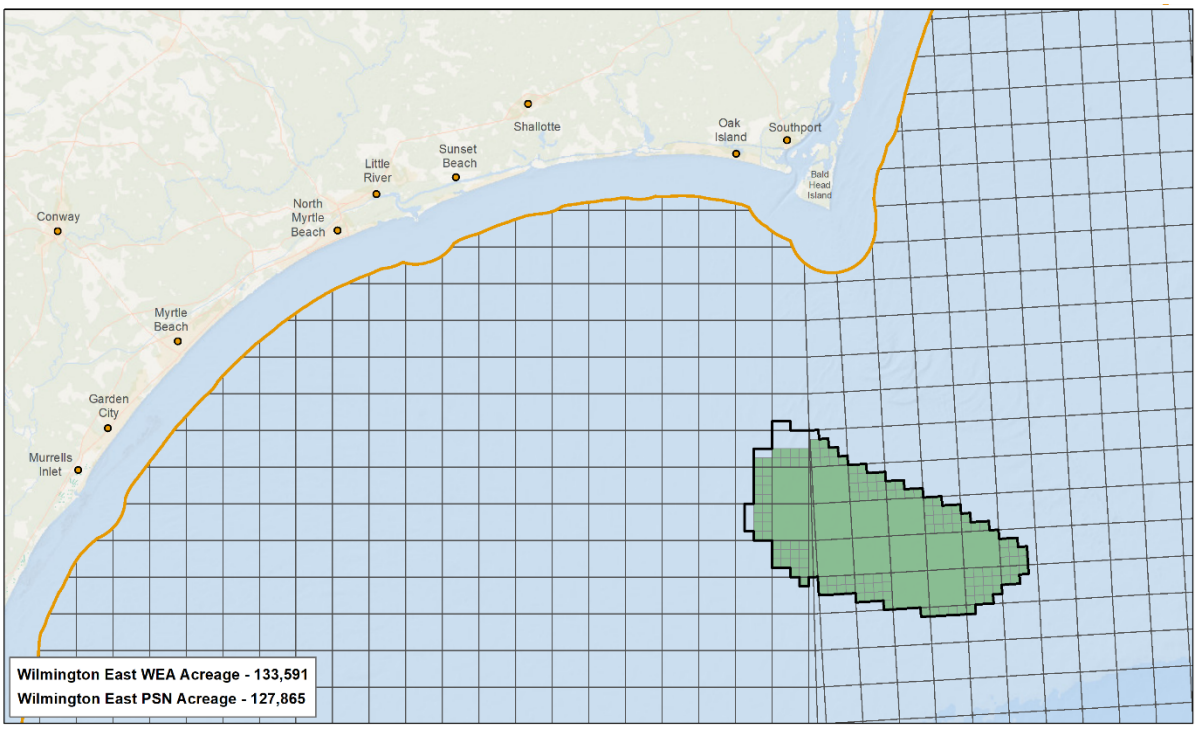
OCS EIS/EA
BOEM 2021-084

Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore North Carolina

Draft Supplemental Environmental Assessment



U.S. Department of the Interior
Bureau of Ocean Energy Management
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LIST OF ACRONYMS AND ABBREVIATIONS

2015 EA	*Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore North Carolina - Revised Environmental Assessment*
ACHP	Advisory Council on Historic Preservation
AMP	Alternative Monitoring Plan
APE	area of potential effects
ASV	autonomous surface vessel
BA	biological assessment
BMP	Best Management Practices
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CD	consistency determination
CMECS	Coastal and Marine Ecological Classification Standard
COP	Construction and Operations Plan
DMA	Dynamic Management Area
DOI	Department of the Interior
DPS	Distinct Population Segments
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FCP	Fisheries Communications Plan
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FSN	Final Sale Notice
ft	foot/feet
G&G	geological and geophysical
GAP	General Activities Plan
GPS	Global Positioning
HAPC	Habitat Areas of Particular Concern
HMS	highly migratory species
ITA	Incidental Take Authorization
LoC	Letter of Concurrence
m	meter(s)
mi	mile(s)
MMPA	Marine Mammal Protection Act
NAAQS	National Ambient Air Quality Standards
NARW	North Atlantic right whale
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NRHP	National Register of Historic Places
OCS	Outer Continental Shelf
PDC	Project Design Criteria
PSN	Proposed Sale Notice
PSO	protected species observer
PTS	permanent threshold shift
RMS	root-mean-square
ROW	right-of-way
SAP	Site Assessment Plan
SAR	Stock Assessment Report
SBP	sub-bottom profiler
SEA	Supplemental Environmental Assessment
SEL	sound exposure level
SELC	Southern Environmental Law Center
SERO	Southeast Regional Office
SHPO	State Historic Preservation Office
SLR	single lens reflex
SMA	Seasonal Management Area
SMZ	special management zones
SOC	Standard Operating Condition
SPL	sound pressure level
TSS	traffic separation scheme
TTS	temporary threshold shifts
UME	Unusual Mortality Event
USBL	ultra-short baseline
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
WEA	Wind Energy Area

1 BACKGROUND

The United States Department of the Interior (DOI), Bureau of Ocean Energy Management (BOEM) has prepared this Supplemental Environmental Assessment (SEA) to determine whether the issuance of leases within the Wilmington East Wind Energy Area (WEA) offshore North and South Carolina and associated site characterization and site assessment activities would lead to reasonably foreseeable significant impacts on the environment and, thus, whether an Environmental Impact Statement (EIS) should be prepared before leases are issued.

1.1 Identification of North Carolina Wind Energy Areas

On August 7, 2014, BOEM announced the identification of three WEAs offshore North Carolina,[1] of which only #3 is subject to this SEA:

1. The **Kitty Hawk WEA** begins about 24 nautical miles (nm) from shore and extends approximately 25.7 nm in a general southeast direction. Its seaward extent ranges from 13.5 nm in the north to 0.6 nm in the south. It contains approximately 21.5 Outer Continental Shelf (OCS) blocks (approximately 122,405 acres).
2. The **Wilmington West WEA** begins about 10 nm from shore and extends approximately 12.3 nm in an east-west direction at its widest point. It contains just over 9 OCS blocks (approximately 51,595 acres).
3. The **Wilmington East WEA**, the subject of this SEA, begins about 15 nm from Bald Head Island at its closest point and extends approximately 18 nm in the southeast direction at its widest point. It contains approximately 25 OCS blocks (approximately 133,590 acres; **Figures 1-1 and 1-2**).

The Wilmington West and East WEAs are part of a larger planning area BOEM refers to as the Carolina Long Bay area offshore the Carolinas.[2]

[1] https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NC/NC_AreaID_Announcement_.pdf

[2] https://www.boem.gov/renewable-energy/state-activities/carolina-long-bay

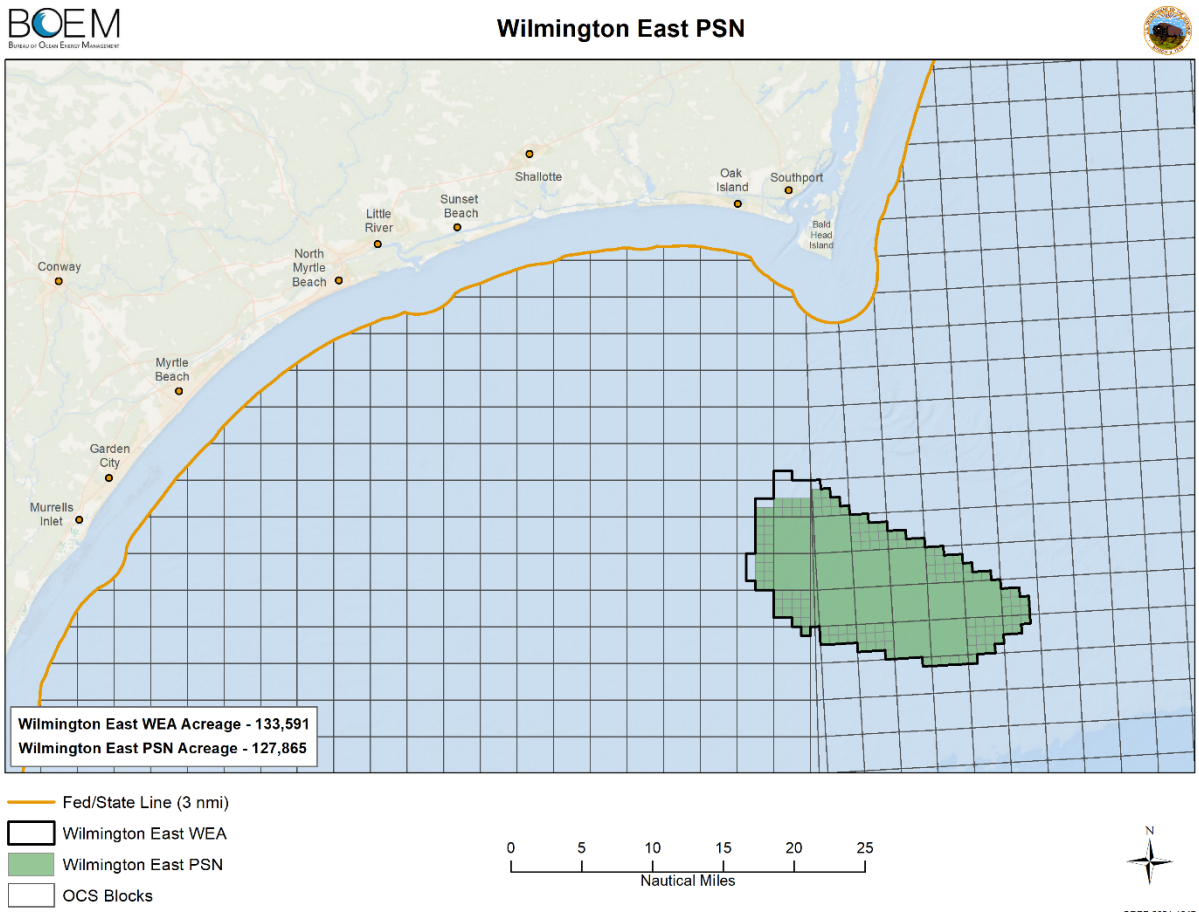

Figure 1-1. Location of the Wilmington East Wind Energy Area (WEA) and Proposed Sale Notice (PSN)

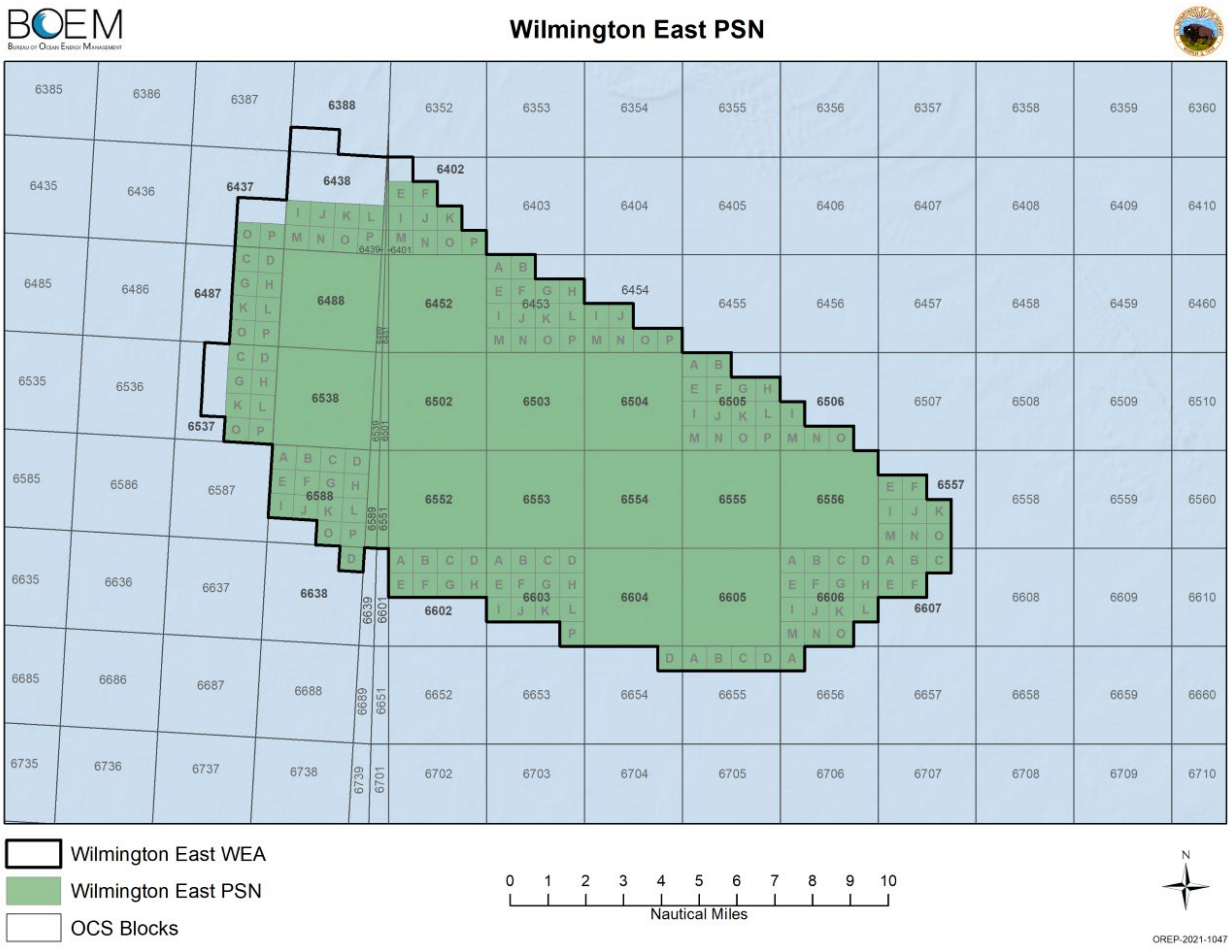

Figure 1-2. Wilmington East Wind Energy Area (WEA) and Proposed Sale Notice (PSN)

1.2 Leasing Process

On September 17, 2015, BOEM published the *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore North Carolina - Revised Environmental Assessment* (BOEM 2015)(80 FR 56494; referred to this in document as the "2015 EA"). The 2015 EA considers the environmental impacts of issuing leases and approving site assessment plans (SAPs) within the entirety of the three WEAs offshore North Carolina. BOEM's issuance of these leases is needed (a) to confer the exclusive right to submit plans to BOEM for potential development (e.g., SAPs and a Construction and Operations Plan (COP)); and (b) to ensure that site characterization and site assessment activities are conducted in a safe and environmentally responsible manner. As a result of the analysis in the 2015 EA, BOEM issued a "Finding of No Significant Impact" (FONSI) stating that no reasonably foreseeable significant impacts were expected to occur as a result of the proposed action or any of the alternatives contemplated in the 2015 EA; therefore, the preparation of an EIS was not required.

On January 17, 2017, BOEM announced the publication of the Final Sale Notice (FSN) for a lease sale offshore North Carolina for just one lease in the Kitty Hawk WEA. On March 16, 2017, BOEM held a competitive lease sale (i.e., auction) for the Kitty Hawk WEA. Avangrid

Renewables, LLC, which bid $9,066,650, was the winner of Renewable Energy Lease OCS-A 0508 (approximately 122,405 acres). The lease was signed by BOEM on October 10, 2017, and went into effect on November 1, 2017.

The Wilmington West and Wilmington East WEAs were removed from this sale due to concerns over visual impacts that also applied to the South Carolina areas. Additionally, the entire Wilmington West WEA was located in proposed right whale critical habitat area. The thought was to combine the Wilmington Areas with the South Carolina leasing effort and resolve the right whale and visual concerns in a more regional manner. The South Carolina leasing effort did not move forward, but BOEM is now planning to conduct another lease sale, which may result in the issuance of up to three commercial leases within the Wilmington East WEA.

On November 1, 2021, BOEM published a Proposed Sale Notice (PSN) for the Wilmington East WEA and opened a 60-day comment period, which ends on January 3, 2022.[3] The PSN proposes the issuance of up to three commercial wind energy leases. The area totals approximately 127,865 acres and includes the majority of the Wilmington East WEA. Lease blocks overlapping the North Atlantic right whale (NARW) critical habitat and areas used for training identified by the Department of Defense were removed from leasing consideration.

1.3 Objective of This SEA

BOEM has identified new information and changed circumstances regarding potential impacts and issues that were not available at the time the 2015 EA. Some of this new information includes a recent marine cultural resources survey, changes in the status of some Endangered Species Act-listed species, the listing of new species, and the designation of the NARW critical habitat.

BOEM prepared this SEA to evaluate the 2015 EA and FONSI in concert with current science, studies, circumstances, and information relevant to reasonably foreseeable environmental impacts that would occur from site characterization activities (i.e., shallow hazards, geological, geotechnical, archaeological, and biological surveys of the lease area and potential cable routes) and site assessment activities (i.e., installation and operation of meteorological buoys) associated with issuing wind energy leases in the Wilmington East WEA. This SEA evaluates resources for which new information has become available since the publication of the 2015 EA, and which could be material to the decision-making process.

