the Division reserves the right to object and request remedial action if the proposal is conducted in a manner, or is having an effect on, the coastal zone that is substantially different than originally proposed.

Thank you for your attention to and cooperation with New Jersey's Coastal Zone Management Program.

If you have any questions regarding this determination, please do not hesitate to contact Janet Stewart of our staff by email at janet.stewart@dep.nj.gov or by phone at (609) 633-2289. Please reference the Division's file number in all communication.

Sincerely,

Christopher Jones, Manager
Bureau of Coastal Permitting
Division of Land Resource Protection

Appendix B: Buoy Technical Details and Specifications

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

Appendix C: Vessel Specifications

Berto L Miller

Home Port	Staten Island, NY	**Official #**	1085966
Station	Long Beach, CA	**Telephone #**	718-727-7303
Call Sign	WDG 6273	**Hull Construction**	Steel
Type of Vessel	Supply Vessel	**Beam**	44'
Length	180'	**Deck Space**	104' X 38'
Draft	12'	**Fuel Capacity**	94,000
Deck Capacity	700 Metric Tons	**Water Capacity**	15,000
Cruising Speed	10 KTS	**Gross Tonnage**	99 Tons
Top Speed	12 KTS	**Single Side Band**	(1) Furuno FS-1503
Communications	RigNet	**Radar**	(1) Furuno FR-8122
Fuel Transfer Rate	400GPM @ 260 Feet	**Chartplotter**	Furuno NAVNET 3D
Ballast Water	75,000 Gallons	**GPS**	(2) Furuno GP-32
Liquid Mud	1,650 BB/69,300 Gallons	**AIS**	(1) Furuno FA-150
Communications	(3) VHFs, (1) SSB	**Generators**	(2) Cat3304 99KW
Main Engines	(2) Cat3512	**Accomodations**	24 + 4 Crew
Bow Thruster	(2) Cat3116	**Tuggers**	(2) Tuggers, 10,000# Linepull Each
Winch	100,000# Linepull	**Other**	DirecTV
Galley	Commercial Style	**Stern Roller**	14' 6" Long

Josephine K Miller

Home Port	Staten Island, NY
Station	Staten Island, NY
Call Sign	WDF 9573
Type of Vessel	Supply Vessel
Length	190'
Draft	12'
Air Draft	
Deck Capacity	440 Ton
Cruising Speed	10 KTS
Top Speed	12 KTS
Communications	GDS 1Mbps down/512kbps up
Transfer Rate	(1) 300GPM @ 240 Feet
Drill Water	30,000 Gallons
Liquid Mud	2,800 BB/117,600 Gallons
Pumping System	(8) Separate Tanks w/2 Manifolds
Mud Trans. Pump	(2) 100 HP Electric
Mud Circ. Pump	(1) 300 HP Electric
DP System	Kongsbergs DP-1
Main Engines	(2) Cat3508B/1920HP Tier 1
Bow Thruster	(1) JD 6125 AFM 75/450HP Tier 1
Galley	Commercial Style
Crane	14ton Grove Crane

Official #	1221799
Telephone #	718-727-7303
Hull Construction	Steel
Beam	36'
Deck Space	100' x 32'
Fuel Capacity	63,236 Gallons
Water Capacity	25,824 Gallons
Gross Tonnage	98 Tons
Single Side Band	(1) Furuno FS-1503
Other	DirecTV
Radar	(2) Furuno FR-8122
GPS	(2) Furuno GP-32
AIS	(1) Furuno FA-150
Color Scope	(1) Furuno FCV-620 Color Scope
VHF Radio	(3) Icom M-504
Loud Hailer	(2) Standard Horizon VLH-3000
Generators	(2) JD 6081AFM 75/170KW Tier 1
Accomodations	16 + 4 Crew
Winch	Skagit, RB-90 72,000# Line Pull
Tuggers	(2) Tuggers, 10,000# Line Pull Each
A-Frame	15 ton A-Frame
Stern Roller	16' Long

