Programmatic Framework Biological Assessment for New York Bight Leases

For the U.S. Fish and Wildlife Service
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U.S. Department of the Interior
Bureau of Ocean Energy Management
Office of Renewable Energy Programs

BOEM
Bureau of Ocean Energy Management

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Abbreviations and Acronyms

Abbreviation	Definition
AC	Alternating current
ADLS	Aircraft Detection Lighting Systems
AMMM	Avoidance, minimization, mitigation, and monitoring
AMSL	Above mean sea level
ATON	Federal Aids to Navigation
BA	Biological Assessment
BMP	Best management practices
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CBD	Center for Biological Diversity
CFR	Code of Federal Regulations
COP	Construction and Operation Plan
CPB	Consultation Package Builder
CVOW	Coastal Virginia Offshore Wind
DC	Direct Current
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FAA	Federal Aviation Administration
HDD	Horizontal directional drill
HVAC	High-voltage alternating current
HVDC	High-voltage direct current
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IPaC	Information for Planning and Consultation
IR	Inadvertent Returns
MHHW	Mean High Higher Water
NARW	North Atlantic Right Whale
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NY	New York
O&M	Operations and Maintenance
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OSRP	Oil Spill Response Plan
OSS	Offshore Substation
PATON	Private Aids to Navigation
PEIS	Programmatic Environmental Impact Statement
POI	Point of Interconnection

Abbreviation	Definition
PSN	Proposed Sale Notice
ROD	Record of Decision
ROV	Remotely Operated Vehicle
ROW	Rights-of-way
RPDE	Representative project design envelope
RSZ	Rotor-swept zone
SCRAM	Stochastic Collision Risk Assessment for Movement
TOYR	Time of Year Restrictions
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance
WEA	Wind Energy Areas
WNS	White-nose syndrome
WTG	Wind Turbine Generator

1 Introduction

Pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, the Bureau of Ocean Energy Management (BOEM) requests formal consultation with the U.S. Fish and Wildlife Service (USFWS) regarding ESA-listed species and designated critical habitats that occur within the Action Area as represented in Figure 1-1. This programmatic framework Biological Assessment (BA), hereafter referred to as the Programmatic BA, includes the analysis of potential impacts from development of a representative project, including application of avoidance, minimization, mitigation, and monitoring (AMMM) measures (i.e., conservation measures), and is based on a representative project design envelope (RPDE). The Proposed Action in this Programmatic BA includes the application of programmatic AMMM measures during the construction, operation, maintenance, and eventual decommissioning of six New York Bight lease areas and two additional lease areas. Projects within the Action Area of this Programmatic BA include the following:

<u>New York Bight Leases:</u>

1. Bluepoint Wind (OCS-A 0537)[1]
2. Attentive Energy (OCS-A 0538)
3. Community Offshore Wind (OCS-A 0539)[2]
4. Atlantic Shores Offshore Wind Bight (OCS-A 0541)
5. Invenergy Wind Offshore (Leading Light Wind) (OCS-A 0542)
6. Vineyard Mid-Atlantic (OCS-A 0544)[3]

<u>Other Leases in the Action Area:</u>

1. Bay State Wind, Massachusetts (OCS-A 0500)
2. Skipjack Wind, Delaware (OCS-A 0519)
3. [4]

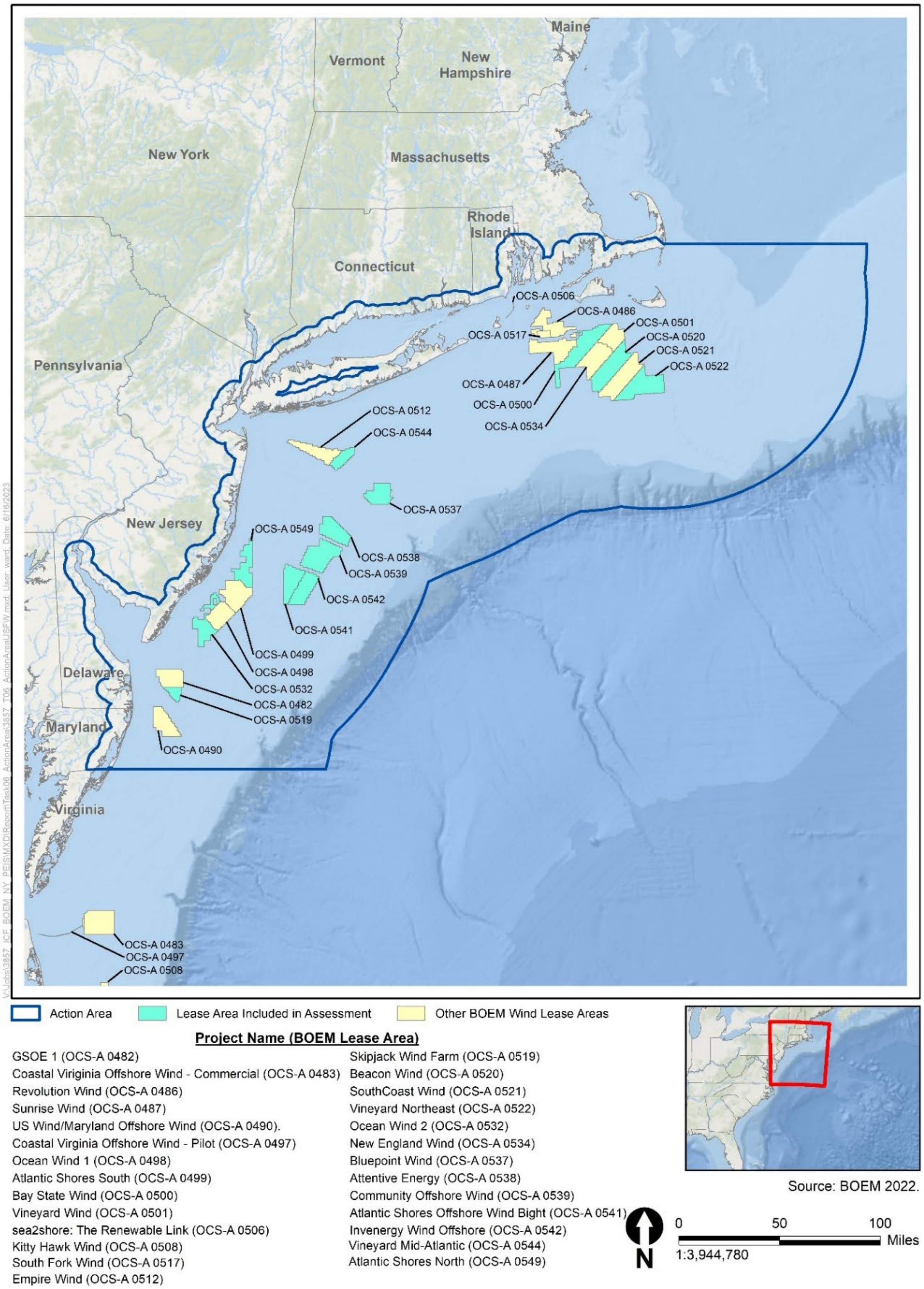
Each of the lease holders for the eight lease areas within the Action Area will need to submit a Construction and Operations Plan (COP) as required under 30 Code of Federal Regulations (CFR) 585.628. BOEM will conduct individual consultations and prepare project-specific BAs. The preparation of this Programmatic BA is a new stage in the National Environmental Policy Act (NEPA) process following the execution of leases but preceding the submission of project-specific COPs. This Programmatic BA will also facilitate the timely review of project-specific COPs submitted for the designated lease areas by reducing redundancies across NEPA analyses and BAs and establishing a framework to streamline project-specific environmental analysis (30 CFR 585.628).

This Programmatic BA will not result in the approval of any activities but rather an evaluation of the potential impacts of implementing a framework for programmatic action (i.e., RPDE). Project-specific BA documents for individual COPs in the eight identified lease areas may tier to or incorporate by reference this Programmatic BA, and could apply additional or different AMMM measures as needed. Publication of the Draft Programmatic Environmental Impact Statement (PEIS) occurred on January 12,

[1] Name changed after lease issuance from OW Ocean Winds East, LLC to Bluepoint Wind, LLC.
[2] Name changed after lease issuance from Bight Wind Holdings, LLC to Community Offshore Wind, LLC.
[3] Name changed after lease issuance from Mid-Atlantic Offshore Wind LLC to Vineyard Mid-Atlantic LLC.
[4] On Oct 31, 2023 Ørsted issued a press release announcing it will cease development of the Ocean Wind 1 and Ocean Wind 2

2024, initiating a 45-day public comment period which was subsequently extended to March 13, 2024. All the comments received will be assessed and considered by BOEM.

BOEM is the lead federal agency for purposes of Section 7 consultation (50 CFR 402.07); the co-action agencies include the Bureau of Safety and Environmental Enforcement (BSEE) and the U.S. Army Corps of Engineers (USACE).



*Note: only Bay State Wind, Massachusetts (OCS-A 0500) and Skipjack Wind, Delaware (OCS-A 0519) are included in this BA.

Figure 1-1. Geographic extent of the Action Area and the lease areas included in this assessment.

1.1 Background

BOEM began evaluation for offshore wind development areas on the U.S. Atlantic Outer Continental Shelf (OCS) in 2009, which was authorized by the Energy Policy Act of 2005. The Act, implemented by BOEM, provides a framework for issuing leases, easements, and rights-of-way (ROW) for OCS activities. BOEM's renewable energy program occurs in four distinct phases: (1) planning and analysis, (2) lease issuance, (3) site assessment, and (4) construction and operations. BOEM proceeded with this initiative on a state-by-state basis. Table 1-1 provides the planning and leasing history offshore NY Bight and Table 1-2 provides history of the additional lease areas.