1.4 Revisions to the Leasing, Site Characterization, and Site Assessment Scenarios

This SEA revises the leasing scenario analyzed in the 2015 EA. As stated above, BOEM is now proposing a lease sale that may result in the issuance of up to three commercial wind energy leases, all within the Wilmington East WEA (Proposed Action). While the 2015 EA only considered the issuance of one lease per WEA, the subdivision of the Wilmington East WEA

[3] https://www.federalregister.gov/documents/2021/11/01/2021-23801/atlantic-wind-lease-sale-9-atlw-9-for-commercial-leasing-for-wind-power-on-the-outer-continental

into more than one lease does not substantially alter the reasonably foreseeable activities that would result from leasing the Wilmington East WEA. Therefore, this does not substantially change the associated site assessment and characterization scenarios.

Regardless of the number of leases that BOEM would issue, the 2015 EA and this SEA both consider full site characterization survey of the Wilmington East WEA. The 2015 EA was so conservative in its forecast of survey activities, including vessel trips, that it covers any potential increase that could result from multiple lessee mobilizations.

The 2015 EA assumed one meteorological tower or two meteorological buoys, or some combination of a meteorological tower and buoy, would be installed within the Wilmington East WEA. While BOEM is now anticipating up to three times the number of meteorological buoys (up to two per lease) in the Willington East WEA, BOEM no longer foresees the construction of a meteorological tower.[4] The installation and operation of meteorological buoys involves substantially less activity and a much smaller footprint than the construction and operation of a meteorological tower. For example, each installation of a meteorological buoy can be completed in approximately 1 to 2 days, respectively, which involves one round vessel trip. Because the decommissioning process would basically be the reverse of installation, it would also take approximately 1 to 2 days for one vessel to decommission the meteorological buoy. These estimates are well below the number of trips required for tower installation, up to approximately 40 round trips, and tower decommissioning, up to approximately 40 round trips, Additionally, total installation time for one meteorological tower would take 8 days to 10 weeks, and total decommissioning time would be 8 days to 10 weeks; therefore, impacts associated with the construction and decommissioning of the number of projected meteorological buoys would be much lower than for towers. Therefore, the reasonably foreseeable site assessment activities now anticipated fall below the range considered with the 2015 EA.

The 2015 EA assumed that there will be up to one cable for each individual lease, each with a 984-foot-wide (300-meter-wide) survey corridor to shore and a maximum of 83.6 nm of cable route to be surveyed for three cables. The impacts resulting from the revised scenario are not expected to be different from those expected from the conservative scenario analyzed in the 2015 EA, since the 984-foot-wide (300-meter-wide) survey corridor analyzed in the 2015 EA is more than the area contemplated in BOEM's regulations to accommodate three cables (i.e., 200 ft project easement, 30 CFR 585.628(g)(2)). It is not yet possible to predict precisely where a power substation may ultimately be installed on any given lease or the route that any potential future transmission line would take across the seafloor to shore, however, this SEA assumes a maximum of three cable routes to different substations. A lessee would be required to submit detailed information on proposed cable route(s) within their COP. BOEM would then analyze the proposed route(s) in a project- and/or site-specific environmental document.

[4] Meteorological buoys have become the preferred meteorological and oceanographic (metocean) data collection platform for developers.

2 PURPOSE AND NEED FOR ACTION

The purpose of the Proposed Action is to issue up to three leases and approve up to three SAPs to allow lessees to assess the wind energy resource within the Wilmington East WEA. The need for BOEM's issuance of leases and approval of SAPs is to adequately assess wind and environmental resources in some or all areas of the Wilmington East WEA to determine if areas within the WEA are suitable for, and could support, commercial-scale wind energy production.

3 PROPOSED ACTION AND ALTERNATIVES

The Proposed Action analyzed in this SEA is the issuance of up to three commercial wind energy leases within the Wilmington East WEA offshore North Carolina and approval of site assessment activities on those leaseholds (through the submission of an SAP) (**Figures 1-1 and 1-2**). This SEA evaluates current science, studies, circumstances, and information relevant to reasonably foreseeable environmental impacts that could occur from site characterization activities (i.e., shallow hazards, geological, geotechnical, archaeological, and biological surveys of the lease area and potential cable routes) and site assessment activities (i.e., installation and operation of meteorological buoys)[5] associated with issuing wind energy leases in the Wilmington East WEA.

BOEM does not consider the issuance of a lease to constitute an irreversible and irretrievable commitment of agency resources. The issuance of a lease only grants the lessee the exclusive right to submit to BOEM an SAP and COP proposing development of the leasehold. Therefore, the Proposed Action does not include construction and operation of any commercial wind energy facilities, which would be evaluated in a separate National Environmental Policy Act (NEPA) analysis if a lessee submits a COP.

After lease issuance, a lessee would conduct surveys and, if authorized to do so pursuant to an approved SAP, install meteorological measurement devices to characterize the site's environmental, cultural, historic, and socioeconomic resources and conditions and to assess the wind resources in the proposed lease area. A lessee would 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 Regional Carolina Long Bay Intergovernmental Renewable Energy Task Force; and perform an independent, comprehensive, site- and project-specific NEPA analysis. This separate site- and project-specific NEPA analysis may take the form of an EIS and would provide additional opportunities for public involvement pursuant to NEPA and the Council on Environmental Quality 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

[5] The installation and operation of meteorological towers was previously analyzed in the 2015 EA; however, this SEA does not include the installation of meteorological towers since met buoys have become the preferred metocean data collection platform for developers.

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 energy facility from occurring. BOEM would do this by disapproving a COP for failure to meet the statutory standards set forth in the Outer Continental Shelf Lands Act.

The timing of lease issuance, as well as weather and sea conditions, would be the primary factors influencing timing of site characterization and site assessment survey activities. Under the reasonably foreseeable site characterization scenario, BOEM could issue leases as soon as mid-2022. It is assumed that lessees would begin survey activities as soon as possible after receiving a lease and preparing a SAP and a Survey Plan, and when sea states and weather conditions allow for site characterization and site assessment survey activities. Lessees have up to 5 years to perform site characterization activities before they must submit a COP (30 CFR §585.235(a)(2)).

3.1 Proposed Action (Alternative A – Preferred Alternative)

The 2015 EA proposed action considered the issuance of commercial and research wind energy leases within the entirety of the three WEAs offshore North Carolina and approval of site assessment activities on those leaseholds. In 2017, BOEM issued a lease in the Kitty Hawk WEA, and because BOEM is not currently pursuing leasing of the Wilmington West WEA, the Proposed Action for this SEA has been revised to reflect the issuance of up to three commercial wind energy leases within the majority of the Wilmington East WEA offshore North Carolina and approval of site assessment activities on this leasehold(s). Although BOEM has identified new information and changed circumstances regarding potential impacts and issues that were not available at the time the 2015 EA was published on September 17, 2015, the impacts resulting from the Proposed Action being analyzed here are not substantially different from those analyzed in the 2015 EA. See **Section 1** for an explanation of the revised leasing, site characterization, and site assessment scenarios.

3.2 Alternative B

Under the 2015 EA's Alternative B, the Wilmington West WEA would be excluded from leasing, but leasing in the Kitty Hawk and Wilmington East WEAs would move forward. Because the Proposed Action analyzed in this SEA only considers leasing in the Wilmington East WEA, Alternative B is not being further analyzed in this SEA.

3.3 Alternative C

Under Alternative C, lease issuance and subsequent site characterization and site assessment activities would still occur in the Wilmington East WEA; however, certain site characterization activities would be seasonally restricted. Appendix A of the *Data Collection and Site Survey Activities Programmatic Informal Consultation* (Baker and Howson 2021) includes mitigation measures that apply to all alternatives. Alternative C expands these restrictions to include prohibiting site characterization activities (surveys) during the winter months when NARWs migrate offshore North Carolina.

Specifically, this alternative would limit vessel activity by excluding high-resolution geological and geophysical (G&G) surveys from November 1 through April 30 during the NARW migratory period. Vessel traffic not associated with high-resolution G&G surveys (e.g., biological surveys, such as avian, bat, marine mammal, and sea turtle surveys) would not be restricted.

3.4 Alternative D – No Action

Under the No Action Alternative, no wind energy leases would be issued, and no site characterization and assessment activities would occur within the Wilmington East WEA. Although site characterization surveys do not require BOEM approval and could still be conducted under Alternative D, these activities would not be likely to occur without commercial wind energy leases. The No Action Alternative was also considered in the 2015 EA.

3.5 Standard Operating Conditions

The 2015 EA concluded that the Standard Operating Conditions (SOCs) (Appendix B of the 2015 EA) could minimize or eliminate potential impacts to marine mammals and sea turtles. These SOCs resulted from BOEM's ESA consultation with National Marine Fisheries Service (NMFS) (see Section 5.2.1 of the 2015 EA). These conditions included vessel strike avoidance and marine debris awareness measures; protected species observers; exclusion and monitoring zones; sound source verification, ramp-up, soft start, and shutdown procedures; visibility, seasonal, and frequency-dependent restrictions for various activities, as well as multiple reporting requirements.

The SOCs have been updated with the mitigation measures (Project Design Criteria, or PDCs) developed with NMFS during the 2021 consultation (**Appendix A**), which covered site assessment and characterization activities associated with data collection in the Atlantic OCS, including the Wilmington East WEA.[6] The activities include the placement and removal of meteorological buoys and geophysical and geotechnical surveys associated with offshore wind development. This consultation resulted in an informal conference opinion that the survey activities considered here would not be likely to adversely affect ESA-listed marine mammals, sea turtles, and fish or their critical habitat

The SOCs are discussed further in **Section 4.1.14**, **Section 5.2.1.2**, and **Appendix A**.

[6] https://www.boem.gov/renewable-energy/nmfs-esa-consultations

4 EVALUATION OF NEW INFORMATION AND CHANGED CIRCUMSTANCES

4.1 Alternative A (Preferred Alternative)

4.1.1 Benthic Resources

(Section 4.4.2.3 of the 2015 EA)

Background: The 2015 EA concluded that primary impacts on benthic communities would be via direct contact by anchors, driven pile(s), and scour protection systems, which could cause crushing or smothering of benthic organisms and habitat. These impacts would be localized, given the extent of benthic habitat types on the Atlantic continental shelf, and would only take place in a very small percentage of the total area of the WEAs (less than 0.2%). Data collected during seafloor surveying would indicate the presence of potential benthic resources so that sensitive habitat types, such as hardbottom and live bottom habitats, would be avoided by the lessee during sub-bottom sampling and when meteorological facility siting decisions are made (in accordance with BOEM policies to avoid impacts on sensitive benthic resources). Therefore, impacts on benthic communities under Alternative A were anticipated to be negligible to minor.

New Information: After publication of the 2015 EA, BOEM funded benthic habitat mapping to provide a baseline data set for potential future development of wind leases in the Wilmington East and West WEAs (Taylor et al. 2016). The project contributes to the knowledge base regarding benthic hardbottom habitat in the area and may be used to inform siting of meteorological buoys associated with site assessment activities, which could further reduce impacts from such activities. Additionally, PDCs and Best Management Practices (BMPs) received from NMFS on June 29, 2021, will follow PDC 1 to "Avoid Live Bottom Features" (Anderson 2021). Reasonable measures will also be included to avoid anchoring on artificial reefs and shipwrecks.

In May 2020, NMFS Southeast Regional Office (SERO) responded to BOEM's request for information on what was then referred to as the Carolina Long Bay area. In response, SERO acknowledged that as part of the initial BOEM Call for Nomination (80 FR 73818) in November 2015, BOEM excluded lease blocks containing known artificial reefs.

Analysis and Conclusion: Both the 2015 EA and this SEA assume avoidance because the area would be surveyed before bottom disturbance activities would take place. The additional baseline data set improves the ability to avoid sensitive habitats. While an increased number of meteorological buoys is now anticipated, impacts from pile driving and scour protection associated with the construction and eventual decommissioning of a meteorological tower would not occur. Additionally, the issuance of one to three leases versus only one lease in the Wilmington East WEA is expected to result in the same impacts from site characterization surveys (e.g., geotechnical surveys that would disturb the bottom) because the analyses in the 2015 EA were based on a conservative forecast of reasonably foreseeable activities. Therefore, impacts on benthic communities under Alternative A are anticipated to remain negligible to minor.

4.1.2 Finfish and Essential Fish Habitat
(Section 4.4.2.7 of the 2015 EA)

Background: The 2015 EA determined that meteorological tower and buoy construction and decommissioning noise could disturb normal fish behaviors and could result in minor effects on fish due to impact pile driving associated with meteorological tower construction. Meteorological buoys and their anchors would displace substrate and water column habitat for fish and also would provide hard benthic substrate, which could be of benefit to some species. The impacted habitat would be extremely small relative to the available habitat, therefore impacts would likely be negligible. Overall impacts on fish species from diesel spills resulting from collisions and allisions were expected to be minimal and temporary and were anticipated to be negligible.

New Information: There have been no changes in essential fish habitat (EFH) designations for fish species since the publication of the 2015 EA. However, NMFS approved the implementation of new management measures for the Snapper-Grouper Fishery Management Plan (FMP) in May 2021 (86 FR 17318). The FMP created 34 special management zones (SMZs) around artificial reefs in the Exclusive Economic Zone off North Carolina and South Carolina in order to restrict fishing gear with greater potential to result in high exploitation rates. Two SMZs were established near the Wilmington East WEA, AR-400 and AR-465, each with a 1,500 ft (457m) radius; however, neither SMZ occur within the Wilmington East WEA.

The primary impact to fish and invertebrates from site characterization activity is acoustic disturbance resulting from survey activities. A new technical report, *Sound Exposure Guidelines for Fishes and Sea Turtles* by Popper et al. (2014), was issued too late for consideration in the 2015 EA. These guidelines are very useful in the broad discussion about more appropriate acoustic thresholds for fish. This report does not attempt to identify a lethal injury threshold, but instead classifies most sound as a recoverable injury threshold and adds more fish categories than just the size category previously used.

Analysis and Conclusion: BOEM excluded hardbottom areas with artificial reefs from the North Carolina Call Areas, which includes the Wilmington East WEA as described above. Also, as described above, the new designation of SMZs in the region do not change the conclusions for finfish and EFH from the 2015 EA. While an increased number of meteorological buoys are now anticipated, eliminating the meteorological tower removes construction impacts from impact pile driving and scour protection resulting in a project with a smaller benthic footprint than what was proposed in the 2015 EA. Additionally, the issuance of one to three leases versus only one lease in the Wilmington East WEA is expected to result in substantially the same impacts from site characterization surveys (e.g., geophysical surveys that would generate noise and geotechnical surveys that would disturb the bottom) because the analyses in the 2015 EA were based on a conservative forecast of reasonably foreseeable activities. Therefore, impacts on finfish and EFH under Alternative A are anticipated to remain negligible to minor.

4.1.3 Commercial and Recreational Fisheries
(Section 4.4.4.5 of the 2015 EA)

Background: The 2015 EA concluded that there was relatively low employment in the commercial fishing industry in North Carolina. Fishing communities in North Carolina tend to be small rural ports. Important commercial species included white shrimp, southern flounder, summer flounder, brown shrimp, Atlantic croaker, and quahog clam. In 2012, 72% of commercial fishing landings occurred within 3 mi of shore, and 28% occurred within Federal waters. On the other hand, North Carolina ranked fifth nationally for expenditures related to recreational fishing. In 2013, the number of angler trips in North Carolina was third among U.S. states. Approximately 53% of trips were ocean trips within 3 mi of shore, and only 5% were ocean trips beyond 3 mi of the shore. The remainder of the trips were inland trips. Based on the relative importance of the analyzed WEAs for local fisheries, the vessel traffic levels expected to be associated with site characterization surveys and site assessment activities, and the potential impact drivers from these activities, the 2015 EA concluded that the impacts were anticipated to be negligible to minor.

New Information: The Wilmington East WEA includes habitat for both federally and non-federally managed marine species, including highly migratory species (HMS), which may seasonally concentrate in high numbers while migrating, spawning, or foraging; therefore, the distribution of marine species in the region may exhibit substantial intra- and interannual variability. The 2015 EA provides a robust snapshot of commercial and recreational fisheries socioeconomics. BOEM has reviewed the currently available data from the Bureau of Labor Statistics, National Oceanic and Atmospheric Administration (NOAA), and Census Bureau. None of the available data exhibits a significant deviation from the data provided in the 2015 EA. However, a 2016 NOAA report indicates that North Carolina's Commercial Fishing Location Quotient is 0.06, indicating that significantly less commercial fishing occurs in North Carolina than in the rest of the country (NMFS 2018b).

Data specific to the Wilmington East WEA is not currently available from NOAA. However, state-wide data can be an indicator for fishing activity within the Wilmington East WEA. Low state-wide activity would indicate likely low activity in the Wilmington East WEA; conversely, high state-wide activity would indicate high activity in the Wilmington East WEA. State-wide landings data from NOAA's Fisheries Office of Science and Technology shows that Blue Crab and Northern White Shrimp are the only species landed with a value of over $20,000,000 between 2015 and 2019 commercially in North Carolina. Commercial HMS landings as a whole landed less than $2,900,000 in any year between 2015 and 2019 (NOAA 2021b). Recreational anglers for most managed fisheries other than HMS are primarily comprised of out-of-state fishermen, either from shore or private vessels. However, recreational fishing for HMS includes for-hire vessels, private anglers, and tournaments. Landings by volume (in pounds) of HMS by recreational fishermen as a percent of total HMS landings varied from roughly 56% in 2015 to 3% in 2018. In 2019, the total volume of HMS landed by recreational fishermen was roughly 25% of the total landings (NOAA 2021b). For-hire trips were a significantly smaller mode of angler trips between 2014 and 2016 (NMFS 2018b).