Appendix D: Example Health, Safety, and Environmental Plan

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

Appendix E: Marine Site Characterization Report

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

Appendix F: Benthic Report

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

Appendix G: Air Emissions Calculator

ATTENTIVE ENERGY SITE ASSESSMENT PLAN
Air Emission Calculations
Emission Summary - Buoy Deployment Activities

Met Facilities Activity	VOC tpy	NO_X tpy	CO tpy	PM/PM_{10} tpy	$PM_{2.5}$ tpy	SO_2 tpy	HAPs tpy	GHG tpy CO_2e
Buoy Deployment	6.21E-03	0.38	0.09	1.28E-02	1.24E-02	2.27E-04	7.65E-04	25.09
Buoy Maintenance	6.21E-03	0.38	0.09	1.28E-02	1.24E-02	2.27E-04	7.65E-04	25.09
Buoy Decommissioning	6.21E-03	0.38	0.09	1.28E-02	1.24E-02	2.27E-04	7.65E-04	25.09
Maximum Annual Emissions (tons)	**0.02**	**1.14**	**0.26**	**0.04**	**0.04**	**6.82E-04**	**2.30E-03**	**75.264**
Total Emissions (tons)	**0.02**	**1.14**	**0.26**	**0.04**	**0.04**	**6.82E-04**	**2.30E-03**	**75.264**

Note: It was conservatively assumed that all vessel activities occur in a single calendar year.

ATTENTIVE ENERGY SITE ASSESSMENT PLAN -AIR EMISSION CALCULATIONS

Buoy Deployment Activities

Vessels/Equipment	No.of Engines per vessel	1. DP 2. Anchored 3.Spuds	Dimensions (ft) length x width x depth (draft)	Emission Factor Used (see EFs worksheet)	Activity	Engine Rating (hp)	Fuel Type	Transit Round Trips	Transit Duration (hrs/round trip)	Offshore Operating Days	Non-Transit Operating Hours (hrs/day)	Non-Transit Total Operating Hours (hrs)	Transit Average load(%)	Non-Transit Average load(%)	Transit Fuel Usage Gallons (per vessel)	Non-Transit Fuel Usage Gallons (per vessel)
Work boat			190 **X** 36 **X** 11 (11)		Buoy Deployment											
-Main Engines	2			1.21		1,920	Diesel	1	11	**1**	12	12	45%	45%	950	1,036
-Main Generators	2			1.12		228	Diesel	1	11	1	12	12	43%	43%	108	118
Work boat			190 **X** 36 **X** 11 (11)		Buoy Maintenance											
-Main Engines	2			1.21		1,920	Diesel	1	11	**1**	12	12	45%	45%	950	1,036
-Main Generators	2			1.12		228	Diesel	1	11	1	12	12	43%	43%	108	118
Work boat			190 X 36 X 11 (11)		Buoy Decommissioning											
-Main Engines	2			1.21		1,920	Diesel	1	11	1	12	12	45%	45%	950	1,036
-Main Generators	2			1.12		228	Diesel	1	11	**1**	12	12	43%	43%	108	118
														TOTALS	**3,173**	**3,461**

Notes:

1. Three separate round trips will be required: one trip each for buoy deployment, maintenance, and decommissioning.
2. Trip time constitutes the round trip transit time to and from the project site. The number of hours per trip were estimated based on an assumed transit speed of 10 knots. Round trip distance is estimated to be 110 nm.
3. Operating hours/day is the estimated time the vessel is at the deployment site performing its associated activities.
4. Emission calculations based on vessels traveling from Miller's Launch in Staten Island.
5. Emission factors for marine vessel engines are from 2022 EPA guidance document, "Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions," EPA-420-B-22-011, April 2022. (See emission factors summary page.)
6. HAP emission factors for commercial marine vessels were determined using the methodology identified by US EPA for the 2017 National Emissions Inventory (NEI); i.e., they are calculated as percentages of the PM2.5 or VOC emissions from the CMVs.
7. Default load factors were based on the harbor craft propulsion and auxiliary load factors presented in Table 4-4 of the 2022 EPA guidance document.
8. C02e emission rates use the following carbon equivalence factors: 25 for CH4, and 298 for N20.