Table 1-1. The history of BOEM's planning and leasing activities offshore of New York Bight

Year	Milestone
2018	On April 11, 2018, BOEM published a Call for Information and Nominations (Call) to obtain nominations from companies interested in commercial wind energy leases within the proposed area in the NY Bight (83 *Federal Register* 15602). The public comment period closed on July 30, 2018. In response to the Call, BOEM received eight nominations from developers for specific portions of the Call area for which they wish to obtain a commercial lease.
2021	In March 2021, BOEM identified nearly 800,000 acres (323,750 hectares) as Wind Energy Areas (WEAs) in the NY Bight. The WEAs were identified in offshore locations that appeared the most suitable for wind energy development, taking into consideration coexistence with ocean users. BOEM received input from the public and other governmental agencies through the Call and Intergovernmental Renewable Energy Task Force meetings as part of the process.
2021	On March 29, 2021, BOEM released a Notice to Stakeholders announcing its intent to prepare an Environmental Assessment (EA) for commercial wind leasing and site assessment activities within the Call area.
2021	On June 14, 2021, BOEM published a Proposed Sale Notice (PSN) for Commercial Leasing for Wind Power on the Outer Continental Shelf in the New York Bight (86 *Federal Register* 31524).
2021	On August 10, 2021, BOEM announced the availability of a Draft EA that assesses the potential impacts of the issuance of commercial and research leases within the identified WEAs of the NY Bight area and granting of rights-of-way and rights-of-use and easement in the region. The availability of the Draft EA initiated a 30-day public comment period that was subsequently extended to September 23, 2021.
2021	On December 16, 2021, BOEM announced the availability of a Final EA. Within the EA, BOEM issued a "Finding of No Significant Impact," which concluded that the issuance of up to 10 commercial and research leases within the WEA, granting rights-of-way and rights-of-use and easement in the region to provide Lessees the exclusive right to submit plans to assess the physical characteristics of the areas, and site characterization and assessment activities would not significantly affect the environment (BOEM 2021).
2022	On January 14, 2022, BOEM published the Final Sale Notice for the sale of six lease areas in the NY Bight area (87 *Federal Register* 2446). In response to comments received on the PSN and consultation with federal agencies, the originally proposed lease areas were rotated and reduced in size to address ocean user conflicts. Additionally, one lease area identified in the PSN was removed in response to issues raised by the fishing industry and Department of Defense, resulting in six lease areas being included in the Final Sale Notice.
2022	On February 23, 2022, BOEM held an offshore wind auction for six lease areas in the NY Bight. Bluepoint Winds, LLC was the winner of Lease Area OCS-A 0537; Attentive Energy LLC was the winner of Lease Area OCS-A 0538; Community Offshore Wind, LLC was the winner of Lease Area OCS-A 0539; Atlantic Shores Offshore Wind Bight, LLC was the winner of Lease Area OCS-A 0541; Invenergy Wind Offshore LLC was the winner of Lease Area OCS-A 0542; and Vineyard Mid-Atlantic LLC[5] was the winner of Lease Area OCS-A 0544.

[5] Name changed after lease issuance from Mid-Atlantic Offshore Wind LLC to Vineyard Mid-Atlantic LLC.

Year	Milestone
2022	On July 15, 2022, BOEM published a Notice of Intent (NOI) to prepare the New York Bight Programmatic Environmental Impact Statement (PEIS), which will analyze potential impacts from wind energy development activities in the NY Bight region. The initial 30-day public comment period opened on July 15, 2022. The period was extended to August 30, 2022.
2024	On January 8, 2024, BOEM announced the availability of its Draft Programmatic Environmental Impact Statement (Draft PEIS) for potential development of six wind lease areas offshore New York and New Jersey in an area known as the New York Bight. On January 12, 2024, BOEM published a notice of availability of the Draft PEIS, opening a 45-day public comment period that ends on February 26, 2024. The period was extended to March 13, 2024, in response to requests from Tribal Nations and stakeholders.

Table 1-2. The history of BOEM's leasing activities for other leases within the Action Area

Project	Lease or Grant Number	Lease Effective Year	Lessee or Grantee
Bay State Wind	OCS-A 0500	2015	Bay State Wind LLC
Skipjack Wind	OCS-A 0519	2018	Skipjack Offshore Energy, LLC

1.2 Consultation History

The Energy Policy Act of 2005 (EPAct), Public Law 109-58, added section 8(p)(1)(c) to the OCS Lands Act. This section authorized the Secretary of the Interior to issue leases, easements, and ROW in the OCS for renewable energy development, including wind energy. The Secretary delegated this authority to the former Minerals Management Service, and later to BOEM. Final regulations implementing this authority (30 CFR part 585) were promulgated on April 22, 2009. These regulations prescribe BOEM's responsibility for determining whether to approve, approve with modifications, or disapprove the COP associated with each lease area.

This Programmatic BA is submitted to support BOEM's request for initiation of ESA formal Section 7 consultation. A Draft Programmatic BA was submitted to U.S. Fish and Wildlife Serice (USFWS) for review on June 27, 2023, in coordination with the USACE and BSEE. BOEM has ensured that the final Programmatic BA has been reviewed by co-action agencies and includes all information required by 50 CFR 402.14(c).

On February 14, 2023, in preparation for the PEIS and this Programmatic BA, BOEM used the USFWS's Information for Planning and Consultation (IPaC) system to determine the federally listed threatened and endangered species, proposed and candidate species, as well as any proposed or designated critical habitats that may potentially occur within the Action Area.The IPaC system indicated that a total of 20 federally recognized threatened, endangered, or candidate species under USFWS jurisdiction that may occur in the Action Area and/or may be affected by the Proposed Action (see Appendix A).

Early in the ESA Section 7 informal consultation process, BOEM met with USFWS to discuss the the details of the programmatic project and the approach to preparing the BA. BOEM and the USFWS held several virtual meetings in support of consultations including:

- November 21, 2022 Section 7 consultation kick-off meeting
- December 2, 2022 follow up meeting
- Working sessions on February 6 & 21, 2023; November 20, 2023; December 7, 2023; May 30, 2024

1.3 Purpose of and Need for the Proposed Action

The Proposed Action for the Programmatic BA is the application of programmatic AMMM measures that BOEM, USFWS, BSEE, and USACE may require as conditions of approval for activities proposed by Lessees in project-specific BAs submitted for the individual lease areas. BOEM may require additional or different measures based on future, site-specific BA analysis or the parameters of specific COPs. BOEM may also modify the measures at the COP-specific NEPA stage to tailor them specifically to the proposed project and/or site of proposed activities, and to ensure conformity with project-specific consultations and/or authorizations. The AMMM measures are considered programmatic insofar as they may be applied to BAs for the six NY Bight lease areas, as well as two additional lease areas identified in this Programmatic BA. However, the AMMMs do not broadly apply under BOEM's renewable energy program outside of the NY Bight lease areas. These additional two lease areas are being included in the Programmatic BA because the activities, species, and haitats that are being analyzed are expected to be similar across all eight lease areas. Additionally, it is anticipated that this Programmatic BA will be finalized prior to the initiation of formal consultation with the USFWS for each project so each project-specific BA can tier to this Programmatic BA and focus on what is different or specific to a given lease area. This Programmatic BA aims to reduce redundancies across project-specific BA analyses, including very similar affected environments, impacts, and mitigation measures. It will provide insights to the regional cumulative effects to listed species and facilitate the streamlined development of future project-specific BA documents.

This Programmatic BA analyzes the potential impacts of development in the Action Area and how those impacts to ESA-listed species can be avoided, minimized, or mitigated with the application of programmatic AMMM measures. However, the Proposed Action will not result in the approval of any activities.

The site-specific BA analyses for each proposed wind energy project will focus on the impacts of approving a particular COP, including identification of AMMM measures that are best suited for consideration in the project-specific BA analysis. The Proposed Action is needed to help BOEM make timely decisions on COPs and BAs submitted for the eight lease areas. Timely decisions further the United States policy to make OCS energy resources available for expeditious and orderly development, subject to environmental safeguards (43 USC 1332(3)) and other requirements listed at 43 USC 1337(p)(4), including protection of the environment, among several other factors. Project-specific BA analysis for individual COPs will tier from or incorporate by reference this Programmatic BA and could apply additional or different AMMM measures as needed. This progammatic BA is the first programmatic document prepared to comprehensively evaluate impacts to ESA-listed species across multiple offshore wind energy lease areas and to evaluate the possibility of applying programmatic AMMM measures and as such is acting as a pilot project for this approach.

This broader approach of a Programmatic BA to analyze the eight projects expected within the Action Area is consistent with Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," issued on January 27, 2021. In that order, President Biden stated that the policy of his administration is "to organize and deploy the full capacity of its agencies to combat the climate crisis to implement a Government-wide approach that reduces climate pollution in every sector of the economy; increases resilience to the impacts of climate change; protects public health; conserves our lands, waters, and biodiversity; delivers environmental justice; and spurs well-paying union jobs and economic growth, especially through innovation, commercialization, and deployment of clean energy technologies and infrastructure." To support the goals outlined in Executive Order 14008, the administration has also announced plans to increase renewable energy production, with a goal of 30 gigawatts (GW) of offshore wind energy capacity by 2030.