Analysis and Conclusion: The new information that has become available since the publication of the 2015 EA confirmed findings in the 2015 EA regarding relatively low fishing activity in the

Wilmington East WEA. In fact, the fishing quotient in 2016 of 0.06 was significantly lower than the 2015 EA fishing quotient of 0.15, indicating that less of the state-wide economy relies on commercial fishing at this time than when the Wilmington East WEA was first analyzed. Because a meteorological tower is no longer anticipated to be used (**Section 1**), there would be a reduction in vessel traffic associated with site assessment activities. The issuance of one to three leases versus only one lease in the Wilmington East WEA is expected to result in substantially the same impacts because the analyses in the 2015 EA were based on a conservative forecast of reasonably foreseeable activities. Therefore, site characterization-related vessel traffic would remain essentially the same. Therefore, BOEM believes the reasonably foreseeable activities associated with lease issuance in the Wilmington East WEA would not result in substantially different environmental effects than those analyzed in the 2015 EA.

To reduce impacts further, BOEM has proposed in the PSN to include two lease stipulations to ensure the lessee would coordinate and communicate their activities with commercial and recreational fishermen. Prior to the development of these lease stipulations, BOEM had been successful in using its review of survey plans and approval of SAPs to ensure that fisheries liaisons are identified and that lessees are communicating with potentially affected fishing groups. Nevertheless, BOEM has determined that these lease stipulations are prudent for future leases. The specific lease stipulations are as follows:

> *Stakeholder Engagement Summary.* The progress report must also include a summary of engagement activities with ocean users potentially affected by proposed activities on the lease or proposed project easement. This summary must identify potentially affected ocean users, engagement activities with those ocean users during the reporting period, and a description of efforts to minimize conflicts between ocean users and the lessee. With respect to potentially affected fishing communities, the summary must describe what measures have been taken during design of the facility to address fishing community concerns. The report must also include a description of any anticipated engagement activities for the next reporting period. As applicable, progress reports under this requirement may provide updates on, or refer to sections within the, Fisheries Communication Plans (FCPs) or Native American Tribes Communication Plans, and are intended to build upon those requirements to provide regular updates on the progress of communication efforts with those and other affected stakeholder groups. Within 30 calendar days from receipt, the lessor may request the lessee modify the progress report to address any comments the lessor submits to the lessee on the contents of the document. Comments must be addressed by the lessee in a manner deemed satisfactory by the lessor.
>
> *FCP and Fisheries Liaison.* The lessee must develop a publicly available FCP that describes the strategies that the lessee intends to use for communicating with fisheries stakeholders prior to and during activities in support of the submission of a plan. The FCP must include the contact information for an individual retained by the lessee as its primary point of contact with fisheries stakeholders (i.e., Fisheries Liaison).

The inclusion of these stipulations are anticipated to have a negligible to slight reduction of impacts on commercial and recreational fisheries under Alternative A compared to those described in the 2015 EA.

4.1.4 Birds and Bats

(Sections 4.4.2.1 and 4.4.2.2 of the 2015 EA)

Background: The 2015 EA concluded that the construction, presence, and decommissioning of meteorological towers and buoys pose no threat of significant impact on birds. For federally listed bird species, U.S. Fish and Wildlife Service (USFWS) concurred with BOEM's "no effect" and "not likely to adversely affect" determinations for all activities that would occur under the proposed action. Therefore, effects on birds were anticipated to be negligible to minor. Because of the anticipated distance between the meteorological buoys, there would be no additive effect on bats from construction of the anticipated buoys. To the extent that there would be any impacts on individuals, the overall impact on bats were anticipated to be negligible.

New Information: Since the publication of the 2015 EA, BOEM has reviewed new information that resulted in greater resolution about migratory bird use of the OCS. This new information includes the following: modeling of avian relative distribution and abundance of dozens of species (Winship et al. 2018), a telemetry study of diving birds (Spiegel et al. 2017), and recent wildlife survey work (Robinson Willmott et al. 2021) that spanned offshore the Carolinas and included the Wilmington East WEA. The modeling and subsequent survey results show relatively little bird activity in the spring, summer, and fall seasons; however, during the winter months, there were relatively high numbers of phalaropes, razor bills, and Bonaparte's gulls in the Wilmington East WEA as predicted by the models (Winship et al. 2018) and confirmed by recent surveys (Robinson Willmott et al. 2021).

On March 17, 2014, the USFWS concurred with BOEM's determination that commercial wind lease issuance and site assessment activities on the Atlantic OCS may affect, but will not likely adversely affect, the Bermuda petrel, black-capped petrel, Kirkland's warbler, roseate tern, piping plover, and red knot. In addition, the USFWS concurred with BOEM's determination of "no effect" to piping plover critical habitat. Although the red knot was listed as threatened in December 2014 (79 FR 79706), the red knot was already covered in BOEM's consultation with the USFWS back in March 2014. Recently, the USFWS removed the Kirtland's warbler from the Federal List of Endangered and Threatened Wildlife due to recovery in 2019 (84 FR 54436). In response to BOEM's notice to prepare this SEA, the USFWS met with BOEM on August 2, 2021, and also provided written scoping comments on September 7, 2021. In its letter, the USFWS recommended deploying acoustic detectors and Motus Wildlife Tracking System receivers during site assessment to collect data on pre-construction bird and bat presence within the WEA.

Analysis and Conclusion: The new information that has become available confirms relatively low bird and bat activity in the Wilmington WEA in the spring, summer, and fall, consistent with the 2015 EA. Impacts of site characterization activities on birds and bats under Alternative A is still anticipated to be negligible because the level of survey activity is not anticipated to be substantially different than that anticipated in the 2015 EA (**Section 1**). However, site assessment impacts to birds and bats would be reduced from those described in the 2015 EA because a meteorological tower, the primary impact-producing factor for birds and bats, is no longer anticipated. Therefore, BOEM now anticipates the overall impacts from site assessments and characterization under Alternative A to be negligible.

4.1.5 Air Quality

(Section 4.4.1.1 of the 2015 EA)

Background: The 2015 EA concluded that nearby onshore areas were within the National Ambient Air Quality Standards (NAAQS) and that the level of activity associated with the installation of meteorological towers and buoys were anticipated to have negligible impacts on air quality onshore.

New Information: The nearest onshore areas remain in NAAQS attainment, and the analysis of emissions expected for the level of activity associated with the installation and operation of meteorological buoys remains the same.

Analysis and Conclusion: The information presented in the 2015 EA remains accurate and does not change the conclusions for air quality. Although an increased number of meteorological buoys are anticipated, impacts from air emissions associated with the construction of a meteorological tower would not occur. Additionally, the issuance of one to three leases versus only one lease in the Wilmington East WEA is expected to result in the same impacts from site characterization surveys because the level of survey activity is not anticipated to be substantially different than that anticipated in the 2015 EA. Therefore, impacts on air quality under Alternative A are anticipated to remain negligible.

4.1.6 Water Quality

(Section 4.4.1.2 of the 2015 EA)

Background: The 2015 EA reviewed the baseline data for the coastal waters of North and South Carolina, including state and national water quality assessments, and concluded that the instrumentation used for site characterization was self-contained, so there would be no discharges to affect the water quality in the WEAs. Operational discharges from vessels are strictly regulated and would disperse, dilute, and biodegrade. Spill risk due to collisions and allisions would be small. Based on this information, the 2015 EA concluded that impacts to water quality were anticipated to be minor.

New Information: New data from the *North Carolina Water Quality Assessment Report from 2016* (USEPA 2016) indicated that 99.8% (302 mi) of coastal shorelines are listed as good, with 0.6 mi of coastal shoreline listed as impaired. The coastal shoreline was also listed as 100% good for fish consumption and 99.8% good for recreation. Coastal bays and estuaries are sampled separately from the coastal shoreline area in North Carolina; in 2016, 28.3% of those coastal bays and estuaries are listed as impaired (890 mi^2). In those areas assessed for more than one designated use, fish consumption, recreation, shellfish harvesting, and water supply are listed as 95% good or greater, while aquatic life is listed at 95.7% impaired. Causes of impairment to North Carolina bays and estuaries in 2016 include metals other than mercury, pH/acidity/caustic conditions, algal growth, pathogens, and turbidity.

Analysis and Conclusion: New information has become available regarding the current state of water quality, indicating that water quality has improved for North Carolina coastal shorelines, bays, and estuaries, but this does not change the conclusions for water quality from the 2015 EA, as this information does not impact site characterization and site assessment activities. While an

increased number of meteorological buoys are now anticipated, disturbance of the seabed and turbidity associated with construction of a meteorological tower would not occur. Further, survey methodology and meteorological buoy design with regards to fuel and chemical storage have not significantly changed since the 2015 EA. Additionally, the issuance of one to three leases versus only one lease in the Wilmington East WEA is expected to result in substantially the same impacts from site characterization surveys (e.g., geotechnical surveys that would disturb the seabed) because the analyses in the 2015 EA were based on a conservative forecast of reasonably foreseeable activities. Therefore, impacts on water quality under Alternative A are anticipated to remain minor.

4.1.7 Land Use and Coastal Infrastructure
(Section 4.4.3 of the 2015 EA)

Background: The 2015 EA assumed that activities associated with issuing leases and approving SAPs (i.e., installation and operation of meteorological towers and buoys) would be more or less evenly distributed among several major and minor ports in North Carolina, South Carolina, and Virginia. Additionally, the 2015 EA concluded that the use of existing ports and marinas for site characterization and site assessment activities would be consistent with existing uses at those facilities. Furthermore, no additional upland or coastal infrastructure would be required for site characterization and site assessment activities. Therefore, no effect on land use or coastal infrastructure were anticipated to occur as a result of the proposed action.

New Information: BOEM's analysis of the ports used by Avangrid Renewables, LLC in their SAP for the Kitty Hawk project offshore of North Carolina (OCS-A 0508) shows that survey vessels, crew transfer vessels, and staging areas have been divided between existing commercial and/or smaller ports in Virginia and North Carolina (Avangrid Renewables LLC 2020). This is consistent with expected port usage identified in the 2015 EA.

Analysis and Conclusion: The new information analyzed does not change the conclusions presented in the 2015 EA for land use and coastal infrastructure. While an increased number of meteorological buoys are anticipated, impacts from vessel traffic and increased port usage associated with the construction of a meteorological tower would not occur. Additionally, the issuance of one to three leases versus only one lease in the Wilmington East WEA is not expected to change the effects to land use and coastal infrastructure, as no additional upland or coastal infrastructure would be required for site characterization activities. Therefore, it is anticipated that there would still be no effect on land use and coastal infrastructure under Alternative A.

4.1.8 Demographics and Employment & Environmental Justice
(Sections 4.4.4.2 and 4.4.4.3 of the 2015 EA)

Background: The 2015 EA concluded that site characterization and site assessment activities (i.e., installation and operation of meteorological towers and buoys) were anticipated to have negligible to minor impacts on demographics and employment because of the limited economic activity associated with these activities relative to the sizes of the affected economies.

The 2015 EA did not identify any environmental justice concerns resulting from site assessment and site characterization activities.

New Information: BOEM reviewed baseline demographic data from the U.S. Census Bureau (2021), employment data from the U.S. Bureau of Labor Statistics (2021), and data regarding the ocean economy from NOAA's Economics: National Ocean Watch (ENOW) database (NOAA 2021c). BVG Associates LLC (2021) provides an assessment of the capabilities of North Carolina ports to support offshore wind development, although this report does not specifically analyze the likely geographic patterns of site characterization or site assessment activities. BOEM also searched for information regarding site characterization/assessment technologies and costs. For example, BOEM reviewed best practices for wind assessment presented in DNV GL (2018), a discussion of the market conditions for site assessment technologies in Dodd (2018), and the SAP for the Kitty Hawk project offshore of North Carolina (Avangrid Renewables LLC 2020).

Analysis and Conclusion: The new information does not show substantial changes in baseline economic conditions and, while technology continues to evolve, the changes do not substantially impact economics and demographics. While an increased number of meteorological buoys are anticipated and there is the potential for an increased number of leases, impacts would not change due to the limited economic activity associated with these activities relative to the sizes of the affected economies. Therefore, impacts on demographics and employment under Alternative A are anticipated to remain negligible to minor.

The 2015 EA did not identify any significant adverse effects on communities resulting from site assessment and site characterization activities, and no new information indicates that this has changed since then. Therefore, it is anticipated that there would be no effect on environmental justice under Alternative A.

4.1.9 Tourism and Recreation

(Section 4.4.4.4 of the 2015 EA)

Background: The 2015 EA concluded that total vessel traffic associated with site characterization surveys and site assessment activities would be relatively small, and, therefore, potential impacts to tourism and recreation from accidental fuel spills were anticipated to be negligible to minor. The WEAs were designed to minimize effects on the viewshed and primary recreational resources; therefore, effects on tourism and recreation, as a result of meteorological tower and buoy placement, also were anticipated to be negligible to minor.

New Information: Updated baseline data regarding recreational activities has become available. For example, NOAA (2021c) provides county-level data on the scale of recreation and tourism in North Carolina and South Carolina. In addition, National Marine Manufacturers Association (2021) provides congressional-district-level data on the impacts of recreational boating in North Carolina and South Carolina. Goedeke et al. (2019) provides information regarding the importance of certain recreational activities to North Carolina and South Carolina residents in the context of wind energy development. In addition, Parsons and Firestone (2018) analyze the impacts of wind energy development on recreational beach use along the Atlantic Coast.

However, neither Goedeke et al. (2019) nor Parsons and Firestone (2018) directly assess the impacts of site characterization or site assessment activities.

Analysis and Conclusion: The new information does not show substantial changes in the baseline data regarding recreational activities, so this does not change the conclusions for recreation and tourism from the 2015 EA. The level of survey activity is not anticipated to be substantially different than that anticipated in the 2015 EA. Although an increased number of meteorological buoys are anticipated, the vessel traffic and accidental fuel spills associated with installation of a meteorological tower, and the viewshed impacts associated with the presence of a meteorological tower, would not occur. Therefore, impacts on recreation and tourism under Alternative A are anticipated to remain negligible to minor.

4.1.10 Navigation and Vessel Traffic

(Sections 3.2.2.4 and 4.4.3.3 of the 2015 EA)

Background: The 2015 EA estimated that the total vessel traffic resulting from the installation, decommissioning, and routine maintenance of meteorological towers was anticipated to be between 300 and 1,020 round trips over a 5-year period, and for meteorological buoys, between 132 and 384 round trips over a 5-year period. The number of vessels passing through the WEAs was not expected to significantly increase vessel traffic density when compared to existing and projected future vessel traffic in the WEAs. Therefore, the impacts on navigation and vessel traffic were anticipated to be negligible and minor.

New Information: Since the publication of the 2015 EA, the U.S. Coast Guard (USCG) has been considering and evaluating the potential for new shipping safety fairways in the Atlantic. These fairways have been evaluated as part of the Atlantic Coast Port Access Route Study (81 FR 13307). USCG has moved forward in the rulemaking process to formally designate these fairways in an Advanced Notice of Proposed Rulemaking (85 FR 37034) and has initiated a supplemental Port Access Route Study to further evaluate new routing and anchorage areas for the Seacoast of North Carolina (85 FR 15487). Currently, these shipping safety fairways overlap portions of the Wilmington East WEA in the following sub-blocks located within protraction NI18-07: 6606H, 6606K, 6606L, 6606M, 6606N, 6606O 6607B, 6607C, 6607E, 6607F, 6655D, and 6656A (**Figure 4-1**).

Current trend forecasts an industry preference for using meteorological buoys over meteorological towers, as demonstrated by SAPs submitted by wind energy developers, and this SEA only considers the installation and operation of meteorological buoys.