ATTENTIVE ENERGY SITE ASSESSMENT PLAN - AIR EMISSION CALCULATIONS
Buoy Deployment Activities

	Total Emissions (Non-Transit)										
Vessels/Equipment	VOC tons	NO_x tons	CO tons	PM_{10} tons	$PM_{2.5}$ tons	SO_2 tons	HAPs tons	CO_2 tons	CH_4 tons	N_2O tons	CO_2e tons
Work boat											
-Main Engines	2.41E-03	0.18	0.04	5.27E-03	5.11E-03	1.07E-04	3.03E-04	11.59	4.60E-05	5.67E-04	11.76
-Main Generators	8.35E-04	1.90E-02	3.48E-03	1.41E-03	1.37E-03	1.21E-05	9.65E-05	1.31	1.59E-05	6.43E-05	1.33
Work boat											
-Main Engines	2.41E-03	0.18	0.04	5.27E-03	5.11E-03	1.07E-04	3.03E-04	11.59	4.60E-05	5.67E-04	11.76
-Main Generators	8.35E-04	1.90E-02	3.48E-03	1.41E-03	1.37E-03	1.21E-05	9.65E-05	1.31	1.59E-05	6.43E-05	1.33
Work boat											
-Main Engines	2.41E-03	0.18	0.04	5.27E-03	5.11E-03	1.07E-04	3.03E-04	11.59	4.60E-05	5.67E-04	11.76
-Main Generators	8.35E-04	1.90E-02	3.48E-03	1.41E-03	1.37E-03	1.21E-05	9.65E-05	1.31	1.59E-05	6.43E-05	1.33
	9.72E-03	**0.60**	**0.14**	**0.02**	**0.02**	**3.56E-04**	**1.20E-03**	**38.70**	**1.86E-04**	**0.00**	**39.27**

ATTENTIVE ENERGY SITE ASSESSMENT PLAN - AIR EMISSION CALCULATIONS
Buoy Deployment Activities

	Total Emissions (Transit)										
Vessels/Equipment	**VOC tons**	**NO_X tons**	**CO tons**	**PM_{10} tons**	**$PM_{2.5}$ tons**	**SO_2 tons**	**HAPs tons**	**CO_2 tons**	**CH_4 tons**	**N_2O tons**	**CO_2e tons**
Work boat											
-Main Engines	2.21E-03	0.16	3.88E-02	4.83E-03	4.68E-03	9.76E-05	2.78E-04	10.62	4.22E-05	5.19E-04	10.78
-Main Generators	7.65E-04	1.74E-02	3.19E-03	1.29E-03	1.26E-03	1.11E-05	8.84E-05	1.20	1.45E-05	5.89E-05	1.22
Work boat											
-Main Engines	2.21E-03	0.16	3.88E-02	4.83E-03	4.68E-03	9.76E-05	2.78E-04	10.62	4.22E-05	5.19E-04	10.78
-Main Generators	7.65E-04	1.74E-02	3.19E-03	1.29E-03	1.26E-03	1.11E-05	8.84E-05	1.20	1.45E-05	5.89E-05	1.22
Work boat											
-Main Engines	2.21E-03	0.16	3.88E-02	4.83E-03	4.68E-03	9.76E-05	2.78E-04	10.62	4.22E-05	5.19E-04	10.78
-Main Generators	7.65E-04	1.74E-02	3.19E-03	1.29E-03	1.26E-03	1.11E-05	8.84E-05	1.20	1.45E-05	5.89E-05	1.22
	8.91E-03	**0.55**	**0.13**	**0.02**	**0.02**	**3.26E-04**	**1.10E-03**	**35.47**	**1.70E-04**	**1.73E-03**	**36.00**

ATTENTIVE ENERGY SITE ASSESSMENT PLAN - AIR EMISSION CALCULATIONS
Emission Factors

Commercial Marine Vessels (CMVs)