Through the development of this Draft Programmatic BA, BOEM is addressing the following objectives:

- Analyzing impacts to ESA-listed species expected from development in the eight lease areas.
- Analyzing potential change in impacts from applying programmatic AMMM measures for the 8 lease areas.
- Analyzing focused, regional cumulative effects.
- Foundational environmental analyses to build upon and/or refer to in COP-specific BA analyses.

The analysis in this Programmatic BA was developed for integration with site-specific BA reviews. Project-specific analyses that tier from or incorporate by reference this Programmatic BA will evaluate whether a project would have greater, equal, fewer, or different impacts than those that were analyzed in the Programmatic BA by considering the level of action analyzed and the particularities of the site. Future COP-specific BA documents will focus on providing site- and project-specific analyses that were not already addressed in this Programmatic BA.

2 Description of the Proposed Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas (50 CFR 402.02).

The Proposed Action in this Programmatic BA includes the analysis of potential impacts from development of a representative project based on the RPDE, as well as the application of AMMM measures. This BA analyzes development of one representative project and eight representative projects with AMMM measures and considers the potential impacts of that development on ESA-listed species under the jurisdiction of the USFWS. The activities addressed in this Programmatic BA include the construction, operations and maintenance (O&M), and eventual decommissioning of both one project and eight projects.

The Proposed Action is needed to help BOEM make timely decisions on COPs submitted for the eightlease areas. Timely decisions further the United States policy to make OCS energy resources available for expeditious and orderly development, subject to environmental safeguards (43 USC 1332(3)) and other requirements listed at 43 USC 1337(p)(4), including protection of the environment, among several other factors. The analysis in this Programmatic BA was developed for integration with site-specific BA reviews. Project-specific analyses that tier from or incorporate by reference this Programmatic BA will evaluate whether a project would have greater, equal, fewer, or different impacts than those that were analyzed in the Programmatic BA by considering the level of action analyzed and the particularities of the site. Future COP-specific BA documents will focus on providing site- and project-specific analyses that were not already addressed in this Programmatic BA.

2.1 Description of Activities Included in the Programmatic Analysis - One Project

The analysis of the Proposed Action assumes that one representative offshore wind project would be developed and considers the potential impacts of that development on the environment. The Proposed Action also provides a framework for further analysis at the COP-specific BA stage, providing context that can be utilized in COP-specific BA analyses and used as a benchmark for comparing proposed actions at the COP-specific stage.

The analysis of the Proposed Action is based upon an RPDE developed with input from the six NY Bight Lessees, American Clean Power, National Renewable Energy Laboratory, and the States of New York and New Jersey, as presented in Table 2-1. The RPDE is not associated with any particular lease area and is instead representative of development that could occur from any of the New York Bight lease areas. It was decided for purposes of this assessment, to apply the RPDE to the additional two lease areas within the Action Area since most parameters were reasonable, and allowed for a more consistent assessment. The analysis of eight projects includes up to 797 WTGs, 44 OSSs, 88 offshore export cables totaling 3,544 miles (5,704 kilometers), and 3,164 miles (5,092 kilometers) of interarray cables. The values for these parameters were provided by the NY Bight Lessees or were calculated by BOEM based upon information provided by the Lessees for the six NY Bight leases, and doubled for this BA to account for the additional two lease areas. These parameters represent the maximum number/length of WTGs, OSSs, and cables that would be developed for the eight lease areas in the Action Area for this BA.

Additionally, the RPDE is not meant to be prescriptive or to establish limits for future offshore wind development, but rather a reasonable approach to assess impacts of a framework programmatic action. The RPDE contains a minimum and maximum value for most parameters or multiple options that could be selected to provide bounds for the analysis. In general, the maximum values in the RPDE represent the maximum or most conservative scenario of development that could occur in the lease areas.

Table 2-1. RPDE parameters for one representative offshore wind project within the Action Area

Element	Project Design Element	Typical Range
WTGs	Number of WTGs	50–280 turbines
	WTG spacing	WTGs would conform to a grid layout with a minimum spacing of 0.6 × 0.6 nautical miles (1.1 × 1.1 kilometers)[1]
	Turbine rotor diameter	721–1,214 feet (220–370 meters)
	Total turbine height[2]	853–1,312 feet (260–400 meters)
	WTG foundation type	Monopiles or piled jackets are most likely. Additional options include suction mono-bucket, suction bucket jacket, tri-suction pile caisson, and gravity-based structures.
	WTG seabed footprint, with scour protection (per foundation)	0.24 acre (0.10 hectare) (monopile) to 2.88 acres (1.7 hectare) (jacket)
OSSs	Number and type of OSSs	1–5 OSSs[3] High-voltage alternating current (HVAC) OSS and high-voltage direct current (HVDC) converter OSS may be used.
	OSS foundation type	Monopiles or piled jackets are most likely. Additional options include suction bucket jackets and gravity-based structures.
	OSS seabed footprint, with scour protection (per foundation)	0.51 acre (0.21 hectare) (monopile) to 8.05 acres (3.26 hectares) (jacket structure)
WTG and OSS Foundations	Foundation installation methods	Piled foundations (monopile and jacket): hydraulic impact hammering, vibratory hammering, water jetting, pile drilling, or a combination of methods. Other foundations: suction bucket and gravity-based installation.

Element	Project Design Element	Typical Range
WTG and OSS Foundations	Scour protection types	Rock placement, mattress protection, sandbags, and stone bags.
Interarray Cables	Total interarray cable length	33–550 miles (53–885 kilometers)
	Interarray cable diameter	5–12 inches (13–30 centimeters)
	Interarray cable seabed disturbance (width)	66–131 feet (20–40 meters)
	Interarray cable burial depth	3–9.8 feet (0.9–3 meters) is the anticipated potential range of burial depth; 6 feet (1.8 meters) is the typical burial depth. Depths may vary based on site-specific factors (e.g., soil type, cable/pipeline crossings, crossing of navigation channels)
	Interarray cable installation methods	Three approaches: pre-lay trenching, simultaneous lay and bury, or post-lay burial. Most common methods are mechanical or jet plowing. Additional options include jet trencher, precision installation (using a remotely operated vehicle/diver), mechanical cutter, control flow excavator, jet plowing, and vertical injection.
	Cable protection types	Rock placement, concrete mattresses, frond mattresses, rock bags, and seabed spacers.
Export Cables	Number of export cables	1–9 export cables
	Total export cable length	30–929 miles (48–1,495 kilometers)
	Export cable voltage	220–420 kilovolt [kV] HVAC 320–525 kV HVDC
	Export cable diameter	6.1–13.8 inches (15.5–35.1 centimeters) HVAC 6.3–16 inches (16–40.6 centimeters) HVDC
	Export cable seabed disturbance (width)	66–131 feet (20–40 meters), per cable including cable protection footprint[4]
	Export cable burial depth	3–19.6 feet (0.9–6 meters) is the anticipated potential range of burial depth; 6 feet (1.8 meters) is typical burial depth. Depths may vary based on site-specific factors (e.g., soil type, cable/pipeline crossings, crossing of navigation channels)
	Export cable installation methods	Three approaches: pre-lay trenching, simultaneous lay and bury, or post-lay burial. Most common methods are mechanical or jet plowing. Additional options include mechanical cutter, jet trencher, control flow excavator, jet plowing, vertical injection, suction hopper dredging, precision installation (using a remotely operated vehicle/diver), horizontal directional drill (HDD), direct piping, open-cut trenching, and jack-and-bore.
	Cable protection types	Rock placement, concrete mattresses, frond mattresses, rock bags, and seabed spacers.

[1] Spacing for OCS-A 0544 would be informed by lease stipulations, which require either two common lines of orientation or a 2-nautical mile setback from the neighboring Lease Area OCS-A 0512. For the purposes of analysis, two common lines of orientation based on the proposed spacing in the COP for OCS-A 0512 were assumed, resulting in a spacing of approximately 0.68 × 0.68 nautical miles.

[2] All elevations are provided relative to mean sea level.

[3] Number of OSSs includes substation platforms as well as other types of offshore platforms, such as booster stations, or a separate offshore platform that may be used to comply with New York State Energy Research and Development Authority's meshed ready requirements or New Jersey Board of Public Utilities' offshore transmission network.

[4] Cable protection is anticipated to be limited to approximately 10 percent of the total export cable length.

The analysis of eight representative offshore wind projects within the Action Area is presented in Section 2.2.

2.1.1 Construction and Installation Activities and Facilities

A representative offshore wind project within the Action Area would include the construction and installation of both onshore and offshore facilities. Construction and installation of a representative offshore wind project in the Action Area is anticipated to start between 2026 and 2030. Construction for offshore wind projects can take on average 3 to 5 years. The timing of construction is anticipated to vary for each lease area and would be subject to vessel and supply chain availability.

2.1.1.1 Onshore Activities and Facilities

Proposed onshore elements of one representative offshore wind project within the Action Area include export cable landfall sites, sea-to-shore transition, onshore export cable routes, onshore substation or converter station, and connection to a point of interconnection (POI). Because the analysis in this programmaitc BA was prepared before any of the project-specific COPs were submitted by Lessees, actual landfall locations and onshore facilities are unknown at this time. Because the location of landfalls and onshore facilities are unknown, this Programmatic BA describes the types of impacts from construction and operation of onshore components generally and largely defers the analysis of onshore components to the COP-specific BA documents. It should also be noted that while BOEM's Programmatic BA includes onshore elements to provide a comprehensive evaluation of the project and support future analyses; BOEM's authority under the Outer Continental Shelf Lands Act (OCSLA) is limited to the activities on the OCS. The onshore activities and facilities for future projects related to or deriving from this initiative will require approval and permits from a number of fedeal, state and local regulatory agencies.