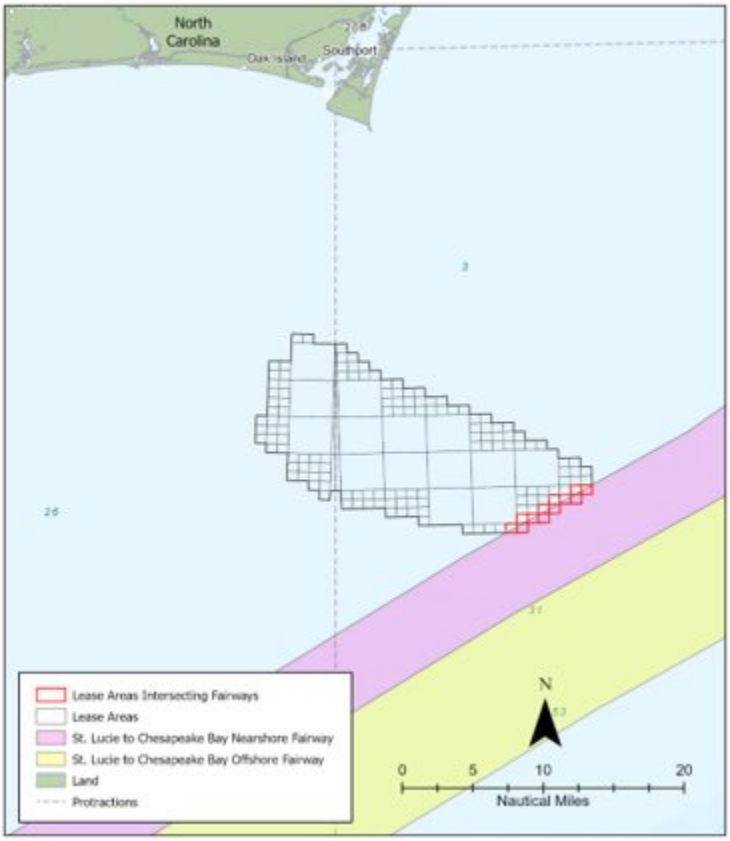

Figure 4-1. Overlap of proposed fairways in the Wilmington East WEA

Analysis and Conclusion: The new information concerning the shipping safety fairways does change the analysis in the 2015 EA. The potential system of shipping safety fairways are intended to ensure that traditional navigation safety routes are kept free from obstruction that could impact navigation safety. These potential shipping safety fairways would be incompatible with site characterization surveys. However, this conflict would only occur in 2,056 acres of the total 127,865 acres being considered for leasing. Further, the 2015 EA estimated that total meteorological buoy trips over a 5-year period would be 132–384, while the total meteorological tower trips over a 5-year period would be 300–1,020. Although an increased number of meteorological buoys are now anticipated, impacts to vessel traffic associated with the construction and eventual decommissioning of a meteorological tower would not occur. Additionally, the issuance of one to three leases versus only one lease in the Wilmington East WEA is expected to result in the same impacts from site characterization surveys because the level of survey activity is not anticipated to be substantially different than that anticipated in the 2015 EA. Therefore, impacts to navigation and vessel traffic under Alternative A are anticipated to remain negligible to minor.

4.1.11 Cultural, Historical, and Archaeological Resources

(Section 4.4.4.1 of the 2015 EA)

Background: The types of historic properties expected within the offshore affected environment include submerged pre-contact and historic period archaeological sites. The Wilmington East

WEA offshore North Carolina is geographically located within portions of the OCS once exposed as dry land and are designated as having a high potential for the presence of submerged pre-contact archaeological sites. Not all formerly exposed areas within the Wilmington East WEA may have survived the destructive effects of erosion caused by sea level rise and marine transgression; however, submerged landforms that are considered to have a higher probability for the potential presence and preservation of archaeological sites have been previously documented within and adjacent to the Wilmington East WEA.

In addition, the coast of North Carolina has a well-deserved reputation as the "graveyard of the Atlantic." More than 4,000 vessel losses have been historically documented in the underwater archaeological site files of the North Carolina Department of Cultural Resources, Underwater Archaeology Unit. Shipwrecks along the North Carolina coast and within the Wilmington East WEA have the potential to date from as early as the late sixteenth century and likely include vessels from every subsequent century. The Cape Fear entrances to the Port of Wilmington, in the vicinity of the Wilmington East WEA, have one of the highest associated concentrations of reported shipwrecks in North Carolina. Seven shipwrecks are reported in the Atlantic Shipwreck Database within and surrounding the Wilmington East WEA.

The types of historic properties expected within the onshore affected environment include districts, sites, buildings, structures, or objects within the viewshed of site characterization and site assessment activities. The 2015 EA documented 42 known NRHP-listed and potentially eligible properties within Brunswick County adjacent to the Wilmington East WEA. These include such properties as the Baldhead Island Lighthouse and the Oak Island Lighthouse.

The 2015 EA analyzed the following impacts by the proposed action and alternatives on historic properties:

- Impacts on cultural, historical, and archaeological resources from seafloor disturbance activities (i.e., bottom sampling [cores and grabs]; placement of anchors, nodes, cables, or other bottom-founded equipment; and placement of anchored monitoring buoys)
- Impacts on cultural, historical, and archaeological resources from accidental fuel spills

The 2015 EA concluded that impacts on both offshore and onshore historic properties from site characterization activities were anticipated to be negligible. Installation of meteorological towers and buoys would result in disturbance of the seafloor and could affect offshore archaeological resources within these areas of disturbance These effects would be unlikely because archaeological surveys conducted during site characterization would be conducted prior to the installation of any structure. If archaeological resources are discovered during the site characterization surveys, additional investigations and avoidance of the resource would occur. If avoidance is not feasible, BOEM would continue its National Historic Preservation Act (NHPA) Section 106 consultation to resolve adverse effects. Therefore, effects on archaeological resources from site characterization activities were anticipated to be negligible. Based on the visual simulations, meteorological towers would be only minimally visible on clear days and would not be expected to affect the viewshed. Therefore, effects on onshore historic properties and heritage resources were anticipated to be negligible.

New Information: Since the publication of the 2015 EA, BOEM has collected new information regarding marine cultural resources within and adjacent to the Wilmington East WEA. In 2017, BOEM and NOAA collaborated via an Interagency Agreement to conduct a baseline archaeological survey in the vicinity of the Wilmington East WEA through the investigation of eight potential archaeological sites (Hoffman et al. 2020).

These investigations included direct observation and documentation by archaeological scientific divers, including the completion of scaled photogrammetric models of site 6577K-1, Lady Margaret, City of Houston, and the 27.162-meter wreck. In addition to confirming the location of each site and documenting the extent of visible remains, background research was completed to assist in providing a preliminary recommendation regarding each site's potential eligibility for listing in the National Register of Historic Places (NRHP; **Table 4-1**).

Table 4-1. Summary of baseline archaeological survey information and recommendations from 2017 study of the Wilmington East and West WEAs

Target	Description	Recommendation
Raritan	76-m (251-ft) metal-hulled cargo vessel, broken into two, that ran aground Frying Pan Shoals and sunk on February 25, 1942	Site is considered potentially eligible for listing in the NRHP based on its association with the Battle of the Atlantic and may be eligible for inclusion under an established multiple property designation for Battle of the Atlantic-associated resources. Preliminary avoidance of this target is recommended by 100 m (328 ft) from the discernable extent of the intact bow and stern sections. Additional investigation is recommended to document and monitor the site.
6537K_1"	34-m (110-ft) metal-hulled vessel, possibly an early 20th century yacht; in addition to hull remains, exposed artifact assemblage is present	Site is considered potentially eligible for listing in the NRHP. Preliminary avoidance of this target is recommended by 50 m (164 ft) from the discernable extent of the hull remains. Additional investigation is recommended to document and monitor the site.
Lady Margaret	Possible remains of 31-m (101-ft) diesel yacht *Lady Margaret* built 1930 and lost 1976 during a storm	Site is considered potentially eligible for listing in the NRHP. Preliminary avoidance of this target is recommended by 100 m (328 ft) from center point of the site. Additional investigation is recommended to document and monitor the site.
"Known Wreck"	52-m (172-ft) metal-hulled barge of undetermined age	Site is not considered eligible for listing in the NRHP. No additional investigation recommended.
City of Houston	90-m (295-ft) composite-built passenger vessel that floundered and sank during a storm in 1878	Site is considered potentially eligible for listing in the NRHP. Preliminary avoidance of this target is recommended by 100 m (328 ft) from the discernable extent of the site. Additional investigation is recommended to document and monitor the site.
Jell II	53-m (174-ft) metal-hulled fishing vessel purposely sunk as part of the North Carolina Artificial Reef Program	Site is part of North Carolina Artificial Reef AR-445 and not considered eligible for listing in the NRHP. No additional investigation recommended.
27.162 m Wreck	26-m (87-ft) metal-hulled vessel, possibly an early 20th century ocean-going tug	Site is considered potentially eligible for listing in the NRHP. Preliminary avoidance of this target is recommended by 50 m (164 ft) from the discernable extent of the hull remains. Additional investigation is recommended to document and monitor the site.

Based on the results of these investigations, avoidance buffers were recommended for five of the sites based on potential eligibility for listing in the NRHP, while no further investigations were recommended for the remaining three sites.

Analysis and Conclusion: The results of the 2017 marine archaeological investigations of the Wilmington East WEA do not substantially change the analysis and conclusions of the 2015 EA. Impacts to any marine cultural resources, including any of the five historic properties described in the 2017 study, would be unlikely because archaeological surveys conducted during site characterization would be conducted prior to the installation of meteorological buoys. The increased site characterization activities that could result from the issuance of one to three leases versus only one lease in the Wilmington East WEA is not expected to substantially change impacts to archaeological resources. If archaeological resources are identified within the area of potential effects (APE) for the proposed activities during site characterization surveys, additional investigations and avoidance of the resource would occur. If avoidance is not feasible, BOEM will initiate NHPA Section 106 consultations to resolve adverse effects. Additionally, while an increased number of meteorological buoys are anticipated, impacts to the viewshed associated with the presence of a meteorological tower would not occur. Therefore, effects on archaeological resources under Alternative A are anticipated to remain negligible.

4.1.12 Visual Resources

(Section 4.4.4.6 and Appendix F of the 2015 EA)

Background: The 2015 EA concluded that the overall visibility of meteorological towers was expected to be relatively minimal when viewed from shoreline locations (occupying less than 1% of the visible seascape), even when viewed from higher elevations. Atmospheric haze reduces visibility and wave action can obscure objects very low on the horizon. Limits to human visual acuity also reduce the ability to discern objects at great distances, and nighttime lighting on the meteorological towers would be similar to lights visible from existing vessel traffic. The 2015 EA also concluded that meteorological buoys would not be visible from onshore locations. Based on the foregoing, the visual resource impacts associated with site characterization surveys and site assessment activities were anticipated to be negligible.

New Information: Current trend forecasts an industry preference for using meteorological buoys over meteorological towers, as demonstrated by SAPs submitted to BOEM by lessees for other leases on the OCS. Additionally, this SEA only considers the installation and operation of meteorological buoys.

Analysis and Conclusion: Although an increased number of meteorological buoys are now anticipated, impacts to visual resources associated with the installation of meteorological tower would not occur because a meteorological tower is no longer anticipated to be used for any site assessments. Impacts of site characterization activities on visual resources is still anticipated to be negligible because the level of survey activity is not anticipated to be substantially different than that anticipated in the 2015 EA (**Section 1**). Therefore, visual resource impacts under Alternative A are anticipated to remain negligible.

4.1.13 Threatened and Endangered Species, Marine Mammals, and Sea Turtles
(Sections 4.4.2.5 and 4.4.2.6 of the 2015 EA)

Background: BOEM completed the 2015 EA based on the best information available at that time for threatened and endangered species and marine mammals. The 2015 EA determined that there could be potential effects to marine mammals from pile driving, loss of water column habitat, prey abundance and distribution effects, and meteorological tower decommissioning. It anticipated that effects from loss of water column habitat, prey abundance and distribution effects, and tower decommissioning would likely result in short-term behavioral changes and these effects were anticipated to be negligible. Effects from pile driving activities were anticipated to be moderate.

Effects on NARWs due to potential increases in vessel strikes—either through funneling NARWs into the traffic separation scheme (TSS) during both site characterization and site assessment activities or from increases in vessel traffic as a result of project-related activities—would be minor to moderate. Based on the short duration of operations and the small footprint of meteorological towers and/or buoys within the Wilmington West WEA, effects caused by fragmentation of the proposed critical habitat for NARWs were anticipated to be negligible to minor

The potential impact-producing factors on sea turtles described in the 2015 EA included noise from pile driving construction, loss of water column habitat, and prey abundance and distribution effects during meteorological tower construction, operation, and decommissioning. The 2015 EA anticipated that effects from loss of water column habitat, prey abundance and distribution effects, construction, operation, and tower decommissioning would result in temporary behavioral changes, these effects were anticipated to be insignificant and discountable, and therefore minor. However, pile driving noise could be detectable by sea turtles at low frequencies; if sea turtles were close enough to the sound source, the potential for injury could exist and the impact would be moderate. BOEM concluded that impacts on sea turtles from site characterization surveys were anticipated to be negligible to minor. Installation of meteorological towers (site assessment) requiring pile driving were anticipated to result in minor to moderate effects on sea turtles. BOEM concluded that there would be no adverse modification to loggerhead sea turtle critical habitat, as there is no overlap between potential lease areas and designated loggerhead sea turtle critical habitat.

New Information: Since completion of the 2015 EA, there is more recent information on marine mammal distribution and abundance (Hayes et al. 2020; Pace 3rd et al. 2021; Pettis et al. 2021; Rolland et al. 2016; Schick et al. 2013), ESA-listed species and associated updates to the list of threatened and endangered species and designated critical habitats (79 FR 39756; 81 FR 20058; 81 FR 62260; 82 FR 16668; 83 FR 2916) that occur or near in the proposed WEA. In addition, the NARW (2017), minke (2018), humpback (2017), and West Indian manatee (2021) are experiencing active unusual mortality events or UMEs (NOAA 2021a). The ESA-listed species and marine mammals in the surrounding proposed lease area and their expected occurrence has been updated in **Table 4-2**. New listings or other changes from the 2015 EA are indicated by an asterisk.

Table 4-2. Threatened and endangered species and marine mammal occurrence in the Wilmington East WEA

Marine Mammals

Common Name	Scientific Name	Status	Seasonal Occurrence in Wilmington East WEA
*North Atlantic Right Whale	*Eubalaena glacialis*	ESA Endangered	Year-round[1]
Fin Whale	*Balaenoptera physalus*	ESA Endangered	Year-round[2]
Sei Whale	*Balaenoptera borealis*	Endangered	Spring[3]
Blue Whale	*Balaenoptera musculus*	Endangered	Unknown, but likely uncommon in WEA
Sperm Whale	*Physeter macrocephalus*	Endangered	Uncommon in WEA
*West Indian Manatee	*Trichechus manatus latirostiris*	Threatened	Summer
*Humpback Whale West Indies DPS	*Megaptera novaeangliae*	MMPA Protected	Likely; fall/winter/spring
Bryde's Whale	*Balaenoptera edeni*	MMPA Protected	Unknown[4]
Minke Whale	*Baleanoptera acutorostrata*	MMPA Protected	Unknown[5]
Harbor Porpoise	*Phocoena*	MMPA Protected	Fall/winter/spring
Short-beaked Common Dolphin	*Delphinus delphis*	MMPA Protected	Winter/spring[6]
Western North Atlantic Bottlenose Dolphin[7]	*Tursiops truncates*	MMPA Protected	Year-round
Atlantic Spotted Dolphin	*Stenella frontalis*	MMPA Protected	Year-round
Risso's Dolphin	*Grampus griseus*	MMPA Protected	Year-round
Long-finned Pilot Whale	*Globicephala melas*	MMPA Protected	Year-round
Short-finned Pilot Whale	*Globicephala macrorhynchus*	MMPA Protected	Year-round
Beaked Whales (various spp.)	*Ziphius and Mesoplodon spp.*	MMPA Protected	Uncommon in WEA
Dwarf and Pygmy Sperm Whales	*Kogia spp.*	MMPA Protected	Uncommon in WEA
False Killer Whale	*(Pseudorca crassidens)*	MMPA Protected	Uncommon in WEA
Harbor Seal	*Phoca vitulina*	MMPA Protected	Fall/winter/spring
*Gray Seal[8]	*Halichoerus grypus atlantica*	MMPA Protected	Uncommon in WEA

Sea Turtles

Common Name	Scientific Name	Status	Seasonal Occurrence in Wilmington East WEA
Loggerhead turtle North Atlantic DPS	*Caretta caretta*	Threatened	Year-round
*Green Turtle North Atlantic DPS	*Chelonia mydas*	Threatened	Year-round
Kemp's Ridley Turtle	*Lepidochelys kempii*	Endangered	Year-round
Leatherback Turtle	*Dermochelys coriacea*	Endangered	Year-round
Hawksbill Sea Turtle	*Eretmochelys imbricata*	Endangered	Year-round, extralimital

Fish

Common Name	Scientific Name	Status	Seasonal Occurrence in Wilmington East WEA
*Giant Manta Ray	*Manta birostris*	Threatened	Year-round
*Oceanic Whitetip Shark	-	Threatened	Year-round
Atlantic Sturgeon Carolina DPS	*Acipenser oxyrinchus oxyrinchus*	Endangered	Year-round

DPS = Distinct Population Segment, MMPA = Marine Mammal Protection Act, WEA = Wind Energy Area

* Denotes a new listing or change from the 2015 EA

[1] Aerial surveys indicate calving and nursing occur as far north as North Carolina (e.g., Good (2008) and McLellan et al. (2004)).

[2] Edwards et al. (2015)found evidence to confirm the presence of fin whales in every season throughout much of the U.S. Exclusive Economic Zone north of 35º N; however, densities vary seasonally.

[3] The seasonal distribution of sei whales is mostly unclear. Please reference Hayes et al. (2021) for the most recent updates, including this inclusion that sei whales are most commonly seen in U.S. waters in the spring (March–May).

[4] There is no discernable seasonal occurrence pattern for Bryde's whale.

[5] Minke whales are typically most abundant in New England waters during the spring-to-fall period. Records based on visual sightings and summarized by Mitchell Jr (1991) hinted at a possible winter distribution in the West Indies, and in the mid-ocean south and east of Bermuda, a suggestion that has been validated by acoustic detections throughout broad ocean areas off the Caribbean from late September through early June (Clark and Gagnon 2002; Risch et al. 2014).