		Commercial Marine Vessel Emission Factors (g/kWh) /a, /b									Fuel Cons.
	Engine Type	VOC	NO_x	CO	PM/ PM_{10} /c	$PM_{2.5}$ /c	SO_2 /d	CO_2	CH_4	N_2O	(gal/kWh) /e
1.11	EPA default, Cat 1, Tier 1/2, kW≥ 37, all displacement ranges (propulsion)	0.43	9.80	1.80	0.43	0.42	0.0062	679	0.0082	0.0332	0.067
1.12	EPA default, Cat 1, Tier 1/2, kW≥ 37, all displacement ranges (auxiliary)	0.43	9.80	1.80	0.73	0.71	0.0062	679	0.0082	0.0332	0.067
1.21	EPA default, Cat 2, Tier 1/2, all kW ranges, all displacement ranges (all)	0.14	10.55	2.48	0.31	0.30	0.0062	679	0.0027	0.0332	0.067
1.31	EPA default, Cat 3, 1999 and earlier, MSD engines, MGO/MDO fuel (propulsio	0.53	13.20	1.10	0.19	0.17	0.401	657	0.0100	0.0290	0.064
1.32	EPA default, Cat 3, 1999 and earlier, MSD engines, MGO/MDO fuel (auxiliary)	0.42	13.80	1.10	0.19	0.17	0.424	696	0.0080	0.0290	0.068

/a Default emission factors for NOx, VOC, CO, PM10, PM2.5, SO2, CO2, and CH4 from Category 1 and Category 2 engines (when age is unknown) are based on the worst case of either the Tier 1 or Tier 2 values in the following sections of the 2022 EPA guidance document, "Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions," EPA-420-B-22-011, April 2022:
Table H.1 for NOx; Table H.2 for PM10 and PM2.5; Table H.3 for VOC and CH4; Table H.4 for CO; Table H.7 for SO2 and CO2; and Equation 4.3 for N2O.

/b Emission factors for Category 3 engines are based on the values for 1999 and earlier engines in the following sections of the 2022 EPA guidance:
Table 3.5 for NOx; Equation 3.3 for PM10; Table 3.8 for VOC, CO, and CH4; Equation 3.4 for CO2; Equation 3.5 for SO2; and Table 3.9 for N2O.
Brake specific fuel consumption (BSFC) for Category 3 engines is from Table 3.6 of the 2022 EPA guidance.
PM2.5 for Category 3 engines is assumed to be 92% of the PM10 value, based on section 3.5.3 of the 2022 EPA guidance.

/c All PM is assumed to less than 10 µm in diameter; therefore, PM emission factor is equivalent to PM_{10} emission factor. For Category 1 and 2 engines, $PM_{2.5}$ is estimated to be 97 % of PM_{10}, per section 4.5.3 of the 2022 EPA guidance; for Category 3 engines, PM2.5 is assumed to be 92% of PM10, per section 3.5.3 of the 2022 EPA guidance.

/d SO2 emission factors assume a fuel sulfur content of: 0.0015 percent by weight for Category 1 and 2 engines (Table H.7 of 2022 EPA guidance); and 0.1 percent by weight for Category 3 engines (Equation 3.5 of 2022 EPA guidance).

/e Fuel consumption for Category 1 and 2 marine engines was based on the brake specific fuel consumption (BSF) value provided in section 4.5.2 of the 2022 EPA guidance for engines≥ 37 kW, with an assumed fuel density of 3.18 kg/gallon.
Fuel consumption for Category 3 marine engines was based on the BSFC values (g/kW-hr) provided in the 2022 EPA guidance, with an assumed fuel density of 3.18 kg/gallon.