The offshore export cable will come ashore at a landfall location (Figure 2-1). Multiple installation methods can be used to make the sea-to-shore transition including open-cut (i.e., trenching) or trenchless methods such as horizontal directional drilling (HDD). HDD involves drilling bore holes for the cables between an entry point offshore and an onshore exit point at the landfall location, which allows the cables to remain buried below the beach, intertidal zone, or other environmentally sensitive areas to be avoided. Open-cut methods are typically used in situations where trenchless methods cannot be used due to conflicting existing infrastructure, loose soil and sediment, or limited workspace. Open-cut methods require open-cut trenching and dredging or jetting to facilitate installation at target burial for approach to landside. Jetting uses pressurized water jets to create a trench within the seabed, where the export cable then sinks into the seabed or waterway as displaced sediment resettles and naturally backfills the trench. Dredging excavates or removes sediment, creating a channel to allow the cable to make landfall or transit across a waterway or wetland crossing at the target installation depth. Various dredging methods could be used, such as clamshell dredging, suction hopper dredging, or hydraulic dredging.

From the landfall location, onshore export cables would carry the electricity to the onshore substations and/or converter stations (Figure 2-1). Onshore export cables are typically buried in a trench and would typically follow existing right-of-way where possible. The onshore substations transform and prepare the power received from the export cables to be connected into the existing grid at the POI. Projects with large nameplate capacity or that include long transmission lines carrying very large power capacities may choose to use high-voltage direct current (HVDC) instead of high-voltage alternating current (HVAC). If HVDC is used, an onshore HVDC converter station would be necessary to convert power from the onshore export cables to HVAC to allow interconnection to the existing transmission infrastructure. Typically, either an overhead connection or an underground transmission line with an overhead tie-line may be used from the onshore substation/converter station to a POI at a nearby facility.

The transmission POI is the location where the power generated by the offshore wind project is connected into the existing electrical grid. This can be done at new facilities constructed for the project or at existing facilities that have been modified to accommodate the interconnection of the offshore wind project.

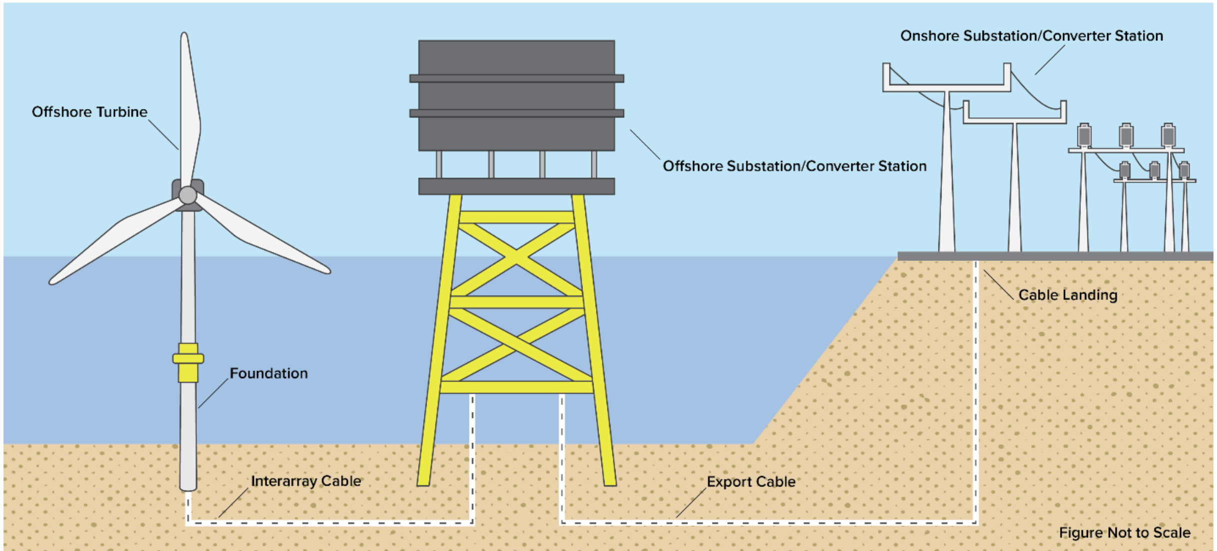


Figure 2-1. Representative onshore and offshore infrastructure

2.1.1.2 Offshore Activities and Facilities

The offshore components that collectively make up the offshore project area include Wind Turbine Generators (WTG) and their foundations, Offshore Substation (OSS) and their foundations, scour protection for foundations, interarray cables, and offshore export cables (Figure 2-1). The WTGs and OSSs would be lighted and marked in accordance with Federal Aviation Administration (FAA), U.S. Coast Guard (USCG), and BOEM Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development (BOEM, 2021).

The proposed offshore project elements would be located on the OCS as defined in OCSLA, except the portion of the offshore export cables that would be located within state waters.

One representative offshore wind project within the Action Area would install between 50 and 280 WTGs within a lease area in a grid layout at a minimum spacing of 0.6 by 0.6 nautical mile (1.1 by 1.1 kilometers). The WTGs considered would have a rotor diameter up to 1,214 feet (370 meters) and a blade tip height that extends up to 1,312 feet (400 meters) above mean sea level (AMSL) (Figure 2-2).

A single representative offshore wind project within the Action Area would install 1–5 OSSs that would serve as common collection points for power from the WTGs as well as the origin for the offshore export cables that deliver power to shore (Figure 2-1). Lessees may use HVAC or HVDC technology to transmit power from the wind farms to shore. Different equipment would be required on each OSS depending on whether HVAC or HVDC technology is used. An HVAC system is typically used to transport energy onshore when the wind farm is within about 30 miles (50 kilometers) of the shore (Middleton and Barnhart 2022). Due to the distance of some of the lease areas to shore, if HVAC OSSs are chosen, an HVAC booster station, or a reactive compensation station, may be required along the export cable route to offset against power losses between the offshore wind farm and the grid. HVAC booster stations are generally similar in size and foundation type to an OSS. HVDC systems operate by converting the alternating current (AC) high-voltage electricity produced by the WTGs to direct current (DC) for transport to shore, and then once onshore convert the electricity back to AC for distribution to the grid. HVDC systems do not experience the same losses in power experienced with AC transmission lines at long distances and do not require booster stations along the export cable route. Because of the large amount of heat generated during the conversion of AC to DC at the HVDC converter OSS located in the wind farm, these systems must be cooled when operating. The most common type of cooling system is an open loop system that intakes cool, filtered sea water and discharges warmer water back into the ocean. Chemicals such as bleach (sodium hypochlorite) may be used in order to prevent growth in the system and keep pipes clean (Middleton and Barnhart 2022).