[6] Short-beaked common dolphins are less common south of Cape Hatteras, although schools have been reported as far south as the Georgia/South Carolina border (32º N) (Jefferson et al. 2009). They exhibit seasonal movements, where they are found from Cape Hatteras northeast to Georges Bank (35˚ to 42˚N) during mid-January to May (Cetacean and Turtle Assessment Program 1982; Payne et al. 1984).

[7] There are likely three stocks of bottlenose dolphins that will be present in the proposed impact area and are now specified in the table: Southern Migratory stock (MMPA depleted and strategic), South Carolina Georgia coastal stock (MMPA depleted and strategic), and Offshore stock (MMPA protected). Both the Southern Migratory and South Carolina Georgia Coastal Stock are also managed under the Bottlenose Dolphin Take Reduction Team. A map of the proposed action area with latitude and longitude coordinates is needed to confirm these stocks of bottlenose dolphins are within the proposed WEAs.

[8] As indicated in the draft 2019 Stock Assessment Reports (Hayes et al. 2020), this species has stranding records in North Carolina and should be added for the potential, but low likelihood of occurrence.

New Sound Exposure Guidelines: In 2016 and through a revision published in 2018, NOAA issued guidance for assessing the effects of anthropogenic sounds on marine mammals (NMFS 2018a). The guidance provides thresholds for onset of permanent threshold shift (PTS) and temporary threshold shifts (TTS) in three functional hearing groups for marine mammals and associated sound sources that produce sounds within the hearing range of each of these groups. The guidance is intended to be used by NOAA analysts and managers, other Federal agencies, and other relevant user groups and stakeholders to better predict how a marine mammal's hearing will respond to sound exposure.

New Information on High-Resolution G&G Surveys and NOAA Sound Exposure Guidance: BOEM has obtained new information on the underwater sounds characteristics produced by high-resolution G&G survey equipment (Crocker and Fratantonio 2016) since completion of the 2015 EA. NOAA's guidance contains new information on how to assess the potential for these sounds to cause barotrauma (ear injury) in marine mammals and was published in August 2016 and updated in 2018 (NMFS 2018a). BOEM's analysis of this new information shows that the overall risk of exposing marine mammals to injurious levels of sound is very low for ESA-listed marine mammals and all other species in the proposed area. BOEM also analyzed the potential for behavioral harassment based on the source levels reported by Crocker and Fratantonio (2016) and found the potential impacts to be less than those BOEM had considered in the 2015 EA. Consequently, the new information available shows that the 200-m exclusion zone from high-resolution G&G sound sources is no longer required. Additionally, all previous mitigation and

monitoring conditions for vessel strike avoidance measures; G&G survey requirements; and sturgeon, marine debris, and protected species reporting conditions (Appendix B of the 2015 EA) have been significantly revised since the 2015 EA (**Section 3.6** and **Appendix A**). The revised conditions in **Appendix A** of this SEA replace all conditions for ESA-listed species and marine mammals in the 2015 EA. This new information alters BOEM's analysis from that in the 2015 EA and substantiates the change in mitigation and monitoring conditions. This new information is covered in BOEM's biological assessment (BA) for data collection activities (Baker and Howson 2021).

Analysis and Conclusions: The best available information on sound source characteristics and propagation of sound in the marine environment shows that the distances around a vessel in which impacts could occur is limited to a small area around a vessel. Many sound sources have no potential to adversely affect marine mammals because the sounds produced are either outside of the hearing range of the marine mammal hearing group, or otherwise operate at such levels that no impacts to hearing or behavior are anticipated (Baker and Howson 2021). High-resolution G&G and geotechnical survey impacts are expected to be less than those considered in the 2015 EA with the new information considered and implementation of the new PDCs under the 2021 ESA Consultation. Impacts from underwater noise in marine mammals may include Level A Harassment (i.e., PTS) or Level B Harassment (i.e., behavioral disturbance) as defined by the Marine Mammal Protection Act (MMPA). Studies indicate that the onset of hearing impacts is correlated with the zero-to-peak sound pressure level (SPL) and sound exposure level (SEL), which account for the intensity of the sound and duration of exposure required to elicit hearing impacts in marine mammals. The potential for impact also depends on the type of sound (impulsive; non-impulsive, continuous; and non-impulsive, intermittent). Therefore, the assessment of PTS in marine mammals in this SEA is based on the NMFS (2018a) acoustic guidance, which provides acoustic threshold criteria for the onset of PTS in five marine mammal hearing groups for both impulsive (e.g., sparkers/boomers) and non-impulsive (e.g., CHIRPs) sound types (Table 4-1 of NMFS (2018a)). No otariid pinnipeds are expected to occur in the Wilmington East WEA, so this hearing group was not included in the assessment. These criteria represent the most recent guidance from NMFS.

Considering the new analysis of sound sources, impacts from high-resolution G&G survey sound sources are expected to be minor. Acoustic signals from high-resolution G&G survey equipment are within the hearing range for marine mammals and may cause Level B Harassment (i.e., behavioral disturbance as defined by the MMPA) but not hearing impairment. With implementation of the BOEM PDCs (**Appendix A**), high-resolution G&G surveys are not likely to adversely impact listed species of marine mammals,

For non-ESA-listed marine mammals, the new information on sound sources was also analyzed. The Level B threshold for marine mammals used in this analysis for high-resolution G&G sources is an SPL of 160 decibels (dB) referenced to (re) 1 micropascal (µPa). This threshold is consistent with the previous analysis; however, recent information indicates the directionality of many of these sources can greatly influence the horizontal propagation of sound produced by these activities, which can reduce the distance from the source at which the potential for behavioral disturbance may occur (86 FR 22160; 86 FR 26465; 85 FR 21198). Although the distances may be smaller for some sources, the acoustic signals are still audible for marine mammals, and even with mitigation and monitoring, some of these sources may still exceed the

Level B threshold. Detailed discussions on underwater sound and its importance to marine mammals and their hearing capabilities can be found in the Atlantic G&G Final Programmatic EIS (BOEM 2014). As a result of new information on noise propagation from high-resolution G&G sources, new PDC and BMPs have been developed for the proposed lease sale (**Section 3.6** and **Appendix A**).

In summary, the following conclusions have been reached for geotechnical surveys and G&G surveys:

- Impacts from vessel and equipment noise, including geotechnical sampling (e.g., coring) are expected to be negligible to minor. The potential for adverse impacts under the June 29, 2021, programmatic ESA consultation with NMFS (Anderson 2021) determined that geotechnical surveys would have discountable impacts and are not likely to adversely impact listed species of marine mammals with the vessel strike avoidance requirements for marine mammals. Similarly, vessel strike avoidance conditions apply to non-ESA-listed marine mammals (**Appendix A**). Impact to marine mammals from geotechnical surveys is anticipated to be negligible.
- Impacts from vessel traffic associated with site characterization are expected to be negligible. Vessel separation distances and vessel strike avoidance procedures for marine mammals from the June 29, 2021, programmatic consultation (Anderson 2021) will be used as appropriate. The potential impacts to marine mammals from vessel operations is anticipated to be minor.
- The predominant source of noise during site characterization activities that could affect marine mammals would be high-resolution G&G survey activities. However, the potential for impacts is not equal among high-resolution G&G equipment. Multibeam echosounder and side scan sonar used during site characterization surveys operate at frequencies above 180 kHz, which is outside the general hearing range of marine mammals likely to occur in the WEA and not likely to affect these species. BOEM acknowledges that some commercially available multibeam echosounders and side scan sonars can operate at frequencies below 180 kHz; however, no surveys completed thus far on existing offshore wind leases have used this equipment. The resolution provided from lower frequencies would be unlikely to meet BOEM guidelines, and BOEM expects that lessees would follow BOEM guidelines to meet the geophysical data requirements at 30 CFR §585.610–585.611 and 30 CFR §585.626(a); therefore, surveys using these equipment are unlikely. Parametric sub-bottom profilers (SBPs) operate below 180 kHz, but no impacts are expected to occur during operation of these sources due to the narrow beamwidth (< 5°), which significantly reduces the impact range of the source, while the higher frequencies (≥ 85 kHz) of the source are rapidly attenuated in sea water. Ultra-short baseline (USBL) positioning systems are also unlikely to affect marine mammals. Though they operate under 180 kHz, they have a wide variety of configurations, source levels, and beamwidths and have been shown to produce extremely small acoustic propagation distances in their typical operating configuration (AECOM Technical Services Inc. and HDR Inc. 2020; CSA Ocean Sciences Inc. 2020; Vineyard Wind LLC and Jasco Applied Sciences (USA) Inc. 2020). Additionally, USBLs were not considered for take assessment in the Gulf of Mexico incidental take regulation published on January 19, 2021 (86 FR 5322), and recent incidental take authorizations (ITAs) in the U.S.

Atlantic have indicated that no Level A or B exposures are likely to result from the use of parametric SBPs or USBLs (86 FR 18943, 86 FR 26465, 86 FR 11930). Therefore, only medium-penetration SBPs (e.g., sparkers, boomers) and shallow-penetration, non-parametric SBPs (e.g., Compressed High-Intensity Radiated Pulses [CHIRPs]) were considered in this assessment.

- PDCs and BMPs for listed marine mammals, sea turtles, and non-listed marine mammals are described in **Appendix A**. BOEM concludes that with implementation of the conditions in **Appendix A**, the potential impacts to marine mammals and sea turtles would be negligible to minor. There are no potential impacts to critical habitat and effects would therefore be determined to be insignificant under the ESA. The new information regarding sound sources indicates that the potential for impacts to marine mammals and other species from sounds produced during geophysical surveys is lower than indicated in the 2015 EA. The 2015 EA considered impacts from pile driving associated with meteorological tower construction and found those impacts to be moderate. Meteorological towers have largely been replaced by buoys and, as a consequence, are no longer considered. The issuance of one to three leases versus only one lease in the Wilmington East WEA is anticipated to result in substantially the same impacts because the analyses in the 2015 EA were based on a conservative forecast of reasonably foreseeable activities. BOEM concludes that activities associated with site characterization surveys occurring in the Wilmington East WEA are anticipated to result in negligible or minor impacts to marine species under Alternative A.

The following sections address new information and analysis specific to individual listed species.

North Atlantic Right Whales: The following summarizes new information and current status of NARWs since the 2015 EA. NOAA Fisheries issued a final rule in 2016 to replace the critical habitat for right whales in the North Atlantic with two new areas. The areas designated as critical habitat contain approximately 29,763 nm^2 of marine habitat in the Gulf of Maine and Georges Bank region (Unit 1) and off the Southeast U.S. coast (Unit 2). The new critical habitat areas do not fall within the proposed lease area. Between 1990 and 2015, survival rates appeared relatively stable, but differed between the sexes, with males having higher survivorship than females (males: 0.985 ± 0.0038; females: 0.968 ± 0.0073) leading to a male-biased sex ratio (approximately 1.46 males per female) (Pace 3rd et al. 2017). However, in June 2017, there were 17 confirmed mortalities observed (12 in Canada; 5 in the United States) that triggered the designation of an ongoing Unusual Mortality Event (UME) for NARWs (NOAA 2021a). In 2018, there were three additional confirmed dead stranded NARWs in the United States, and, in 2019, 10 additional confirmed dead stranded right whales (nine in Canada and one in the United States).

Using the methods in Pace 3rd et al. (2017), the 2021 Marine Mammal Stock Assessment Report (Hayes et al. 2021) N_{est} population estimate is 412 (95 percent credible interval range of 403–424) individuals. Prior estimates considered the annual survival rate to be flat across the history of the time series. However, since 2010, annual survival rates have dropped. Therefore, the survival mechanism parameter in the model was adjusted to allow for different survival rates for different years. Using an adjusted regime model, the population estimate has been estimated to be a lower at 368 individuals (356–378) (Pace 2021). The Pace (2021) estimated population size

of 368 is 44 individuals fewer than the previous Marine Mammal Stock Assessment Report (Hayes et al. 2021). In addition to these updated population estimates using new methods that predict a small population size, new marine mammal density estimates are also available which are valuable to assess the potential seasonal occurrence of NARWs in the proposed lease area. In 2020, the Duke University Marine Geospatial Ecological Laboratory published updated density models for NARWs in the Atlantic (Roberts et al. 2020; 2021), which will result in a full suite of final density models for all extant marine mammal species beginning in 2022. Although this information is being revised for the Atlantic, it is expected that NARWs may potentially occur year-round, but their overall monthly seasonal densities are anticipated to be low.

Mid-Atlantic waters offshore North Carolina are an important migratory corridor for NARWs, connecting feeding and mating areas offshore the northeastern U.S. with calving habitat offshore the southeastern U.S. BOEM has previously received comments from NOAA that any activities within any potential future lease area should not obstruct whale migration, cause serious injury or mortality to whales, or displace whales into shipping lanes. Since the 2015 EA, critical habitat was designated for NARWs in 2016. As a result, a small portion of the Wilmington East WEA as described in the 2015 EA was within southern calving habitat (Unit 2) designated as critical habitat for NARWs (81 FR 4838 2016; 50 CFR §226.203). This portion of the Wilmington East WEA has been removed from consideration for leasing and is not discussed further.

Analysis and Conclusion: Although the population size of NARWs continues to be a concern for the recovery of the species, the activities under Alternative A are anticipated to have minor effects with the proposed PDCs and BMPs in place (**Appendix A**).

Humpback Whales: Since the 2015 EA, NMFS has divided the globally listed endangered humpback whale species into 14 Distinct Population Segments (DPSs), removed the species-level listing, and re-evaluated the listing status of each DPS. The humpback whale DPS occurring in the action area belong to the West Indies DPS, which was determined not to warrant listing. This final rule was effective on October 11, 2016 (81 FR 62260). The change in listing status itself does not result in different environmental effects. Humpback whales are susceptible to entanglement and entrapment in fishery survey gear. Fishery surveys were neither considered in the 2015 EA nor in the consultation under the Endangered Species Act; they were also not a part of this Proposed Action. If fishery surveys are required at a later date, such as at the COP stage, the potential for impacts would be evaluated at that time.

Analysis and Conclusions: High-resolution G&G and geotechnical survey impacts are expected to be less than those evaluated in the 2015 EA. Since 2015, additional analysis of the high-resolution G&G sound producing equipment typically used in the offshore wind industry has provided new information on the area of effect for many high-resolution G&G sound sources, which is smaller than previously believed (Crocker and Fratantonio 2016). In addition, implementation of new PDCs—as a result of the 2021 Data Collection Consultation under the Endangered Species Act—is anticipated to further reduce risk to large whales. These criteria are designed to minimize the likelihood of adverse effects associated with potential disturbance to discountable levels through the establishment of pre-clearance, exclusion zones, shutdowns, Protected Species Observer monitoring, and other BMPs to avoid and reduce exposure of ESA-listed species and other large whales to underwater survey noise. Impacts to humpback whales under Alternative A are anticipated to be minor.

Green Sea Turtles: On April 6, 2016, NMFS designated 11 DPSs of green sea turtles as threatened or endangered (80 FR 20057). A single DPS in the Atlantic is now designated as the threatened North Atlantic DPS of green sea turtles. Although the DPS designation occurred after the 2015 EA, the DPS designation for green turtles does not present any new information that would change BOEM's impact assessment in the 2015 EA. The potential effects to the North Atlantic DPS are not different from those determined by BOEM for the previously listed global population of green sea turtles. The change in listing of the green sea turtle population itself does not result in significantly different environmental effects. However, all sea turtle species are also susceptible to entanglement and entrapment in fishery survey gear, which are not covered in the 2015 EA nor under a consultation under the ESA. Fishery surveys are not anticipated as a part of the Proposed Action; however, if fishery surveys are required at a later time, such as at the COP stage, additional analysis and consultation would occur.

Analysis and Conclusions: High-resolution G&G and geotechnical survey impacts are expected to be less with implementation of the new PDCs under the ESA than were previously considered. Impacts to green sea turtles under Alternative A are anticipated to be minor.

Atlantic Sturgeon: On August 17, 2017, NMFS designated critical habitat for Atlantic sturgeon effective beginning on September 18, 2017 (82 FR 39160). Rivers and their estuaries are designated, but no marine habitat is designated. Designated rivers near the proposed lease areas are designated for the Carolina Distinct Population Segment. The Proposed Action could potentially affect Atlantic sturgeon critical habitat if future high-resolution G&G or geotechnical surveys for cable routes were to occur in these rivers. Additionally, sturgeon may also be susceptible to entanglement and entrapment in fishery survey gear, but fishery surveys are not anticipated as part of the Proposed Action.

Analysis and Conclusion: Impacts to Atlantic sturgeon under Alternative A are anticipated to be minor.

Giant Manta Rays: New species have been listed under the ESA since information on the call areas was last requested. In 2018, NOAA Fisheries listed giant manta rays as threatened under the ESA (83 FR 2916). Giant manta rays are included in the new 2021 consultation. Notably, giant manta rays may also be susceptible to entanglement and entrapment in fishery survey gear, but fishery surveys are not part of the Proposed Action.

Analysis and Conclusion: Impacts to giant manta rays under Alternative A are anticipated to be minor.