ATTENTIVE ENERGY SITE ASSESSMENT PLAN
EPA NEI HAP emission factors for Commercial Marine Vessels

Pollutant	HAP?*	Fraction of	Fraction (All engines Cat 1/2/3, all fuel types, all operating modes)
Ammonia	No	PM2.5	0.019247
Antimony	Yes	PM2.5	0.000615
Arsenic	Yes	PM2.5	2.59E-05
Benz[a]Anthracene	Yes	PM2.5	8.82E-06
Benzo(g,h,i)Perylene	Yes	PM2.5	0.000132
Benzo[a]Pyrene	Yes	PM2.5	4.18E-06
Benzo[b]Fluoranthene	Yes	PM2.5	8.35E-06
Benzo[k]Fluoranthene	Yes	PM2.5	4.18E-06
Cadmium	Yes	PM2.5	0.000236
Chromium (VI)	Yes	PM2.5	7.24E-09
Chrysene	Yes	PM2.5	1.63E-05
Dibenzo[a,h]anthracene	Yes	PM2.5	8.65E-06
Fluoranthene	Yes	PM2.5	8.97E-05
Indeno[1,2,3-c,d]Pyrene	Yes	PM2.5	8.35E-06
Lead	Yes	PM2.5	0.000125
Manganese	Yes	PM2.5	3.22E-06
Mercury	Yes	PM2.5	4.18E-08
Nickel	Yes	PM2.5	0.000687
Polychlorinated Biphenyls	Yes	PM2.5	4.18E-07
Pyrene	Yes	PM2.5	3.37E-05
Selenium	Yes	PM2.5	4.38E-08
Total HAP (ratioed to PM2.5)			**0.0213**
1,3-Butadiene	Yes	VOC	0.001013
2,2,4-Trimethylpentane	Yes	VOC	0.00712
Acenaphthene	Yes	VOC	5.09E-05
Acenaphthylene	Yes	VOC	0.000118
Acetaldehyde	Yes	VOC	0.009783
Acrolein	Yes	VOC	0.001848
Anthracene	Yes	VOC	0.000344
Benzene	Yes	VOC	0.004739
Ethyl Benzene	Yes	VOC	0.000439
Fluorene	Yes	VOC	0.000164
Formaldehyde	Yes	VOC	0.042696
Hexane	Yes	VOC	0.00279
Naphthalene	Yes	VOC	0.00273
o-Xylene	Yes	VOC	0.000513
Phenanthrene	Yes	VOC	0.001356
Propionaldehyde	Yes	VOC	0.001517
Toluene	Yes	VOC	0.002035
Xylenes (Mixed Isomers)	Yes	VOC	0.001422
Total HAP (ratioed to VOC)			**0.0807**

*For completeness, all of the pollutants in EPA's database are shown, but not all are HAP as defined in Section 112 of the Clean Air Act and as updated in 40 CFR 63 Subpart C.

Reference: US EPA, "2017 National Emissions Inventory (NEI)," April 2020, available from https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data.
HAP speciation profiles for Category 1 and 2 engines are from Table 8 of the 2017 NEI "Methodology Documentation for EPA's Commercial Marine Emissions Estimates" for Category 1 and 2 vessels. HAP speciation profiles for Category 3 and 2 engines are from Table 15 of the "Methodology Documentation for EPA's Commercial Marine Emissions Estimates" for Category 3 vessels. Both documents are available from https://www.epa.gov/sites/production/files/2019-11/cmv_methodology_documentation.zip.

Appendix H: Marine Archaeological Resources Assessment

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

Appendix I: National Marine Fisheries Service Consultation Letter (June 29, 2021)

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

June 29, 2021

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

Dear Mr. Bennett:

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

ACTION AREA AND PROPOSED ACTIONS

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

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

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

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

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

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

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

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

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

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

USACE

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

Consideration of Potential Issuance of Incidental Harassment Authorizations for Survey Activities