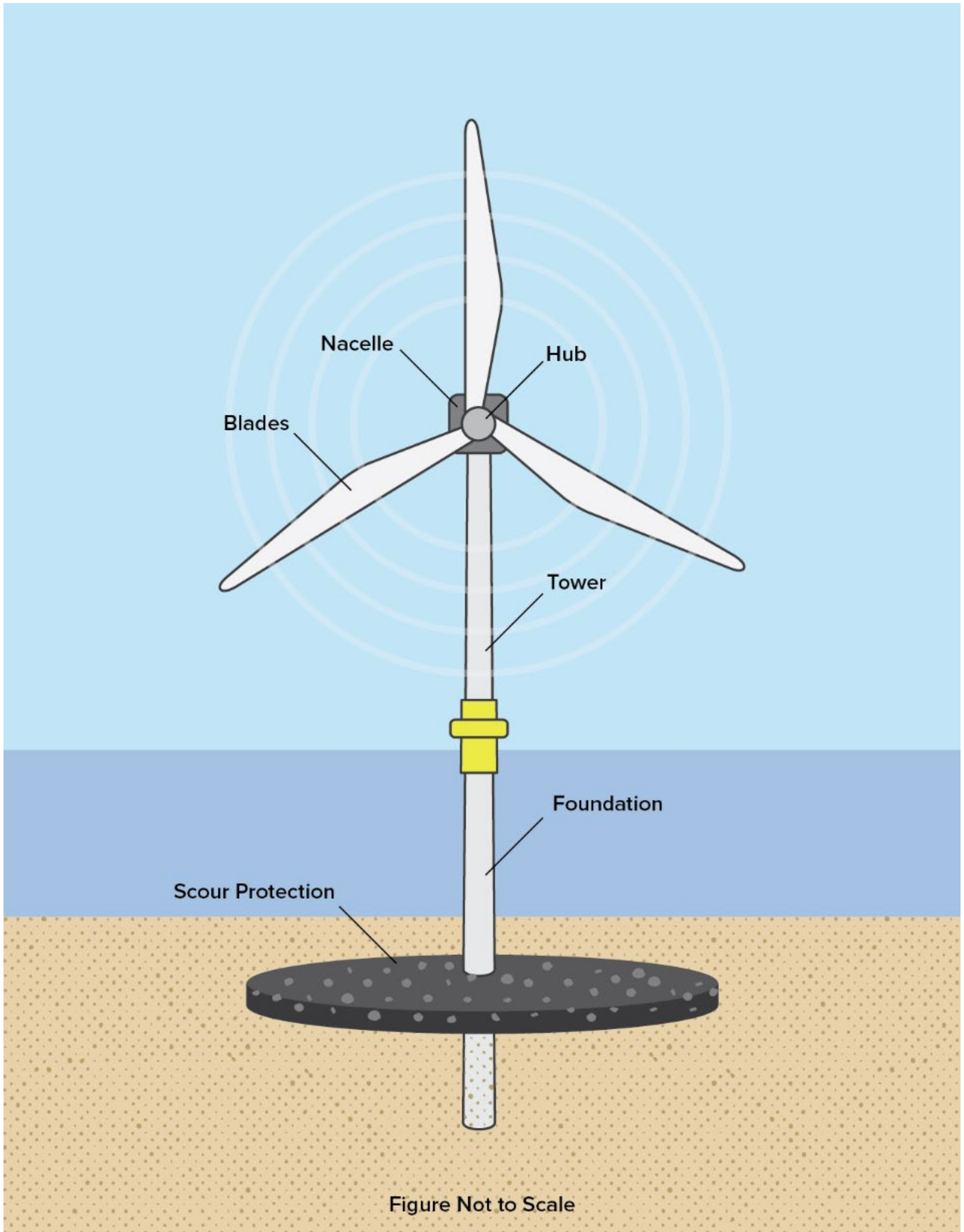


Figure 2-2. Representative wind turbine

WTGs and OSSs would be mounted on one or a combination of the following foundation types: monopile (Figure 2-3), piled jacket (Figure 2-4), suction bucket (Figure 2-5); could be mono-bucket, suction bucket jacket, or tri-suction pile caissons), or gravity-based foundations (Figure 2-6). Monopile and piled jacket are anticipated to be the most likely foundation types to be used for the representative offshore wind project within the Action Areas. Monopile foundations typically consist of a single steel cylindrical pile that is embedded into the seabed and is made up of sections of rolled steel plate welded together. A transition piece is fitted over the monopile and secured via bolts or grout, from where the tower is attached. Piled jacket foundations are large lattice structures fabricated of steel tubes welded together and typically consist of three- or four-legged structures to support WTGs and OSSs. For monopile and piled jacket substructures, the foundations would be driven to the target seabed penetration depths by hydraulic impact hammering, vibratory hammering, water jetting, pile drilling, or a combination of methods. During the installation of suction bucket jacket foundations, the open bottom of the bucket would settle on the seabed, then water and air would be pumped out of the bucket to create a negative pressure, which embeds the foundation bucket into the seabed. Gravity-based foundations sit on top of the sea floor and have sufficient mass and diameter to provide the stability and stiffness required to resist overturning loads. Gravity-based foundations would be lowered into position by adding water,solid ballast, or a combination. For all foundation types, seabed preparation activities, such as dredging to level the seabed and remove soft seabed surface layers, may be required for installation, although this would be most common for suction bucket and gravity-based foundations. Scour protection, consisting of rock placement, mattress protection, sandbags, and stone bags may be applied around foundations if required.