4.1.14 Updates to BOEM SOCs
(Appendix B, 2015 EA)

Background: The 2015 EA concluded that the SOCs (Appendix B of the 2015 EA) would minimize or eliminate potential impacts to marine mammals and sea turtles. These SOCs resulted from BOEM's ESA consultation with NMFS (see Section 5.2.1 of the 2015 EA and **Section 3.6** of this EA). These conditions include vessel strike avoidance and marine debris awareness measures; protected species observers; exclusion and monitoring zones; sound source

verification, ramp-up, soft start, and shutdown procedures; visibility, seasonal, and frequency-dependent restrictions for various activities, as well as multiple reporting requirements.

New Information: Since that consultation, new information is available on high-resolution G&G survey sound sources, and NOAA has updated sound exposure analysis guidance. As a result, The SOCs have been updated (**Appendix A**) with the mitigation measures (PDCs) developed with NMFS during the 2021 consultation, which covered site assessment and characterization activities associated with data collection in the Wilmington East WEA.[7] The consultation included the placement and removal of meteorological buoys and geophysical and geotechnical surveys.

Analysis and Conclusion: The consultation resulted in an informal conference opinion that with PDCs and BMPs in place, effects to ESA-listed marine mammals and sea turtles resulting from the survey activities under Alternative A would be insignificant and not result in harassment. BOEM has developed additional BMPs for non-listed marine mammals that are based on this new information and are intended to reduce impacts.

4.2 Alternative C

Alternative C expands the existing seasonal pile driving restriction to also include site characterization activities (surveys). This alternative would limit vessel activity by excluding high-resolution G&G surveys during peak migration of NARWs. The period of peak migration NARWs is November 1 through April 30. Vessel traffic not associated with high-resolution G&G surveys (e.g., biological surveys, such as avian, bat, marine mammal, and sea turtle surveys) would not be restricted.

4.2.1 Benthic Resources
(Section 4.6.3.3 of the 2015 EA)

Effects on benthic communities under Alternative C would be similar to the impacts described for Alternative A (**Section 4.1.1**), which are anticipated to be negligible. Alternative C includes seasonal restrictions on high-resolution G&G surveys during peak migration of NARWs. However, seasonal restrictions on surveys would not change the extent of potential impacts on benthic communities compared to Alternative A because the number of meteorological buoys would be the same and seafloor disturbance would be similar. With implementation of the BOEM standard policy to avoid impacts on sensitive benthic resources and because benthic communities typically recover within 1 to 3 years, impacts on benthic communities under Alternative C are anticipated to be negligible to minor

4.2.2 Finfish and EFH
(Section 4.6.3.7 of the 2015 EA)

Effects on fish and fish habitat under Alternative C would be similar to the impacts described for Alternative A (**Section 4.1.2**), which are anticipated to be negligible. Alternative C would limit

[7] https://www.boem.gov/renewable-energy/nmfs-esa-consultations

vessel activity by excluding high-resolution G&G surveys during peak migration of NARWs (November 1 through April 30), leading to the potential of increased concentration of vessel-based survey activities from May 1 through October 31. No impacts to finfish or EFH are expected as a result of the potential increase in vessel activity during the peak NARW migration period. Impacts to finfish and EFH would be similar to those described for Alternative A. Therefore, impacts on finfish and EFH under Alternative C are anticipated to be negligible to minor.

4.2.3 Commercial and Recreational Fisheries

(Section 4.6.5.5 of the 2015 EA)

Effects on commercial and recreational fisheries under Alternative C would entail similar types and amounts of activities as Alternative A (Section 4.1.3), but under Alternative C, vessel traffic would be limited between November 1 and April 30. This limit would likely concentrate traffic during the remaining 6 months of the year. Impacts on commercial and recreational fisheries would likely increase relative to those of Alternative A (**Section 4.1.3**). However, Alternative C would likely have a similar amount of vessel traffic and similar impacts as described for Alternative A because of the relatively low number of vessel round trips associated with the proposed activities, because the offshore area associated with Alternative C is the same size as that of Alternative A, and because the same number of meteorological buoys would be used. Therefore, impacts on commercial and recreational fisheries under Alternative C are anticipated to still have negligible to slight reduction of impacts.

4.2.4 Birds and Bats

(Sections 4.6.3.1 and 4.6.3.2 of the 2015 EA)

Effects on birds under Alternative C would be similar to the impacts described for Alternative A (**Section 4.1.4**), which are anticipated to be minor and negligible. While all alternatives include seasonal restrictions on pile driving due to concerns about impacts on NARWs, Alternative C expands these restrictions to include all offshore activities. This includes high-resolution G&G surveys during peak migration of NARWs. These seasonal restrictions would only allow surveys to occur from May through October, which could result in decreased impacts on bird species that migrate between November and April. Some birds can migrate during the summer months, and the impacts on these birds would be no greater than what is described for Alternative A, which are anticipated to be negligible. Therefore, impacts to birds under Alternative C are anticipated to be negligible.

Effects on bats under Alternative C would be similar to the impacts described for Alternative A (**Section 4.1.4**), which are negligible. Alternative C includes seasonal restrictions on high-resolution G&G surveys during peak migration of NARWs. These seasonal restrictions would cause surveys to occur between May and October; however, the presence of bats would still be marginal in the WEAs, and the impacts would be similar to what is described for Alternative A. Therefore, impacts on bats under Alternative C are anticipated to be negligible.

4.2.5 Air Quality

(Section 4.6.1 of the 2015 EA)

Effects on air quality under Alternative C would entail the same types and amounts of activities as Alternative A (**Section 4.1.5**), but a portion of the activity would shift seasonally from the winter months to the remainder of the year. The total annual emissions and any effects on air quality would be the same on an annual basis for Alternative C as for Alternative A. However, because Alternative C would shift some emissions from the winter months to the remainder of the year, the maximum short-term (24 hours or fewer) concentrations of air pollutants could be slightly higher in the warmer seasons with Alternative C than with Alternative A. Any increased air quality effects during the warmer seasons are expected to be negligible. Therefore, air quality effects under Alternative C would be similar to effects under Alternative A and are anticipated to be negligible.

4.2.6 Water Quality

(Section 4.6.2 of the 2015 EA)

Effects on water quality under Alternative C would be similar to the impacts described under Alternative A (**Section 4.1.6**), but Alternative C requires all activities to occur between May and October. Because the offshore area associated with Alternative C is the same size as Alternative A and the same number of meteorological buoys would be used, Alternative C would have similar water quality impacts as described for Alternative A. Therefore, impacts to water quality under Alternative C are anticipated to be minor.

4.2.7 Land Use and Coastal Infrastructure

(Section 4.6.4 of the 2015 EA)

Effects on land use and coastal infrastructure under Alternative C would be similar to the impacts described under Alternative A (**Section 4.1.7**), but Alternative C requires all activities to occur between May and October. Alternative C would not change the effects to land use and coastal infrastructure, as no additional upland or coastal infrastructure would be required for site characterization activities. Impacts on coastal infrastructure under Alternative A are anticipated to be negligible. Therefore, impacts on coastal infrastructure under Alternative C are also anticipated to be negligible.

4.2.8 Demographics and Employment & Environmental Justice

(Sections 4.6.5.2 and 4.6.5.3 of the 2015 EA)

Effects on demographics and employment under Alternative C would be similar to the impacts described under Alternative A (**Section 4.1.8**), but Alternative C would limit vessel traffic during the period between November 1 and April 30. Demographic and employment impacts on port areas would most likely be concentrated during the remaining 6 months of the year. Peak employment derived from site characterization surveys and site assessment activities would be higher than under Alternative A (**Section 4.1.8**). However, because of the small number of vessel round trips relative to current navigation, demographic and employment impacts are anticipated to remain negligible to minor.

Because no high and adverse human health or environmental effects were identified in this SEA from the alternatives analyzed, no disproportionately high and adverse human health or environmental effects under Alternative C are expected.

4.2.9 Tourism and Recreation

(Section 4.6.5.4 of the 2015 EA)

Effects on tourism and recreation under Alternative C would entail similar types and amounts of activities as Alternative A (**Section 4.1.9**), but Alternative C would limit vessel traffic during the period between November 1 and April 30. The potential generation of trash and debris and accidental diesel spills would likely be concentrated during the remaining 6 months of the year. This would coincide with the period of summer recreational use of coastal areas. However, because the expected generation of trash and debris would remain small, as would the harm done by accidental diesel spills, impacts on recreation and tourism under Alternative C are anticipated to be negligible to minor.

4.2.10 Navigation and Vessel Traffic

(Section 4.6.4.2 of the 2015 EA)

Effects on navigation and vessel traffic under Alternative C would entail similar types and amounts of activities as Alternative A (**Section 4.1.10**), but Alternative C would limit vessel traffic between November 1 and April 30. This would likely concentrate traffic during the remaining 6 months of the year. Impacts on navigation and vessel traffic would likely increase relative to those of Alternative A (**Section 4.1.10**). However, Alternative C would have the same amount of vessel traffic and the same impacts described under Alternative A because of the relatively low number of vessel round trips associated with the proposed activities, because the offshore area associated with Alternative C is the same size as that of Alternative A, and because the same number of meteorological buoys would be used. Therefore, impacts on navigation and vessel traffic under Alternative C are anticipated to be minor.

4.2.11 Cultural, Historical, and Archaeological Resources

(Section 4.6.5.1 of the 2015 EA)

Effects on cultural, historical, and archaeological resources from Alternative C would be similar to the impacts described under Alternative A (**Section 4.1.11**). However, under Alternative C, all activities would be required to occur between May and October. Timing of activities would not change the determination of impacts. Therefore, impacts on cultural and historic resources under Alternative C are anticipated to be negligible.

4.2.12 Visual Resources

(Section 4.6.5.6 of the 2015 EA)

Effects on visual resources under Alternative C would be similar to the impacts described under Alternative A (**Section 4.1.12**). However, under Alternative C, all activities would be required to occur between May and October. Timing of activities would not change the outcome of the visual analysis or determination of impacts. Therefore, visual effects under Alternative C would be similar to effects under Alternative A (**Section 4.1.12**) and are anticipated to be negligible.

4.2.13 Threatened and Endangered Species, Marine Mammals, and Sea Turtles

(Sections 4.6.3.5 and 4.6.3.6 of the 2015 EA)

Effects on marine mammals from Alternative C would be similar to the impacts described for Alternative A (**Section 4.1.13**), which would be negligible to minor. Alternative C includes seasonal restrictions on high-resolution G&G surveys during peak migration of NARWs. These seasonal restrictions would allow survey activities to occur only between May and October, which would result in decreased underwater noise and potential vessel strike impacts on NARWs and other marine mammals compared to Alternatives A. However, in general, the effects of survey activities on NARWs are anticipated to be negligible to minor. Therefore, effects on NARWs under Alternative C would remain negligible to minor. In addition to the site characterization seasonal restrictions, all SOCs for marine mammals (described in **Appendix A**) would be implemented under Alternative C.

Because Alternative C would construct the same number of meteorological buoys as the Proposed Action (Alternative A), effects on proposed NARWs critical habitat under Alternative C are anticipated to be similar, at negligible to minor levels.

Effects on sea turtles under Alternative C for site characterization activities would be similar to the impacts described for Alternative A (**Section 4.1.13**), which would be negligible to minor. Alternative C includes seasonal restrictions, which would allow high-resolution G&G surveys to occur only between May and October. These seasonal restrictions would result in decreased underwater noise and potential vessel strike impacts on sea turtles compared to Alternative A. However, although the effects of survey activities on sea turtles are anticipated to be generally minor, this survey season would be focused during sea turtle nesting season. In addition to the site characterization seasonal restrictions, all SOCs for marine mammals and sea turtles described in **Appendix A** would be implemented under Alternative C and would help to reduce potential effects on sea turtles.

4.3 Alternative D – No Action

Under the No Action Alternative, no wind energy leases would be issued, and no site assessment activities would be approved within the Wilmington East WEA offshore North Carolina. This would eliminate or at least postpone vessel traffic associated with site assessment (construction and operation of meteorological buoys). Site characterization surveys are not under BOEM's jurisdiction and could still be conducted; however, these activities would not be likely to occur without the possibility of a commercial energy lease.

4.3.1 Air Quality

(Section 4.7.1 of the 2015 EA)

Under Alternative D, there would be no activity that requires emission-producing vehicles, such as vessels associated with installation and operation of meteorological buoys; therefore, there would be no effects on air quality under Alternative D.

4.3.2 Water Quality
(Section 4.7.2 of the 2015 EA)

Under Alternative D, there would be no activity that could affect water quality, such as vessels or construction equipment that can result in turbidity, fuel, or waste discharges, associated with installation and operation of meteorological buoys; therefore, there would be no effects on water quality under Alternative D.

4.3.3 Land Use and Coastal Infrastructure
(Section 4.7.4 of the 2015 EA)

There would be no impacts on coastal infrastructure and land use under Alternative D because no use of land-based features would occur. Additionally, there would be no impacts on vessel traffic because no temporary increase in vessels in the WEA would occur under the No Action Alternative.

4.3.4 Socioeconomic Resources
(Section 4.7.5 of the 2015 EA)

Under Alternative D, there would be no impacts on cultural or historic resources because no activities with potential to encounter or disturb these resources would occur. There would be no effects on visual resources under the No Action Alternative because no structures would be installed, and no activities would occur.

Under Alternative D, there would be no added employment around onshore support areas for site characterization surveys and site assessment activities. Under Alternative D, there would be no high and adverse human health or environmental impacts associated with site characterization surveys or site assessment activities. There would be no impacts on tourism and recreation from generation of trash and debris or diesel fuel spills associated with site characterization surveys or site assessment activities. The No Action Alternative would not result in any impacts on commercial or recreational fisheries associated with site characterization surveys or site assessment activities.

4.3.5 Biological Resources
(Section 4.7.3 of the 2015 EA)

Under Alternative D, there would be no activity associated with site assessment activities or installation and operation of meteorological buoys. Biological surveys that may be conducted under Alternatives A or C would also not occur and would preclude collection of data related to bats, birds, and other marine species that could be used to assist in future analyses of offshore activities. Although this data may be useful for future offshore activities and for developing additional avoidance and minimization measures, as well as gaining a better understanding of habitat utilization in the area overall, there would be no effects on biological resources under Alternative D.

4.4 Cumulative Impacts

(Section 4.8 of the 2015 EA)

Background: Cumulative impacts are the incremental effects of a proposed action on the environment when added to other past, present, or reasonably foreseeable future actions taking place within the region of the WEA, regardless of which agency or person undertakes the actions (see 40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a given period. The 2015 EA identified potential cumulative impacts over the 5-year life of the proposed action (2015–2020), focusing on the incremental contribution of the proposed action to other current and reasonably foreseeable future actions. The 2015 EA concluded that the proposed action was anticipated to not result in a substantive incremental contribution to cumulative effects on any resources discussed in the 2015 EA.

New Information: The 5-year life of the Proposed Action considered in this SEA is 2022–2027. The three meteorological towers in the Kitty Hawk, Wilmington West, and Wilmington East WEAs considered in the 2015 EA are no longer anticipated. While the level of site characterization activity associated with an individual WEA is not anticipated to be substantially different, the majority of the Kitty Hawk WEA surveys are completed, and it is unlikely that Wilmington West WEA surveys would occur in 2022–2027, because BOEM is not considering leasing the Wilmington West WEA at this time. Therefore, the majority of the Wilmington East WEA surveys are not anticipated to occur concurrently with other surveys in the area as was anticipated in the 2015 EA.

Since the 2015 EA was published, two COPs have been submitted to BOEM proposing commercial wind energy facilities in the Kitty Hawk and Virginia WEAs. If approved, construction could overlap later years of the 5-year period analyzed in this SEA. BOEM is preparing EISs to consider the reasonably foreseeable impacts of approving these COPs. Based on previous EISs for proposed commercial wind energy facilities, there could be major impacts for some resources even without considering the incremental effect of impacts resulting from the Proposed Action.

Analysis and Conclusion: The incremental effects on cumulative impacts resulting from the Proposed Action would be reduced when compared to the 2015 EA because there is less concurrent activity, and the Proposed Action does not consider the installation of meteorological buoys. Therefore, the Proposed Action analyzed in this SEA will not result in a substantial contribution to the cumulative effects on any resources.

5 CONSULTATIONS AND COORDINATION

5.1 Public Involvement

As described in Section 5.1 of the 2015 EA, there has been extensive public involvement and notification throughout the environmental review of lease issuance of the North Carolina areas. Consistent with 40 CFR 1501.5(e), BOEM solicited comment on the Notice of Intent (NOI) to prepare the 2015 EA (December 13, 2012, 77 FR 74218) and held two public information meetings in January 2013 in Nags Head and Wilmington, NC. On January 23, 2015, BOEM notified the public of the availability of the 2015 EA (80 FR 3621), which considered the reasonably foreseeable environmental consequences associated with leasing, site characterization, and site assessment. In particular, the 2015 EA analyzed the environmental and socioeconomic impacts of surveys (including shallow hazards, geological, geotechnical, archaeological, and biological), the installation, operation, and decommissioning of meteorological towers and/or buoys, vessel traffic, and onshore activities. During this 30-day comment period, BOEM provided an opportunity for public input (i.e., suggesting new issues or contributing information with regard to potential environmental effects) and held three in-person public meetings to provide an overview of the 2015 EA findings and solicit public comments. These meetings were held during the week of February 9, 2015, in Kitty Hawk, Wilmington, and Carolina Shores, NC. On September 17, 2015, BOEM notified the public of the availability of the Revised 2015 EA and FONSI (80 FR 56494).[8]

On July 21, 2021, BOEM held the Regional Carolina Long Bay Intergovernmental Renewable Energy Task Force meeting that outlined the basic principles and major decision points BOEM is considering for offshore renewable energy leasing in the Carolina Long Bay area. BOEM also updated task force members on recent planning activities. The meeting also allowed for discussion with Federal, tribal, state, and local government officials, as well as an opportunity for the public to provide comments.