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

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

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

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

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

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

Activities Considered in this Programmatic Consultation

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

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

Action Area

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

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

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

IMPLEMENTATION, TRACKING, AND REPORTING FOR THIS PROGRAMMATIC CONSULTATION

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

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

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

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

ESA-LISTED SPECIES AND CRITICAL HABITAT CONSIDERED IN THIS CONSULTATION

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

ESA-Listed Species in the Action Area

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

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

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

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

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

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

Critical Habitat in the Action Area

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

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

Critical Habitat designated for the North Atlantic Right Whale

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

Consideration of Potential Effects to Unit 1

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

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

Consideration of Potential Effects to Unit 2

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

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

EFFECTS OF THE ACTION ON NMFS LISTED SPECIES AND CRITICAL HABITAT

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

Effects of Exposure to Noise Associated With Survey Activities

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

Acoustic Thresholds

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

ESA-listed Whales

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

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

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

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

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

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

Sea Turtles

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

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

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

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

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

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

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

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

Marine Fish

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

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

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

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

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

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

HRG Acoustic Sources

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

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

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

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

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

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

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

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

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

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

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

Marine Mammals

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

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

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

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

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

Sea Turtles

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

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

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

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

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

Marine Fish

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

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

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

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

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

Acoustic Effects - Geotechnical Surveys

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

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

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

Meteorological Buoys

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

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

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

Effects to Habitat

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Breeding

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

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

Constricted Migratory Corridors

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

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

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

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

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

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

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

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

Marine Mammals

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

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

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

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

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

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

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

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

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

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

Sea Turtles

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

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

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

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

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

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

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

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

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

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

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

Marine Fish

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

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

Giant Manta Ray

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

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

Sturgeon

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

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

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

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

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

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

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

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

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

Vessel Noise

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

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

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

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

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

Consideration of Effects of the Actions on Air Quality

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

CONCLUSIONS

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

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

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

Sincerely,

Jennifer Anderson

Jennifer Anderson
Assistant Regional Administrator
for Protected Resources

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

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

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Appendix A – Tables and Figures

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Figure 1. Action Area for this programmatic consultation.