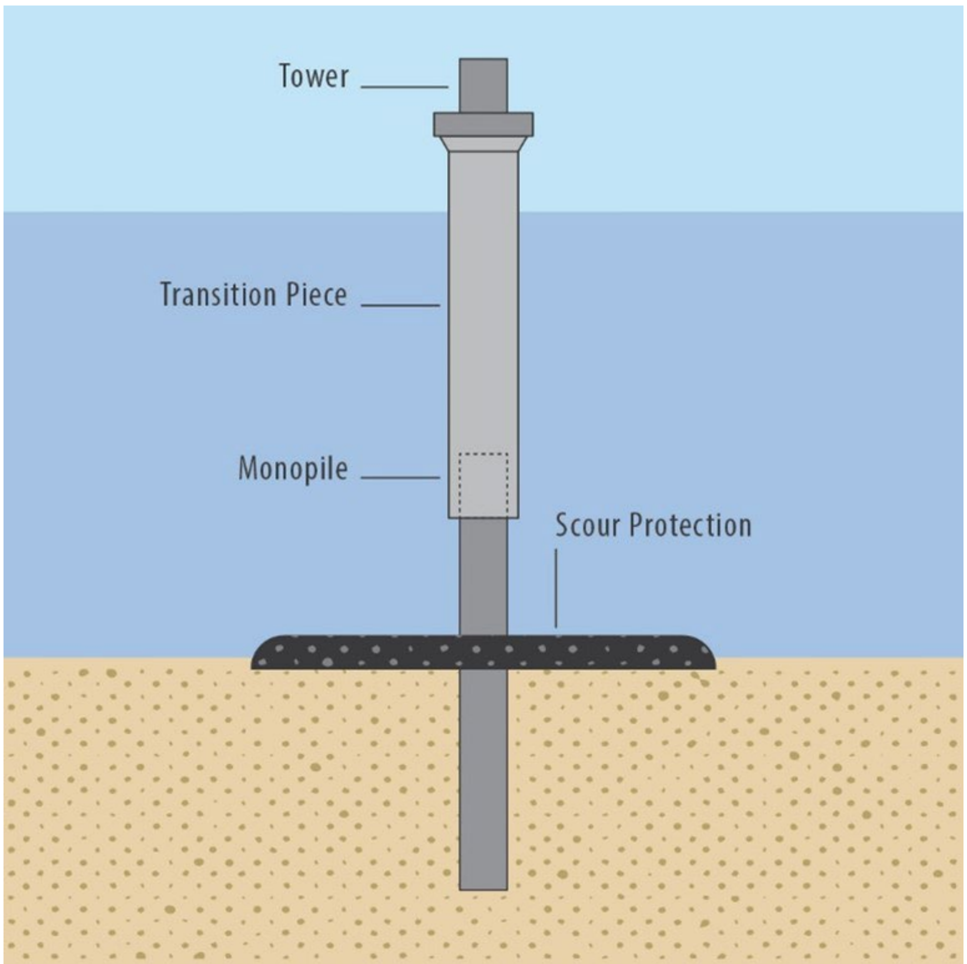


Figure 2-3. Monopile foundation

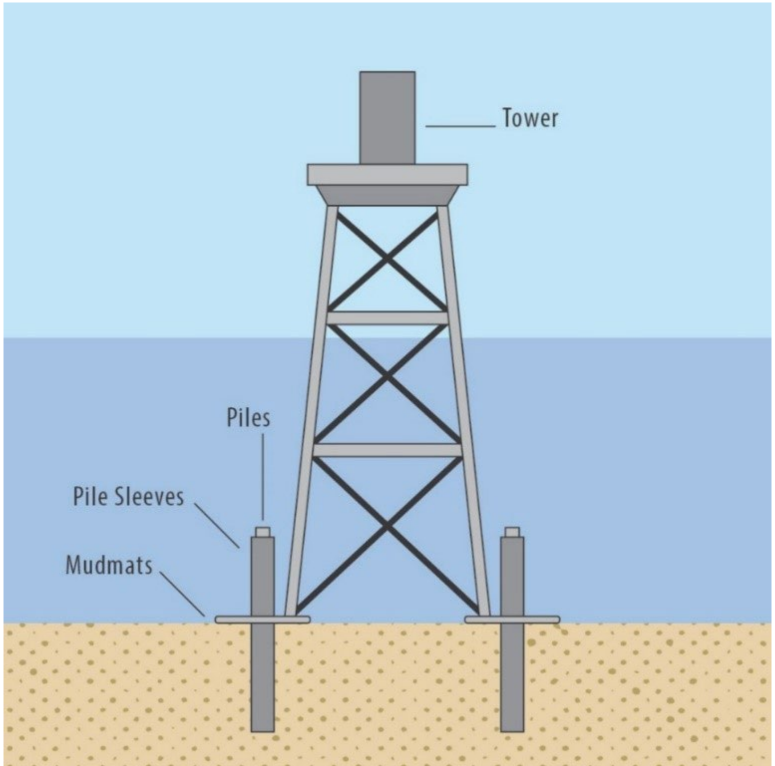


Figure 2-4. Jacket foundation

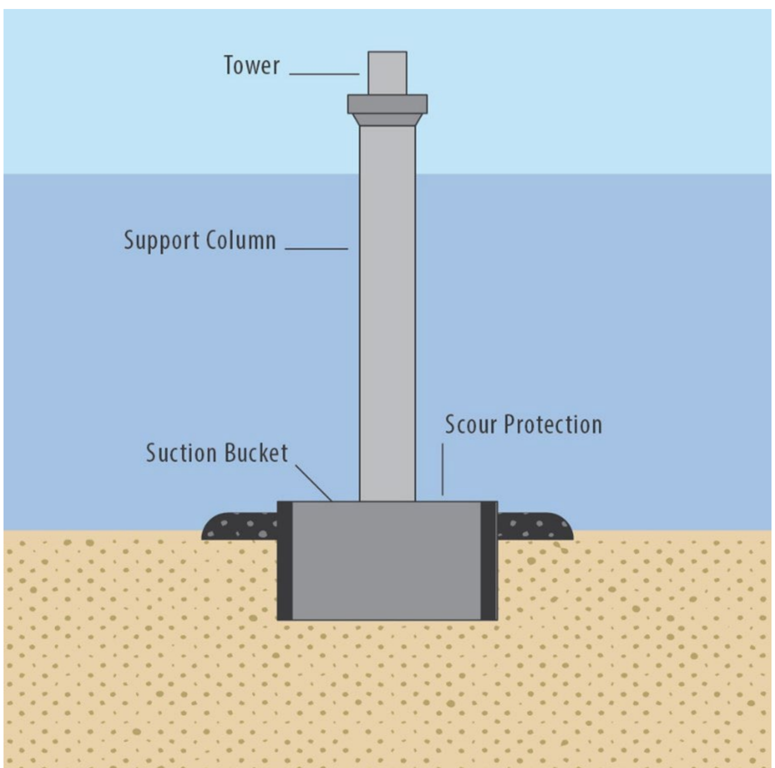


Figure 2-5. Suction bucket foundation

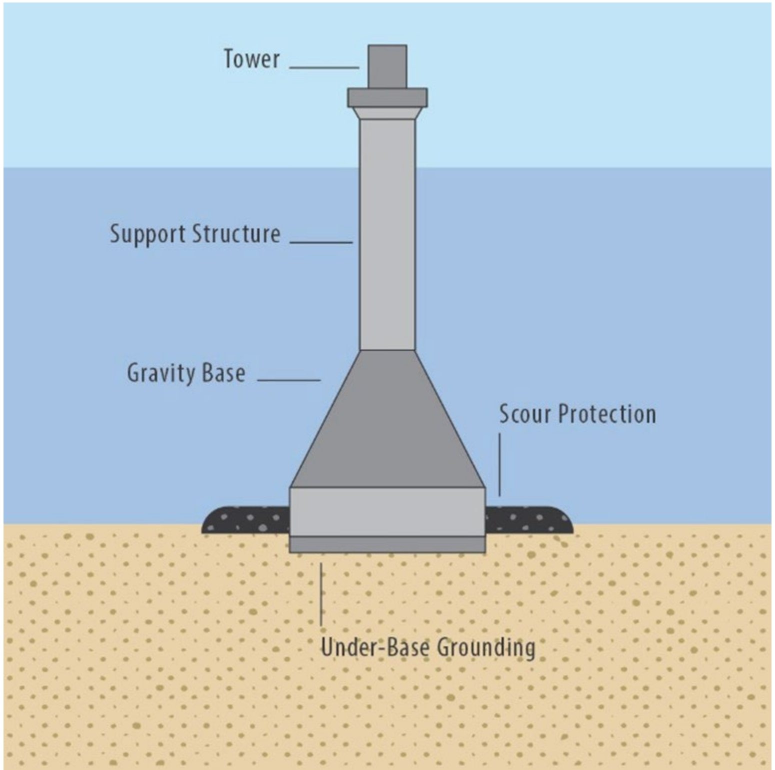


Figure 2-6. Gravity-based foundation

Between 1 and 9 export cables per project would be installed per project to deliver electricity from the OSSs to the landfall sites. The combined length of all export cables per project would be between 30 and 929 miles (48 to 1,495 kilometers) to reach the landfall locations. Pre-lay trenching, simultaneous lay and bury, and post-lay burial approaches to cable installation are considered under the RPDE. Several cable installation methods are considered under the RPDE, with mechanical and jet plowing as the most common installation techniques; however, mechanical cutter, jet trencher, control flow excavator, jet plowing, vertical injection, suction hopper dredging, precision installation (with remotely operated vehicles [ROVs] or divers), HDD, direct piping, open-cut trenching, and jack-and-bore are also considered as additional options. Offshore export cables would have a burial depth ranging between 3 and 19.6 feet (0.9 and 6 meters) below the surface, depending on site-specific conditions. The required burial depth within federal navigational channels is typically 15 feet (4.6 meters) below authorized dredged depth, but non-federally managed areas do not have the same requirements.

One representative offshore wind project within the Action Area would install up to 550 miles (885 kilometers) of interarray cables used to connect WTGs to OSSs. Interarray cables and offshore export cables would be installed similarly, with mechanical or jet plowing being the most common method for interarray cable burial. Interarray cables would have a burial depth ranging between 3 and 9.8 feet (0.9 and 3 meters), depending on site-specific conditions.

Cable protection for both export cables and interarray cables would be required at any cable crossing location and for areas where target cable burial depth cannot be achieved. Cable protection methods considered under the RPDE include rock placement, concrete mattresses, frond mattresses, rock bags, and seabed spacers.

Prior to cable installation, BOEM anticipates that site preparation activities would be completed including debris and boulder clearance, unexploded ordnance (UXO) clearance, pre-lay grapnel run, and pre-installation surveys to ensure the submarine export cable and burial equipment would not be affected by debris or other hazards during the burial process. A pre-lay grapnel run may be completed to remove seabed debris, such as abandoned fishing gear, wires, etc., from the siting corridor. Pre-lay grapnel runs involve the utilization of a grapnel rope that is lowered to the seabed using a tug vessel and on-board winch as support. The grapnel rope and ground chain are towed within the footprint of the WTGs and OSS platforms to remove any debris that may be present and could hinder construction operations on the seafloor. As the grapnel is dragged across the bottom, the grapnel penetrates the seafloor snagging and catching debris.

Additionally, pre-sweeping may be required in areas of the submarine export cable corridor with megaripples and sand waves. Pre-sweeping involves smoothing the seafloor by removing ridges and edges using dredging equipment to remove the excess sediment. Dredged material generated from pre-sweeping activities may either be sidecast near the installation site or removed for reuse or proper disposal.

During construction and installation, support vessels typically travel between the offshore project area and port facilities where equipment and materials are staged. Multiple ports with capabilities to support offshore wind development are present within the region.

2.1.1.2.1 Transmission Interconnection Configurations

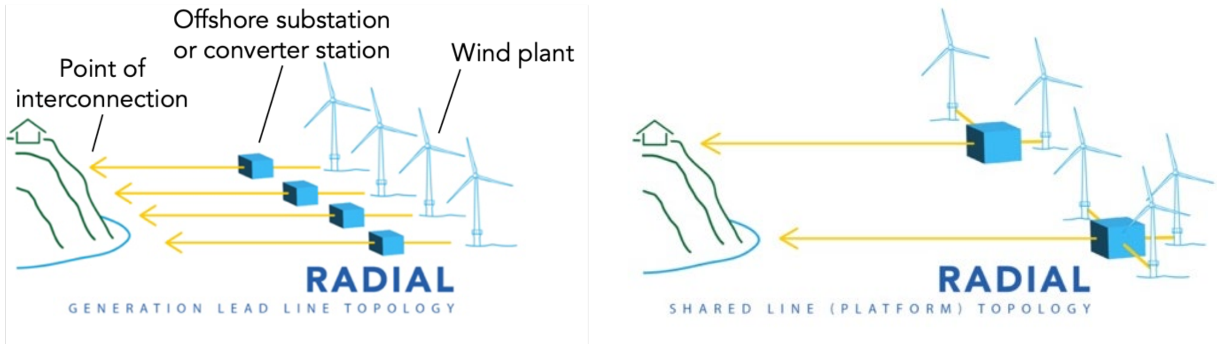
When multiple offshore wind projects – or wind plants – are located in a single region offshore, as is the case for the NY Bight projects, different configurations can be used to connect wind plants to the grid, including the shared use of offshore transmission equipment. Each offshore transmission configuration – or topology – has its own advantages and requires different levels of coordination between transmission and wind plant operators. Four configurations are described below, classified as either radial or network configurations. Any of these configurations could be employed for the any of the representative projects. Each of the configurations would likely require different amounts of cable, OSSs, and other offshore and onshore infrastructure that could result in differing levels of environmental impacts. Under the Proposed Action, BOEM is analyzing the maximum case scenario for cable and OSS infrastructure, which is anticipated to encompass the infrastructure requirements for any of these transmission configurations, as reflected in the RPDE presented in Table 2-1.

In the figures depicting different transmission configurations below, each turbine represents an individual offshore wind project (e.g., one representative project).

Radial Configurations

Radial configurations collect power from a wind plant at an OSS that connects to a single onshore interconnection point. In radial configurations, power from a wind plant will always flow to the same onshore POI. Generation lead line topology and shared line (platform) topology are two types of radial configurations (Source: DOE 2023, Figure 2-7):

- Generation lead line topology is where each wind plant connects to a dedicated OSS that transfers power to a single onshore interconnection point.
- Shared line (platform) topology is where two or more wind plants connect to an OSS that transfers power to a single onshore interconnection point.



- Generation lead line topology
- Shared line (platform) topology

Source: DOE 2023

Figure 2-7. Radial configuration topologies

Network Configurations

Network configurations collect power from a wind plant at an OSS that is connected to a series of other OSSs that transfer power to different onshore interconnection points. In a network configuration, power from a wind plant can flow to multiple onshore interconnection points and allows power to flow in multiple directions throughout the offshore transmission network. Grid operators may utilize a network configuration for purposes of managing congestion and reliability. Backbone topology and meshed grid topology are two types of network configurations (Figure 2-8)[6]:

- Backbone topology is where multiple OSSs are linked together along a single pathway – or backbone – to connect between two onshore interconnection points.
- Meshed grid topology, also known as an offshore grid, is where multiple OSSs are linked together to create a meshed grid that connects three or more onshore interconnection points.

- Backbone topology
- Meshed grid topology

Source: DOE 2023

Figure 2-8. Network configuration topologies

[6] In July 2022, the State of New York released an offshore wind solicitation with a requirement for projects using HVDC to follow meshed ready requirements, available here: https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/Offshore-Wind-Solicitations/2022-Solicitation.