5.1.1 Note to Stakeholders

On August 13, 2021, in response to an internal review of the 2015 EA and the comments provided at the Regional Carolina Long Bay Intergovernmental Renewable Energy Task Force meeting, BOEM announced the preparation of this SEA and provided an opportunity for public input (i.e., suggesting new issues or contributing information with regard to potential environmental effects). A total of 24 comments were received during the 30-day comment period. Many of the commenters—including the Environmental Protection Agency (EPA), the Southern Environmental Law Center (SELC), the NMFS, Oceana, and the Marine Mammal Commission—raised concerns about the Proposed Action's proximity to the newly designated NARW critical habitat, possible vessel strikes, shifting seasonality of NARWs, effects on new listed species, effects on migratory species, and the importance of including monitoring plans. Other issues identified to be analyzed included the following:

[8] https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NC/NC-EA-Camera-FONSI.pdf

- Analysis of the potential harmful effects of wind power generation on birds and other fauna that depend upon the offshore ecosystem
- Incorporating mitigation efforts in a lease agreement
- Setting vessel speed restrictions
- Analysis of the potential conflict with the Coast Guard's proposed Atlantic Coast Fairway
- Engaging the local communities
- Defining BMPs throughout the regulatory process
- Enhancing the data collection for future offshore wind energy facility siting

Two alternatives were requested during scoping. The first was the exclusion of lease blocks within the NARW critical habitat. As stated in **Section 1.2** of this SEA, portions of the Wilmington WEA overlapping the NARW critical habitat were removed from leasing consideration in the PSN. Therefore, such an alternative is not applicable and not analyzed further in this SEA. The second was the removal of lease blocks within 24 nm of North Carolina's shores due to concerns over visual impacts from offshore wind turbines, which is outside the scope of this SEA. Of the action alternatives analyzed in this SEA, the Proposed Action is anticipated to have the greatest environmental consequences associated with site characterization and assessment activities. This removal would not result in meaningful differences in impacts from site characterization and assessment activities to the various resources analyzed. In addition, BOEM can elect to lease fewer and/or smaller areas. Therefore, this alternative was also not analyzed further in this SEA.

The comments can be viewed at http://regulations.gov by searching for docket ID BOEM-2021-0055. These comments were considered in the preparation of this SEA. BOEM will consider comments received on this Draft SEA during development of the Final SEA.

As with the 2015 EA, BOEM makes this SEA available for public review on its website at https://www.boem.gov/renewable-energy/state-activities/north-carolina-activities. In addition, BOEM will notify interested stakeholders through email of the SEA's availability pursuant to 40 CFR 1506.6(b)(3).

5.2 Consultations

5.2.1 Endangered Species Act

5.2.1.1 U.S. Fish and Wildlife Service

In June 2013, BOEM submitted a species list to the USFWS and NMFS in anticipation of preparation of a BA and Section 7 consultation for proposed activities not covered in the NMFS G&G biological opinion in areas on the Atlantic OCS offshore North Carolina, South Carolina, and Georgia. In February 2014, BOEM submitted the BA to the USFWS and initiated consultation for the following activities: 1) issuing renewable energy leases; 2) associated site characterization activities that lessees may undertake on those leases (e.g., geophysical, geotechnical, archaeological, and biological surveys); and 3) the subsequent approval of site assessment activities on the leaseholds (e.g., installation, operation, and decommissioning of meteorological towers and buoys).

On March 17, 2014, the USFWS concurred with BOEM's findings in the BA that commercial wind lease issuance and site assessment activities on the Atlantic OCS offshore North Carolina, South Carolina, and Georgia may affect, but will not likely adversely affect, the Bermuda petrel, black-capped petrel, Kirtland's warbler, roseate tern, piping plover, and red knot (which has since been listed as threatened by the USFWS [FR 73706-73748, December 11, 2014]). For the West Indian manatee and piping plover critical habitat, the USFWS concurred with BOEM's determination of no effect. The USFWS determination covered a total of 352 whole and 156 partial OCS lease blocks (totaling 960,288 hectares). The area covered more than the ~55.5 OCS lease blocks covered in the 2015 EA. This SEA covers an even smaller area (~20 lease blocks, or less than 1/10 the area covered in the consultation); therefore, the level of effects caused by the activities described in the SEA are anticipated to be much lower than the level of effects covered in the consultation.

The red knot was listed as threatened in December 2014 (79 FR 79706); however, the red knot was already covered in BOEM's consultation with the USFWS back in March 2014. In addition, the USFWS removed the Kirtland's warbler from the Federal List of Endangered and Threatened Wildlife due to recovery in 2019 (84 FR 54436). In response to BOEM's notice to prepare this SEA, the USFWS met with BOEM on August 2, 2021, and also provided written scoping comments on September 7, 2021. In its letter, the USFWS recommended deploying acoustic detectors and Motus Wildlife Tracking System receivers during site assessment to collect data on pre-construction bird and bat presence within the WEA.

Based on the analysis of proposed activities in this SEA (e.g., leasing, characterization surveys, installation and decommission of buoys) and based on the information described above, reinitiation of ESA consultation with the USFWS is not required.

5.2.1.2 NMFS

Consultation under Section 7 of the ESA on the potential impacts of leasing activities concluded with the issuance of a biological opinion, the *Programmatic Geological and Geophysical Activities in the Mid and South Atlantic Planning Areas from 2013 to 2020* on July 19, 2013 (NMFS 2013). This biological opinion prepared by NMFS considered site characterization and site assessment activities that may occur as a result of (1) BOEM's own planning and analysis; (2) unsolicited lease application to actualize plans for a renewable energy facility; (3) request for approval of a SAP to construct a meteorological tower or install meteorological buoys on the leasehold; (4) request for approval of a COP which details the construction and operation of a wind energy facility on the lease; and (5) request for approval of a General Activities Plan (GAP) for rights-of-way (ROW) for installation of electrical cable in the seabed or for substations supporting an OCS wind energy facility on unleased OCS land or across land leased to a third party.

The 2013 biological opinion in effect at the time of the 2015 EA expired in 2020. On October 24, 2018, BOEM requested reinitiation of consultation on offshore wind data collection activities in the Atlantic OCS, including the activities considered in this SEA. The new consultation concluded with a Letter of Concurrence (LoC) from NMFS on June 29, 2021 (Anderson 2021). NMFS conclude that with implementation of the PDCs and BMPs (**Appendix A**), data collection activities covered in the consultation may affect, but are not likely to adversely affect, listed

species or designated critical habitat. The PDCs and BMPs in **Appendix A** will be required conditions of any leases that may be issued as a result of the proposed lease sale in this SEA. No adverse impacts to critical habitat are anticipated.

5.2.2 Magnuson-Stevens Fishery Conservation and Management Act

Pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (Public Law 94-265), Federal agencies are required to consult with NMFS on any action that may result in adverse effects on EFH. NMFS regulations implementing the EFH provisions of the MSA can be found at 50 CFR 600. Certain OCS activities authorized by BOEM may result in adverse effects on EFH and, therefore, require consultation with NMFS.

On January 17, 2013, NMFS SERO reviewed BOEM's NOI, dated December 13, 2012, regarding the preparation of the 2015 EA for consideration of potential wind energy leases offshore of North Carolina, including Wilmington East. NMFS stated in their comments regarding the MSA, their responsibilities as stewards of living marine resources, and their concerns for potential impacts on hardbottom habitat in the WEA. BOEM submitted the EFH assessment included in the 2015 EA to NMFS on February 5, 2015. NMFS responded on February 23, 2015, that it had no additional comments regarding BOEM's EFH assessment.

On February 7, 2020, BOEM requested additional information pertaining to NOAA trust resources within the Carolina Long Bay area, which includes the Wilmington East WEA. NMFS SERO responded (dated May 1, 2020) that the Mid-Atlantic Fishery Management Council, South Atlantic Fishery Management Council, and NMFS' Atlantic Highly Migratory Species Management Division have designated a variety of habitat types within the Carolina Long Bay leasing area as EFH. Habitat types include, depending upon species and life stage, the water column (e.g., Charleston Gyre, Gulf Stream), abiotic substrates (e.g., sandy shoals, hard bottom) and biotic features (e.g., floating seaweed, corals). Additionally, NMFS raised further concern for the possibility of unidentified hardbottom habitat occurring within the lease block.

More recently, on September 15, 2021, NMFS SERO, reviewed BOEM's notice (BOEM-2021-0055) to prepare this SEA to consider additional wind leasing options offshore of North and South Carolina, as well as the lease sale of the Wilmington East WEA. NMFS' response reiterated the comments received on May 1, 2020, with the following additions for EFH: NMFS encourages BOEM to consult the updated version of the *User's Guide to Essential Fish Habitat Designations by the South Atlantic Fishery Management Council.* NMFS expanded their concern for the possibility of unidentified habitat types in the lease blocks to include ledges, mixed hardbottom/sand, and pavement habitats that occur in the Wilmington East WEA.

NMFS determined that the proposed action of the 2015 EA would not significantly affect the quality and quantity of EFH in the action area. At that time, one meteorological tower and two meteorological buoys were proposed to be installed. An increased number of meteorological buoys are now anticipated as proposed in the SEA; however, the construction of a meteorological tower has been removed. This SEA now anticipates a smaller benthic footprint than what was proposed in the 2015 EA. As such, additional consultation with NMFS is not warranted, as the expected impacts on EFH remain negligible to minor. The availability of benthic data (Taylor et al. 2016) and additional surveys prior to the deployment of

meteorological buoys would reduce the likelihood of significant impacts to hardbottom, sand, and pavement habitats. Additionally, per the conservation recommendations from NMFS in 2015, BOEM intends to review a SAP for the areas considered in this SEA in coordination with NMFS to ensure it is within the scope of the assessed impacts.

5.2.3 Coastal Zone Management Act

The Coastal Zone Management Act requires that Federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone be "consistent to the maximum extent practicable" with relevant enforceable policies of a state's federally approved coastal management program (15 CFR 930, Subpart C). If an activity will have direct, indirect, or cumulative effects, the activity is subject to a Federal consistency determination (CD). On August 11, 2016, BOEM sent a CD to the state of North Carolina and the Commonwealth of Virginia. This CD covered the reasonably foreseeable coastal effects of site assessment and site characterization activities in the Kitty Hawk WEA. In October 2016, the state of North Carolina and Commonwealth of Virginia concurred with BOEM's finding that the proposed activities are consistent, to the maximum extent practicable, with states' federally approved coastal management programs. Since the 2016 CD did not cover the Wilmington East WEA, BOEM will perform a consistency review and prepare a CD for the states of North Carolina and South Carolina covering the reasonably foreseeable coastal effects of site assessment and site characterization activities in the Wilmington East WEA.

BOEM has determined that North Carolina and South Carolina share common coastal management issues and have similar enforceable policies as identified by their respective coastal zone management plans. Given the proximity of the Wilmington East WEA to each state, the similarity of the reasonably foreseeable activities for the Wilmington East WEA, and the similarity of impacts on environmental and socioeconomic resources and uses within each state, BOEM will prepare a single CD under 15 CFR 930.36(a) to determine whether issuing leases and approving site assessment activities (including the installation, operation, and decommissioning of meteorological buoys) in the Wilmington East WEA offshore North Carolina is consistent to the maximum extent practicable with the provisions identified as enforceable by the coastal zone management plans of North Carolina and South Carolina.

The 2015 EA and this SEA provide the comprehensive data and information required under 30 CFR 939.39 to support BOEM's CD. When the states receive the CD, they will have 60 days to review it. Additionally, the states have 14 days after receiving the CD to identify any missing information required by 30 CFR 930.39(a) and notify BOEM.

5.2.4 National Historic Preservation Act

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 (ACHP) an opportunity to comment. BOEM has determined that its issuance of commercial leases and approval of SAPs constitute undertakings subject to Section 106 review. These undertakings have the potential to cause effects on historic properties insofar as these actions may lead to lessees conducting geotechnical testing and installing and operating site assessment facilities (e.g., meteorological buoys).

BOEM executed a Programmatic Agreement 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 North Carolina. BOEM developed this agreement for two primary reasons: (1) BOEM's decisions to issue leases and approve SAPs, COPs, or other plans are complex and multiple; and (2) BOEM did not have the results of archaeological surveys prior to the issuance of leases and, as such, decided to conduct historic property identification and evaluation efforts in phases (36 CFR 800.4(b)(2)). The Programmatic Agreement establishes the process to determine and document the APE for each undertaking; to identify historic properties within the APE; and to assess potential adverse effects. If any of the undertakings result in a finding of adverse effect, the Programmatic Agreement requires BOEM to resolve the adverse effect pursuant to 36 CFR 800.6 of the Section 106 regulations.

In September 2014, BOEM initiated Section 106 consultation for the undertaking of issuing commercial leases within the North Carolina WEAs through letters of invitation to the North Carolina SHPO and ACHP as signatories to the agreement, as well as to the South Carolina SHPO and the Catawba Indian Nation. BOEM additionally contacted representatives of local governments, historic preservation groups, state-recognized tribes, and other Federal agencies to solicit information on historic properties that could potentially be affected by the undertaking and to determine their interest in participating as a consulting party (see Table 5-1 in the 2015 EA document).

In May 2015, BOEM made a Finding of No Historic Properties Affected for the undertaking of issuing commercial leases within the North Carolina WEAs (Finding). The Finding is based on the review conducted by BOEM of existing and available information, consultation with interested and affected parties, and the conclusions drawn from this information. The required identification and avoidance measures that will be included in commercial leases issued within the North Carolina WEAs will ensure that the proposed undertaking will not affect historic properties (see Section 4.4.4.1 of the 2015 EA). BOEM shared the Finding and supporting documentation with the consulting parties; the Finding is available on BOEM's website at http://www.boem.gov/NC-WEAs-Lease-Issuance. The definition of the undertaking has not changed since BOEM concluded its Section 106 consultation in 2015 with a Finding of No Historic Properties Affected, and no new information has been provided that would require additional consultation for the Proposed Action being analyzed in this SEA.

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APPENDIX A. Project Design Criteria and Best Management Practices for Protected Species

Definitions

1. **Dynamic Management Area (DMA):** The term "DMA" refers to a temporary area designated by NOAA NMFS based on visual sightings documenting the presence of three or more right whales within a discrete area.
2. **ESA-Listed Species:** The term ESA-listed species means threatened or endangered species of marine mammal, sea turtle, fish, or coral listed under the Endangered Species Act.
3. **Geophysical Survey:** The term geophysical survey means sub-bottom profiler devices including any boomers, sparkers, or bubble guns that produces noise to record geophysical data that to which the mitigation, monitoring, and reporting for operation of the sound source.
4. **Geotechnical Survey:** The term "geotechnical survey" is used to collectively refer to any physical testing or sampling of the surface or sub-surface of the seafloor.
5. **Large Whale:** The term “large whale” means baleen whales (North Atlantic right whales, fin whales, sei whales, blue whales, humpback whales, and minke whales); sperm whales; and any unidentified whale.
6. **Live Bottom Features:** The term “live bottom features” means all sensitive live bottom habitats including submerged aquatic vegetation and consolidated seabed features for this measure such as pavement, scarp walls, and deep/cold-water coral reefs, and shallow/mesophotic reefs as defined in the Coastal and Marine Ecological Classification Standard (CMECS) Geologic Substrate Classifications.
7. **Protected Species:** The term protected species” means all threatened and endangered marine species listed under the Endangered Species Act and all marine mammals.
8. **Ramp-up:** The term "ramp-up" means the process of incrementally increasing the acoustic source level of the survey equipment when conducting high-resolution G&G surveys until it reaches the operational setting.
9. **Small Cetacean:** The term small cetacean refers to any species of dolphin in the family *Delphinidae* and harbor porpoises in the family *Phocoenidae*.
10. **Slow Zone:** The term “Slow Zone” refers to announcements by NOAA Fisheries that North Atlantic right whales have been either acoustically detected or visually within a defined area. Slow Zones are inclusive of Dynamic Management Areas.

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.

PDC 2. Avoid Spawning and Developmental Habitat of Sturgeon

BMP 2.1 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 may be necessary.

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 the 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)
- Recordkeeping and the availability of records for inspection by DOI

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).

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.

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.

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, sidescan sonar, or sub-bottom profile in accordance with DOI's most recent, applicable guidance
- An explanation of how the object was lost
- 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.