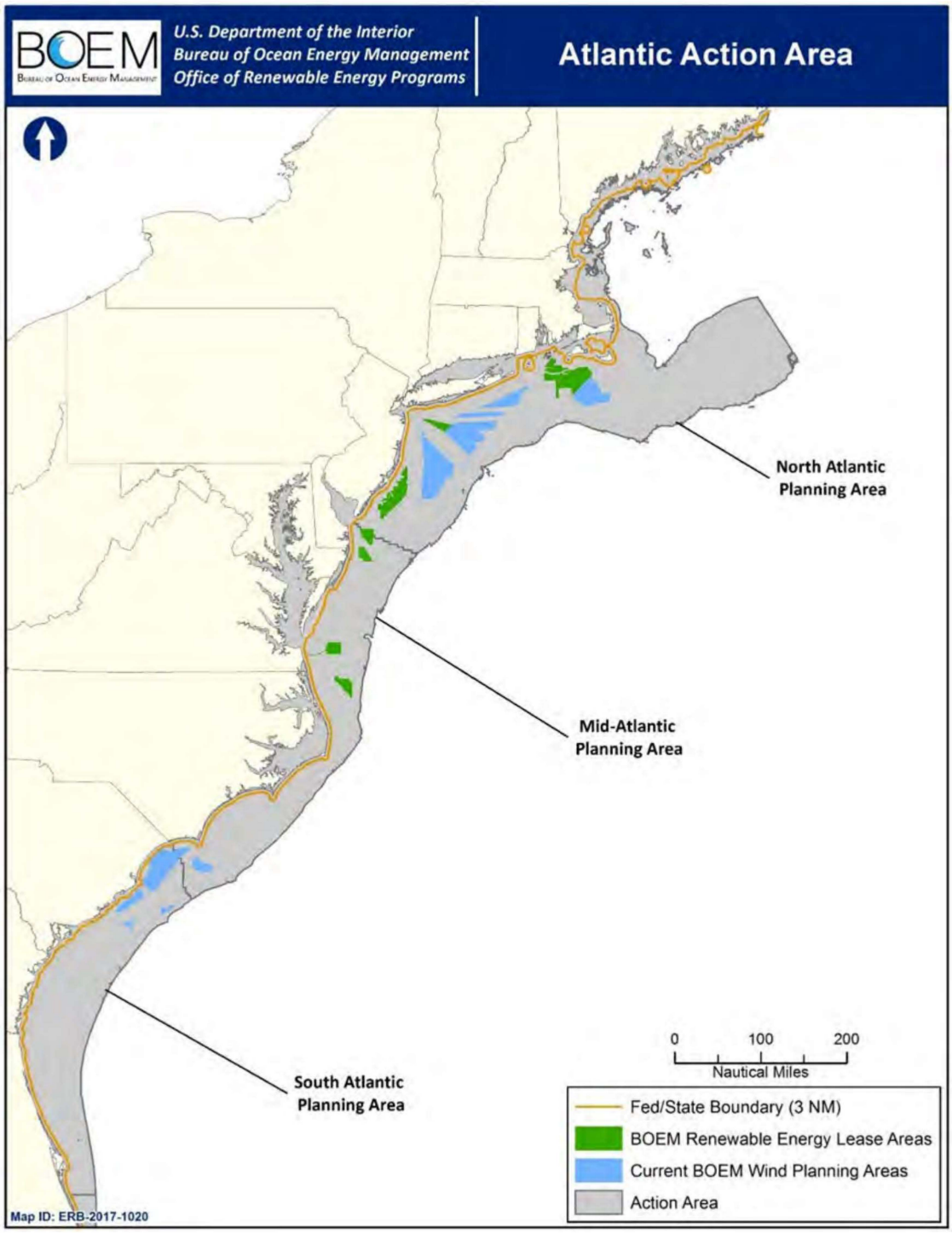

Table A.1 Description of Representative HRG Survey Equipment and Methods

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

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

	Highest Measured Source Level (Highest Power Setting)						
HRG Source	**Source Setting**	**PK**	**RMS**	**SEL**	**Pulse Width (s)**	**Main Pulse Frequency (kHz)**	**Inter-Pulse Interval (s) (1/PPS)**
Mobile, Impulsive, Intermittent Sources							
AA200 Boomer Plate	250 J (low)	209	200	169	0.0008	4.3	1.0 (1 pps)
AA251 Boomer Plate	300 J (high)	216	207	176	0.0007		1.0 (1 pps)
Applied Acoustic Delta Sparker	2400 J at 1 m depth, 0.5 kHz	221	205	185	0.0095	0.5	.33333 (1-3 pps)
Applied Acoustic Dura-Spark	2400 J (high), 400 tips	225	214	188	0.0022	2.7	.33333 (1-3 pps)
Applied Acoustics S-Boom (3 AA252 boomer plates)	700 J	211	205	172	0.0006	6.2	1.0 (1 pps)
Applied Acoustics S-Boom (CSP-N Source)	lO00J	209	203	172	0.0009	3.8	.33333 (3 pps)
ELC820 Sparker	750 J (high) lm depth	214	206	182	0.0039	1.2	1.0 (1 pps)
FSI HMS-620D Bubble Gun	Dual Channel 86cm	204	198	173	0.0033	1.1	8.0 (1 per 8 s)
Mobile, Non-Impulsive, Intermittent Sources							
Bathyswath SWATHplus-M	100%, 234 kHz	223	218	180	0.00032	≥200 kHz	0.2000 pps (unknown)
Echotrac CVl00 Single-Beam Echosounder	Power 12, 80 cycles, 200 kHz	196	193	159	0.00036	≥200kHz	0.0500 (20 pps)
EdgeTech 424 with 3200-XS topside processor (Chirp)	100% power, 4-20 kHz	187	180	156	0.0046	7.2-11	.12500 (8 pps)

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

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

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

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

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

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

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

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

"= cSEL distances were calculated by 20 log(Source Level + 10 log(1800 sec)-Threshold Level)

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

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

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

HRGSOURCE	DISTANCE OF POTENTIAL DISTURBANCE (m)*		
	Marine Mammals	Sea Turtles	Fish
AA200 Boomer Plate	100	18	317
AA25 l Boomer Plate	224	40	708
Applied Acoustics S-Boom (3 AA252 boomer plates)	178	32	563
Applied Acoustics S-Boom (CSP-N Source)	142	26	447

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

NA = Not Audible

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

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

APPENDIX B

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

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

PDC 1: Avoid Live Bottom Features

BMPs:

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

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

BMP:

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

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

This table will be supplemented with additional rivers as necessary.