2.1.2 Operations and Maintenance

For analysis purposes, BOEM assumes that each of the representative offshore wind project within the Action Area would have an operating period of 35 years. The NY Bight leases each have operations term of 33 years that commences on the date of COP approval. The Lessees would need to request and be granted an extension of its operations term from BOEM under the regulations at 30 CFR 585.425 et seq. in order to operate the projects for 35 years. While the Lessees within the Action Area have not made such a request, this Programmatic BA uses the longer period in order to avoid possibly underestimating any potential effects.

2.1.2.1 Onshore Activities and Facilities

One representative offshore wind project within the Action Area would include regular inspection and preventative maintenance, as needed, for onshore substations and converter stations, onshore export cables, and grid POIs. Onshore substations and converter stations are typically designed to serve as unmanned stations and would not be expected to have an operator onsite during typical operation. Scheduled maintenance of the onshore export cables would also be performed; any necessary maintenance would be accessed through manholes and completed within the installed transmission infrastructure.

2.1.2.2 Offshore Activities and Facilities

Planned maintenance of offshore facilites and cables would include regularly scheduled inspections and routine maintenance of mechanical and electrical components, as well as needed repairs and scour protection. The types and frequency of inspections and maintenance activities for WTGs would be based on detailed original equipment manufacturer specifications. Annual maintenance campaigns are expected to be needed for general upkeep (e.g., bolt tensioning, crack and coating inspection, safety equipment inspection, cleaning, high-voltage component service, and blade inspection) and replacement of consumable components (e.g., lubrication, oil changes).

BOEM anticipates OSSs would also undergo annual maintenance to both medium-voltage and high-voltage systems, auxiliary systems, and safety systems as well as topside structural inspections. Portions of the topsides may require the reapplication of corrosion-resistant coating. Routine maintenance and refueling would also be performed on generators located on the OSSs.

WTG and OSS foundations would be inspected both above and underwater at regular intervals to check their condition, including checking for corrosion, cracking, and marine growth. Scheduled maintenance of foundations may also include safety inspections and testing; coating touch up; preventative maintenance of cranes, electrical equipment, and auxiliary equipment.

2.1.3 Decommissioning

Decommissioning of a representative offshore wind project within the Action Area would be required in accordance with 30 CFR 285. Under 30 CFR 285, Lessees within the Action Area would be required to remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seabed of all obstructions created. Absent permission from BSEE, all projects would have to achieve complete decommissioning within 2 years of termination of the lease and either reuse, recycle, or responsibly dispose of all materials removed.

Lessees would be required to submit a decommissioning application upon the earliest of the following dates: 2 years before the expiration of the lease, 90 days after completion of the commercial activities on the commercial lease, or 90 days after cancellation, relinquishment, or other termination of the lease (30 CFR 285.905). Upon completion of the technical and environmental reviews, BSEE may approve, approve with conditions, or disapprove the Lessee's decommissioning application. The Lessees would need to obtain separate and subsequent approval from BOEM for facilities to be left in place approval of such activities would require compliance under NEPA and other federal statutes and implementing regulations. If a COP is approved or approved with modifications, the Lessee would have to submit a bond (or another form of financial assurance) that would be held by the U.S. government to cover the cost of decommissioning the entire facility in the event that the Lessee would not be able to decommission the facility.

2.1.3.1 Onshore Activities and Facilities

At the time of conceptual decommissioning, some components of the onshore electrical infrastructure may still have substantial life expectancies. Onshore export and transmission cables may be retired in place; however, if removal is required, the cables would be pulled and sent to repurposing or recycling facilities. Depending on the needs at the time, onshore facilities may be left in place for possible future use or demolished and materials recycled.

2.1.3.2 Offshore Activities and Facilities

Decommissioning of the WTGs and OSSs would typically follow a "reverse installation" process, with turbine components or the OSS topside structure removed prior to foundation removal. The procedures used for decommissioning the WTG and OSS foundations would depend on the type of foundation. Foundations that penetrate the seabed would be cut 15.0 feet (4.6 meters) below the mudline (BML) in accordance with 30 CFR 285.910 or may be removed completely.

Offshore export cables and interarray cables would either be decommissioned in place or removed from the seabed. The decision regarding whether to remove these cables and any overlying cable protection would be made based on future environmental assessments and consultations with federal, state, and municipal resource agencies.

2.2 Eight Projects

In addition to the analysis of one representative project, the Proposed Action also analyzes the impacts of eight representative projects ("eight projects") to evaluate the overall impacts of a full offshore wind buildout in the lease areas. The eight projects that are considered in this Programmatic BA are identified in Figure 1-1. While Lessees may elect a phased development approach resulting in more than one project per lease, for purposes of analysis, this Programmatic BA assumes one project per lease area. The same types of design parameters described for one representative offshore wind project within the Action Area would apply to eight projects, except that the number and length of each parameter is scaled for eight projects. The analysis of eight representative offshore wind projects within the Action Area includes up to 797 WTGs, 44 OSSs, 88 offshore export cables totaling 3,544 miles (5,704 kilometers), and 3,164 miles (5,092 kilometers) of interarray cables. The values for these parameters were provided by the NY Bight Lessees or were calculated by BOEM based upon information provided by the NY Bight Lessees and represent the maximum number of WTGs, OSSs, and maximum length of cables that could be expected for the eight projects, and is not a multiplication of the RPDE values of one representative project. The estimated number of acroos the eight projects comes from Table D-3 of the planned offshore wind projection in the Maryland Offshore Wind FEIS (summarized in Table 6.2)

3 Action Area

Under ESA Section 7 consultation regulation 50 CFR 402.02, the "Action Area" refers to all areas affected directly and indirectly by the Proposed Action. This includes the area where all consequences to listed species or critical habitat that are caused by the Proposed Action would occur, including actions that would occur outside the immediate area involved in the action (see 50 CFR 402.17). The Action Area therefore includes where all future project activities associated with the six NY Bight lease areas (OCS-A 0544, 0537, 0538, 0539, 0541, and 0542) and the two additional lease areas (OCS-A 0500 and 0519,) are expected to occur (Figure 1-1).

For the purposes of this Programmatic BA, the Action Area is further delineated into the onshore Action Area and the Offshore Action Area. The onshore Action Area encompasses portions of coastal Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Maryland, and Delaware within a 5 -mile (8-kilometer) buffer of the coastline. Onshore project components that would fall within this area are considered for potential impacts within this Programmatic BA. The Offshore Action Area encompasses each offshore windfarm's lease area, and potential locations for interarray cable routes, and transmission cable right-of-way to the onshore cable landing location and is characterized as the area from shoreline to 100 miles (161 kilometers) offshore. The Action Area, therefore, consists of the area where all effects of the Proposed Action would occur within the defined onshore and offshore portions.

Additionally, for the purposes of this Programmatic BA, the term "one project" is used in reference to the location where construction, O&M, and eventual decommissioning of a single representative project will occur. The term "eight projects" considers the six NY Bight lease areas and the additional two lease areas collectively under a realistic scenario of project development (i.e., slightly staggered construction, overlapping O&M).

4 Avoidance, Minimization, Mitigation, and Monitoring Measures

The Proposed Action for the Programmatic BA includes the application of programmatic AMMM measures (i.e., conservation measures) that BOEM, USFWS, BSEE, and USACE may require as conditions of approval for activities proposed by Lessees in COPs submitted for the lease areas within the Action Area.. BOEM, USFWS, BSEE, and USACE may require additional or different measures based on subsequent, site-specific BA analysis or the parameters of specific COPs. BOEM may also modify the measures at the COP-specific NEPA stage to tailor them specifically to the proposed project and/or site of proposed activities, and to ensure conformity with project-specific consultations and/or authorizations. Please note that not all of the AMMM measures are within BOEM's statutory and regulatory authority; those that are not may be adopted and imposed by other governmental agencies.

BOEM identified the AMMM measures analyzed in the Programmatic BA from review of other offshore wind COPs; COP EISs; scoping comment letters; input from cooperating agencies and participating agencies, and Cooperating Tribal Governments; public comments on the Draft PEIS; and through other programmatic consultations under the ESA. BOEM analyzed AMMM measures that would be applicable to more than one lease area, are reasonable and enforceable, and allow for flexibility where appropriate. These AMMM measures are considered programmatic insofar as they may be applied to COPs for the six NY Bight lease areas as well as the additional two lease areas analyzed in this BA. BOEM may require additional or different measures based on future, site-specific NEPA analysis or the parameters of specific COPs. The project-specific conservation measures would be developed with spatial and temporal context, would be tailored to project methods and activities, and would include triggers for adaptive actions. In accordance with USACE's requirements under Section 404(b)(1) Guidelines, impacts to waters of the U.S., including wetlands and streams, will be avoided and minimized to the maximum extent practicable.

The complete list of AMMM measures can be found in Appendix G, *Mitigation and Monitoring* of the PEIS. Tables G-1 provides AMMM measures included in the analysis and Table G-2 provides best management practices (BMPs) which are not enforceable, but BOEM encourages Lessees to implement these BMPs as they may further avoid and minimize environmental impacts. These BMPs are not part of the Proposed Action. AMMM measures from the PEIS that have the potential to reduce impact to ESA-listed species under the Proposed Action of this BA are presented in Table 4-1. While some of the AMMM measures considered in this Programmatic BA do not have specificity associated with them to clearly identify the extent to which they would reduce potential impacts to the ESA-listed species, they do provide the framework and basis for future project-specific consultations and associated consultation measures. Many of the monitoring AMMM measures could be applied to impacts from all stressors and all ESA-listed species and do not directly reduce impact, however, the data gathered would be evaluated and considered to inform future mitigation and monitoring needs which will serve to reduce future impacts.