PDC 4: Minimize Interactions With Protected Species During Geophysical Survey Operations

To avoid injury of and minimize any potential disturbance to protected species, the Lessee must implement the following measures for all vessels towing boomer, sparker, or bubble gun categories of equipment. Shutdown, pre-start clearance, and ramp-up procedures are not required during high-resolution G&G survey operations using only other sources (e.g., ultra-short baselines, fathometers, parametric shallow-penetration SBPs, hull-mounted non-parametric sub-bottom profiler/CHIRP systems, side scan sonars, pingers, acoustic releases, echosounders, and instruments attached to submersible vehicles [HOV/AUV/ROVs]).

BMP 4.1 For situational awareness, a Monitoring Zone (500 m in all directions) for ESA-listed species must be monitored around all vessels operating boomer, sparkers, or bubble gun equipment.

4.1.1 The Monitoring Zone must be monitored by approved third-party protected species observers (PSOs) at all times and any observed listed species must be recorded (see reporting requirements below).

4.1.2 Any observations of ESA-listed species by crew members aboard any vessel associated with the survey must be relayed to the PSO on duty.

4.1.3 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 handheld 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. 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.

BMP 4.2 To minimize exposure to noise that could be disturbing, a 500 m Shutdown Zone for North Atlantic right whales and unidentified whales, and a 100 m Shutdown Zone for all other ESA-listed whales visible at the surface must be established around each vessel operating boomer, sparker, or bubble gun equipment.

4.2.1 The Shutdown Zone(s) must be monitored by third-party PSOs at all times when boomer, sparker, or bubble gun categories of equipment is being operated and all observed ESA-listed species must be recorded (see reporting requirements below).

4.2.2 If an ESA-listed whale is detected within or entering the respective Shutdown Zone, any boomer, sparker, or bubble gun categories of equipment that requires PSOs must be shut off until the minimum separation distance is re-established and the measures in (4.3) are carried out (500 m for North Atlantic right whales and 100 m for other ESA-listed whales).

4.2.3 A PSO must notify the survey crew that a shutdown of all active boomer, sparker, and bubble gun acoustic sources 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.

BMP 4.3 For non-ESA-listed marine mammals, the Lessee must comply with NMFS permit conditions of any applicable ITA received under the Marine Mammal Protection Act. If an ITA is not required, the Lessee must adhere to the following measures for non-ESA-listed marine mammals for which incidental take has not been authorized.

4.3.1 Prior to powering up survey equipment, a 328-foot (100-meter) clearance zone must be clear of all small cetaceans and seals for 15 minutes; and humpback whales, minke whales, Kogia, and beaked whales for 30 minutes.

4.3.2 If any non-ESA-listed marine mammal is observed within the clearance zone during the monitoring period, the clock must be paused for 15 or 30 minutes depending on the species sighted. If the PSO confirms that the animal has exited the Shutdown Zone and is headed away from the survey vessel, the clock that was paused may resume.

4.3.3 The clock will reset to respective clearance time if the marine mammal dives and is not resighted by the PSO.

4.3.4 A Shutdown Zone of 200 meters must be established around the survey vessel. For non-ESA-listed marine mammals, a shutdown of impulsive acoustic sources is required upon observation of a species entering the Shutdown Zone.

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

4.3.6 If the Shutdown Zone(s) cannot be adequately monitored for protected species (i.e., a PSO determines conditions, including at night or other low-visibility conditions, are such that animals cannot be reliably sighted within the Shutdown Zone[s]), the survey must be stopped until such time that the Shutdown Zone(s) can be reliably monitored.

BMP 4.4 Before any noise-producing survey equipment is deployed, the Monitoring Zones (500 meters for all ESA-listed species and 200 meters for non-ESA-listed marine mammals) must be monitored for 30 minutes of pre-clearance observation.

4.4.1 If any protected species is observed within the respective Monitoring 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.

BMP 4.5 A "ramp-up" of the boomer, sparker, or bubble gun survey equipment must occur at the start or re-start of geophysical survey activities when technically feasible. A ramp-up must begin with the power for the geophysical survey ramped up half power for 5 minutes, and then to full power.

BMP 4.6 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) and heading away from the vessel, and (d) the Shutdown Zone(s) remains clear of all ESA-listed species. If all the conditions above are not met, the Monitoring Zone (500 m for all ESA-listed species) must be monitored for 30 minutes of pre-clearance observation before noise-producing equipment can be turned back on.

BMP 4.7 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 surveys may occur if the Clearance and Shutdown Zone(s) cannot be reliably monitored for the presence of ESA-listed species.

4.7.1 An Alternative Monitoring Plan (AMP) must be submitted to BOEM 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.

4.7.2 The plan must include technologies that have the technical feasibility to detect ESA-listed species in the Clearance and Shutdown Zones. Night-vision equipment (i.e., night-vision goggles and/or infrared technology) must be available for use during nighttime monitoring.

4.7.3 PSOs should be trained and experienced with any AMP technology used.

4.7.4 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 could be performed during mobilization and periodically throughout the survey operation.

4.7.5 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.

BMP 4.8 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).

BMP 4 .9 Boomer, sparker, or bubble gun sound sources used within the Southeast Right Whale Critical Habitat Unit 2 during the calving and nursing season (December–March) shall not operate at frequencies between 7 kHz and 35 kHz at night or poor visibility (i.e., anytime AMP methods are required).

BMP 4.10 At times when multiple survey vessels using boomer, sparker, or bubble gun categories of equipment are operating within a lease, adjacent lease areas, or exploratory cable routes, a minimum separation distance must be maintained between survey vessels to ensure that sound sources do not overlap.

BMP 4.11 To minimize disturbance to the Northwest Atlantic Ocean Distinct Population Segment 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 in 4.1, if any loggerhead or other unidentified sea turtles is observed within a 100-meter Monitoring Zone during a survey, sparker operation should be paused by turning off the sparker until the sea turtle is beyond 100-meters 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.

BMP 4.12 Any visual observations of listed species by crew or project personnel must be communicated to PSOs on duty.

BMP 4.13 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 listed 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 Protected Species

The Lessee must ensure all vessels associated with survey activities (transiting 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.

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.

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 handheld 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.

5.2.1 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 strikes 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.

5.2.2 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.

5.2.3 A minimum separation distance of 500 m from all ESA-listed whales (including unidentified large whales) must be maintained around all surface vessels at all times.

5.2.4 If an ESA-listed whale or large unidentified whale is observed 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.

5.2.5 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.

5.2.6 If a sea turtle or manta ray is sighted at any distance within the operating vessel's forward path, the vessel operator must slow down to 4 knots and steer away (unless unsafe to do so). The vessel may resume normal vessel operations once the vessel has passed the individual.

5.2.7 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.

5.2.8 Vessels operating in water depths with less than 4 feet of clearance between the vessel and the bottom should maintain speeds no greater than 4 knots to minimize risk of vessel strikes on sturgeon and sawfish.

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 a 180-degree direction of the forward path of the vessel (90 degrees port to 90 degrees starboard).

5.3.1 Visual observers monitoring the vessel separation distances from ESA-listed species 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 in 8.

5.3.2 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.

5.3.3 Vessels underway must not divert their course to approach any ESA-listed species and marine mammals.

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 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 portions 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).

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.

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.

5.6.1 North Atlantic right whale Sighting Advisory System info can be accessed at: https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html

5.6.2 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

The Lessee must ensure any mooring systems used during survey activities must be designed to prevent 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.

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.

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.

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.

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 in the area to minimize entanglement risk.

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.

BMP 6.6 All buoys must be properly labeled with owner and contact information.

PDC 7: Protected Species Observers

The Lessee must use qualified third-party PSOs to observe Clearance and Shutdown Zones for boomer, sparker, or bubble gun categories of acoustic sources with the exception of parametric SBPs or ultra-short baseline equipment.

BMP 7.1 All PSOs must have completed a BOEM-approved PSO training program and have received NMFS approval to act as a PSO for geophysical surveys. The Lessee must provide to BOEM upon request, documentation of NMFS approval as PSOs for geophysical 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. Instructions and application requirements to become a NMFS- approved PSO can be found at https://www.fisheries.noaa.gov/national/endangered-species-conservation/protected-species-observers.

BMP 7.2 Crew members serving as lookouts when PSOs are not required must receive training on protected species identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements.

BMP 7.3 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.

7.3.1 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.

BMP 7.4 A minimum of one PSO (assuming PDC 5 is met) must be observing for listed species at all times that boomer, sparker, or bubble gun equipment is operating, or a minimum of one

PSO or one Trained Lookout when the survey vessel is actively transiting during daylight hours (30 minutes prior to civil sunrise and through 30 minutes following civil sunset). The Lessee must include 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. PSOs must not be on watch for more than 4 consecutive hours, with at least a 1-hour break after a 4-hour watch. PSOs must not work for more than 12 hours in any 24-hour period.

BMP 7.5 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.

BMP 7.6 The Lessee must ensure that suitable equipment is available to each PSO to adequately observe the full extent of the Monitoring and Shutdown Zones during all vessel operations and meet all reporting requirements. The following equipment must be available:

7.6.1 Visual observations must be conducted using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.

7.6.2 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 Monitoring and Shutdown Zone(s).

7.6.3 Digital cameras with a telephoto lens that is at least 300 mm or equivalent on a full-frame single lens reflex (SLR). The camera or lens should also have an image stabilization system. Cameras should be used to record sightings and verify species identification whenever possible.

7.6.4 A laptop or tablet to collect and record data electronically.

7.6.5 Global Positioning Units (GPS) if data collection/reporting software does not have built-in positioning functionality.

7.6.6 PSO data must be collected in accordance with standard data reporting, software tools, and electronic data submission standards approved by BOEM for the particular activity.

7.6.7 Any other tools deemed necessary to adequately perform PSO tasks.

PDC 8: Reporting Requirements

The Lessee must ensure that monthly reporting of survey activities is submitted to BOEM (at renewable_reporting@boem.gov) by the PSO provider on the 15th of each month for each vessel conducting survey work. Any editing, review, and quality assurance checks must be completed only by the PSO provider prior to submission to BOEM. The PSOs may record data electronically, but the data fields listed below must be recorded and exported to an Excel file. Alternatively, BOEM has developed an Excel spreadsheet with all the necessary data fields that is available upon request. The Lessee must submit final monthly reports to BOEM in coordination with PSO Providers within 90 calendar days following completion of a survey. Final monthly reports must contain vessel departure and return ports, PSO names and training

certifications, the PSO provider contact information, dates of the survey, a vessel track, a summary of all PSO documented sightings of protected species, survey equipment shutdowns that occurred, any vessel strike avoidance measures taken, takes of protected species that occurred, and any observed injured or dead protected species. PSOs must be approved by NMFS prior to the start of a survey, and the Lessee must submit documentation of NMFS' approval upon request to BOEM (at renewable_reporting@boem.gov). Application requirements to become a NMFS-approved PSO for G&G surveys can be obtained by sending an inquiry to nmfs.psoreview@noaa.gov. DOI will work with the Lessee to ensure that DOI does not release confidential business information found in the monitoring reports.

BMP 8.1 Instructions for high-resolution G&G Survey Reports. The following data fields for PSO reports of G&G surveys must be reported in Excel format (.xml file):

Survey Information:

- Project name
- Lease number
- State Coastal Zones
- Survey Contractor
- Survey Type
- Reporting start and end dates
- Visual monitoring equipment used
- Distance finding method used
- PSO names (last, first), training certification, and affiliation
- PSO location and observation height above sea surface

Operations Information:

- Vessel name(s)
- Sound sources including equipment type, power levels, and frequencies used
- Greatest root-mean-square (RMS) source level
- Dates of departures and returns to port with port name

Monitoring Effort Information:

- Date (YYYY-MM-DD)
- Source status at time of observation (on/off)
- Number of PSOs on duty
- Start time of observations for each shift in UTC (HH:MM)
- End time of observations for each shift in UTC (HH:MM)
- Duration of visual observations of protected species
- Wind speed (knots), from direction
- Swell (meters)
- Water depth (meters)
- Visibility (km)
- Glare severity
- Block name and number
- Location: Latitude and Longitude

- Time pre-clearance visual monitoring began in UTC (HH:MM)
- Time pre-clearance monitoring ended in UTC (HH:MM)
- Duration of pre-clearance visual monitoring
- Time of day of pre-clearance (day/night)
- Time power-up/ramp-up began
- Time equipment full power was reached
- Duration of power-up/ramp-up (if conducted)
- Time survey activity began (equipment on)
- Time survey activity ended (equipment off)
- Survey Duration
- Did a shutdown/power-down occur?
    - Time shutdown was called for (UTC)
    - Time equipment was shut down (UTC)
- 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 0:30 intervals if obtainable from data collection software
- Habitat or prey observations
- Marine debris sighted

<u>Detection Information (in addition to the Survey, Operation, and Monitoring fields)</u>

- Date (YYYY-MM-DD)
- Sighting ID (multiple sightings of the same animal or group should use the same ID)
- Time at first detection in UTC (YY-MMDDT HH:MM)
- Time at last detection in UTC (YY-MM-DDT HH:MM)
- PSO name(s) (Last, First) on duty
- Effort (ON=Hammer On; OFF=Hammer Off)
- Start time of observations
- End time of observations
- Compass heading of vessel (degrees)
- Beaufort scale
- Precipitation
- Cloud coverage (%)
- Sightings including common name and scientific name
- Certainty of identification
- Number of adults
- Number of juveniles
- Total number of animals or estimated group size
- Bearing to animal(s) when first detected (ship heading + clock face)
- Distance determination method
- Distance from vessel (e.g., reticle distance in meters)
- Description of unidentified animals (include features such as overall size; shape of head; color and pattern; size, shape, and position of dorsal fin; height, direction, and shape of blow, etc.)

- Detection narrative (note behavior, especially changes in relation to survey activity and distance from source vessel)
- Direction of travel/first approach (relative to vessel)
- Behaviors observed: indicate behaviors and behavioral changes observed in sequential order (use behavioral codes)
- If any bow-riding behavior observed, record total duration during detection (HH:MM)
- Initial heading of animal(s) (degrees)
- Final heading of animal(s) (degrees)
- Shutdown Zone size during detection (meters)
- Was the animal inside the Shutdown Zone? (Y/N)
- Closest distance to vessel (reticle distance in meters)
- Time at closest approach (UTC HH:MM)
- Time animal entered Shutdown Zone (UTC HH:MM)
- Time animal left Shutdown Zone (UTC HH:MM)
- If observed/detected during ramp-up/power-up: first distance (reticle distance in meters), closest distance (reticle distance in meters), last distance (reticle distance in meters), behavior at final detection
- Did a shutdown/power-down occur? (Y/N)
- Time shutdown was called for (UTC)
- Time equipment was shut down (UTC)
- Detections with PAM

BMP 8.2 The Lessee must submit a final monitoring report to BOEM at renewable_reporting@boem.gov within 90 days after completion of yearly survey activities. The report must fully document the methods and monitoring protocols, summarize the data recorded during monitoring, estimate the number of listed species that may have been taken during survey activities, describe, assess and compare the effectiveness of mitigation and monitoring measures. Any photos or videos taken by PSOs must be included in the report. Factors that may be contributing to impaired observations during active surveys, such as environmental conditions or equipment malfunctions, must be described. PSO raw sightings and trackline data must also be provided with the final monitoring report.

BMP 8.3 Reporting sightings of North Atlantic right whales:

8.3.1 If a North Atlantic right whale is observed at any time by a PSO or project personnel during surveys or vessel transit, the Lessee or PSO must report sighting within 2 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/).

8.3.2 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

BMP 8.4 In the event of a vessel strike of a protected species by any survey vessel, the Lessee must immediately report the incident to BOEM (renewable_reporting@boem.gov) and NMFS (incidental.take@noaa.gov) and the NOAA stranding hotline: From Maine–Virginia, report sightings to 866-755-6622, and from North Carolina–Florida to 877-942-5343. The report must include the following information:

- Name, telephone, and email or the person providing the report
- Vessel name
- 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)
- To the extent practicable, photographs or video footage of the animal(s)

BMP 8.5 Detected or Impacted Protected Species Reporting. The Lessee is responsible for reporting dead or injured protected species, regardless of whether they were observed during operations or due to Lessee activities. The Lessee must report any potential take, strikes, or dead/injured protected species caused by Project vessels to the NMFS Protected Resources Division (at incidental.take@noaa.gov), NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622), BOEM (at renewable_reporting@boem.gov), and BSEE (at protectedspecies@bsee.gov) as soon as practicable, but no later than 24 hours from the time the incident took place (Detected or Impacted Protected Species Report). In the event that an injured or dead marine mammal or sea turtle is sighted, regardless of the cause, the Lessee must report the incident to the NMFS Protected Resources Division (at incidental.take@noaa.gov), NMFS 24-hour Stranding Hotline number (866-755-6622), BOEM (at renewable_reporting@boem.gov), and BSEE (at protectedspecies@bsee.gov) as soon as practicable (taking into account crew and vessel safety), but no later than 24 hours from the

sighting (Protected Species Incident Report). Staff responding to the hotline call will provide any instructions for the handling or disposing of any injured or dead protected species by individuals authorized to collect, possess, and transport sea turtles.

8.5.1 The Protected Species Incident Report must 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)
- General circumstances under which the animal was discovered

U.S. Department of the Interior (DOI)

The DOI protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

Bureau of Ocean Energy Management (BOEM)

BOEM's mission is to manage development of U.S. Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way.