PDC 3: Marine Trash and Debris Awareness and Prevention

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

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

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

BMPs:

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

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

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

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

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

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

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

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

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

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

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

BMPs:

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

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

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

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

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

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

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

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

PDC 5: Minimize Vessel Interactions with Listed Species

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

BMPs:

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

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

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

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

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

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

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

BMPs:

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

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

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

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

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

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

PDCs 8: Reporting Requirements

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

BMPs:

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

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

k. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any change;
l. Water depth (if obtainable from data collection software) (in meters);
m. Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including wind speed and direction, Beaufort scale, Beaufort wind force, swell height (in meters), swell angle, precipitation, cloud cover, sun glare, and overall visibility to the horizon;
n. Factors that may be contributing to impaired observations during each PSO shift change or as needed as environmental conditions change (e.g., vessel traffic, equipment malfunctions);
o. Survey activity information, such as type of survey equipment in operation, acoustic source power output while in operation, and any other notes of significance (i.e., pre-clearance survey, ramp-up, shutdown, end of operations, etc.);

Visual Sighting (all Visual Effort fields plus):

a. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
b. Vessel/survey activity at time of sighting;
c. PSO/PSO ID who sighted the animal;
d. Time of sighting;
e. Initial detection method;
f. Sightings cue;
g. Vessel location at time of sighting (decimal degrees);
h. Direction of vessel's travel (compass direction);
i. Direction of animal's travel relative to the vessel;
j. Identification of the animal (e.g., genus/species, lowest possible taxonomic level, or unidentified); also note the composition of the group if there is a mix of species;
k. Species reliability;
l. Radial distance;
m. Distance method;
n. Group size; Estimated number of animals (high/low/best);
o. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
p. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
q. Detailed behavior observations (e.g., number of blows, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior);
r. Mitigation Action; Description of any actions implemented in response to the sighting (e.g., delays, shutdown, ramp-up, speed or course alteration, etc.) and time and location of the action.
s. Behavioral observation to mitigation;
t. Equipment operating during sighting;
u. Source depth (in meters);

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

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

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

5. Sightings of any injured or dead listed species must be immediately reported, regardless of whether the injury or death is related to survey operations, to BOEM (*renewable_reporting@boem.gov*), NMFS (*nmfs.gar.incidental-take@noaa.gov*), and the appropriate regional NOAA stranding hotline (from Maine-Virginia report sightings to 866-755-6622, and from North Carolina-Florida to 877-942-5343 for marine mammals and 844-732-8785 for sea turtles). If the project proponent's activity is responsible for the injury or death, they must ensure that the vessel assist in any salvage effort as requested by NMFS. When reporting sightings of injured or dead listed species, the following information must be included:
    a. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
    b. Species identification (if known) or description of the animal(s) involved;
    c. Condition of the animal(s) (including carcass condition if the animal is dead);
    d. Observed behaviors of the animal(s), if alive;
    e. If available, photographs or video footage of the animal(s); and
    f. General circumstances under which the animal was discovered.
6. Reporting and Contact Information:
    a. Dead and/or Injured Protected Species:
        1. NMFS Greater Atlantic Region's Stranding Hotline: 866-755-6622
        2. NMFS Southeast Region's Stranding Hotline: 877-942-5343 (marine mammals), 844-732-8785 (sea turtles)
    ii. Injurious Takes of Endangered and Threatened Species:
        1. NMFS Greater Atlantic Regional Office, Protected Resources Division (*nmfs.gar.incidental-take@noaa.gov*)
        2. BOEM Environment Branch for Renewable Energy, Phone: 703-787-1340, Email: *renewable_reporting@boem.gov*

Appendix J: Basis for Design Data – Preliminary Metocean Design Criteria

(Contains Privileged or Confidential Information - Provided Under Separate Cover)