Table 4-1. Avoidance, Minimization, Mitigation, and Monitoring Measures under the Proposed Action applicable to ESA-listed bats, birds, and insects

Measure ID	Measure Name	Description	Resource Area Mitigated
BB-1	Immediate reporting of injured/dead ESA-listed bird and bats	Any occurrence of dead or injured ESA-listed birds or bats, or eagles protected under the Bald and Golden Eagle Protection Act, must be reported to BOEM, BSEE, and USFWS as soon as practicable (taking into account crew and vessel safety), ideally within 24 hours and no more than 72 hours after the sighting. If practicable, the Lessees must carefully collect the dead specimen and preserve the material in the best possible state, contingent on the acquisition of any necessary wildlife permits and compliance with the Lessee's health and safety standards. Occurrences of bird and bat carcasses must also be reported in the Injury and Mortality Reporting (IMR) System.	ESA-listed birds ESA-listed bats
BB-2	Injured/dead bird and bat reporting	The lessee must submit an annual report covering each calendar year, due by January 31, documenting any dead or injured birds or bats found on vessels and structures during construction, operations, and decommissioning in the preceding year. The report must be submitted to BOEM, BSEE, and USFWS. The report must contain the following information: the name of species, date found, location, a picture to confirm species' identity (if possible), and any other relevant information. Carcasses with federal or research bands must be reported to the United States Geological Survey Bird Band Laboratory. Developers should also report any other form of tag such as Motus or satellite. Occurrences of bird and bat carcasses must also be reported in the Injury and Mortality Reporting (IMR) System.	ESA-listed birds ESA-listed bats
BB-3	Birds and bat monitoring	**Bird and Bat Post-Construction Monitoring Plan.** The Lessees must develop and implement a Bird and Bat Post-Construction Monitoring Plan (BBPCMP) based on the Lessee's Bird and Bat Post-Construction Monitoring Framework (RP, BB-4), in coordination with USFWS, and other relevant regulatory agencies. Prior to, or concurrent with, offshore construction activities, including seabed preparation activities, the Lessees must submit a BBPCMP for BOEM, BSEE, and USFWS (New York and New Jersey Field Offices) review. BOEM, BSEE, and USFWS will review the BBPCMP and provide any comments on the plan within 60 days of its submittal. The Lessees must resolve all comments on the BBPCMP to BOEM's and BSEE's satisfaction before implementing the plan and before commissioning the first WTG. **Monitoring.** The Lessee must conduct monitoring as outlined in the BBPCMP, which must include use of radio tags to monitor movement of ESA-listed birds in the vicinity of the project. The BBPCMP will allow for changing methods over time in order to regularly update and refine collision estimates for listed birds. Specific to this purpose, the plan must include an initial monitoring phase involving deployment of Motus radio tags, or similar technology, on listed birds or other species of concern in conjunction with installation and operation of Motus receiving stations on WTGs in the Lease Area following offshore Motus recommendations (https://motus.org/groups/atlantic-offshore-wind/). The initial phase, which will last for the first few years of operation, may also include deployment of satellite-based tracking technologies (e.g., Global Positioning System [GPS], Argos tags, acoustic bat detectors, or integrated multi-sensor systems). The monitoring may also include measurement of avoidance behavior and densities. **Annual Monitoring Reports.** The Lessees must submit to BOEM (at renewable_reporting@boem.gov), USFWS, and BSEE (via TIMSWeb and at protectedspecies@bsee.gov) a comprehensive report after each full year of monitoring within 12 months. The report must include all data, analyses, and summaries regarding ESA-listed and non-ESA-listed birds and bats. BOEM, BSEE, and the USFWS shall use the annual monitoring reports to assess the need for reasonable revisions (based on subject matter expert analysis) to the BBPCMP. BOEM and BSEE reserve the right to require reasonable revisions to the BBPCMP and may require the use of new technologies as they become available for use in offshore environments. **Post-Construction Quarterly Progress Reports**. The Lessees must submit quarterly progress reports during the implementation of the BBPCMP to BOEM (at renewable_reporting@boem.gov), BSEE, and USFWS by the 15th day of the month following the end of each quarter during the first full year that the project is operational. The progress reports must include a summary of all post-construction monitoring performed, an explanation of overall progress, and any technical problems encountered. **Monitoring Plan Revisions.** Within 30 days of submitting the annual monitoring report, the Lessees must meet with BOEM, BSEE, USFWS, and appropriate state agencies to discuss the following: the monitoring results; the potential need for revisions to the BBPCMP, including technical refinements or additional monitoring; and the potential need for any additional efforts to reduce impacts. If, based on this annual review meeting, BOEM, in consultation with USFWS, determines that revisions to the BBPCMP are necessary, BOEM will require the Lessee to modify the BBPCMP. If the projected collision levels, as informed by monitoring results, deviate substantially from the Final COP NEPA analysis, the Lessee must transmit recommendations for new mitigation measures and/or monitoring methods to BOEM. In consultation with USFWS, BOEM and BSEE may adjust the frequency, duration, and methods for various monitoring efforts in future revisions of the BBPCMP based on current technology (including its cost) and the evolving weight of evidence regarding the likely levels of collision mortality for each listed bird species. **Operational Reporting (Operations)**. The Lessees must submit to BOEM (at renewable_reporting@boem.gov) and BSEE (via TIMSWeb and at protectedspecies@bsee.gov) an annual report summarizing monthly operational data calculated from 10-minute supervisory control and data acquisition data for all WTGs together in tabular format: the proportion of time the WTGs were operational (monthly revolutions per minute [rpm]), the average rotor speed (rpm) of spinning WTGs plus 1 standard deviation, and the average pitch angle of blades (degrees relative to rotor plane) plus 1 standard deviation. Any operational data considered by the Lessee to be privileged or confidential must be clearly marked as confidential business information and will be handled by BOEM and BSEE in a manner consistent with 30 CFR 585.114. **Raw Data.** The Lessees must store the raw data from all avian and bat surveys and monitoring activities according to accepted archiving practices. Such data must remain accessible to BOEM, BSEE and USFWS upon request for the duration of the lease. The Lessees must work with BOEM to ensure the data are publicly available. All avian tracking data (i.e., from radio and satellite transmitters) must be stored, managed, and made available to BOEM, BSEE, and USFWS following the protocols and procedures outlined in the agency document entitled *Guidance for Coordination of Data from Avian Tracking Studies*, or its successor applicable at the time the particular data is being stored. All bat data must be stored in the North American Bat Monitoring Program (NABat) database.	ESA-listed birds ESA-listed bats

Measure ID	Measure Name	Description	Resource Area Mitigated
BIR-1	Bird-Deterrent Devices and Plan	To minimize attracting birds to operating WTGs, the Lessee must install bird perching-deterrent device(s) on each WTG and OSS. The Lessee must submit a plan to deter perching on offshore infrastructure by roseate terns and other marine birds for BOEM and BSEE to review in coordination with USFWS and with the FIR ("Bird Perching Deterrent Plan"). BOEM, BSEE, and USFWS will review the Bird Perching Deterrent Plan and provide any comments on the plan within 60 days of its submittal. The Lessee must resolve all comments on the Bird Perching Deterrent Plan to the satisfaction of BOEM and BSEE before implementing the plan The Bird Perching Deterrent Plan must include the type(s) and locations of bird perching-deterrent devices and a monitoring plan for the life of the project, must allow for modifications and updates as new information and technology becomes available, and must track the efficacy of the deterrents. The plan must be based on best available science regarding the effectiveness of perching-deterrent devices on minimizing collision risk. The location of bird perching-deterrent devices must be proposed by the Lessee based on BMPs applicable to the appropriate operation, effectiveness, and safe installation of the devices. The Lessee must also provide the location and type of bird-deterrent devices as part of the as-built submittals to BSEE.	ESA-listed birds
BIR-2	Light impact reduction for birds	Nothing in this condition supersedes or is intended to conflict with lighting, marking, and signaling requirements of FAA, USCG, or BOEM. The Lessee must use lighting technology that minimizes impacts on avian species to the extent practicable, including lighting designed to minimize upward illumination. The Lessee must provide USFWS with a courtesy copy of the final Lighting, Marking, and Signaling Plan, and the Lessee's approved application to USCG to establish Private Aids to Navigation (PATON).	ESA-listed birds
BIR-3	Compensatory Mitigation Plan for Piping Plover and Red Knot	At least 180 days prior to the start of commissioning of the first WTG, the Lessee would distribute a Compensatory Mitigation Plan for piping plovers and red knot to BOEM, BSEE, and USFWS for review and comment. BOEM, BSEE, and USFWS would review the Compensatory Mitigation Plan and provide any comments on the plan to the Lessee within 60 days of its submittal. The Lessee would resolve all comments on the Compensatory Mitigation Plan to BOEM, BSEE, and USFWS's satisfaction before implementing the plan and before commissioning of the first WTG. The Compensatory Mitigation Plan would provide compensatory mitigation actions to fully offset the impact of the incidental take of piping plover and red knot. The Compensatory Mitigation Plan would require that the compensatory mitigation be implemented by the fifth year of WTG operation. The Lessee will review the effectiveness of the plan with BOEM, BSEE and USFWS at regular (5 year) intervals thereafter or as new information becomes available, during which alternative and adaptive strategies might be considered. The Compensatory Mitigation Plan would include: (1) a quantification of the level of offsets to fully offset the impact of the incidental take expressed in the Incidental Take Statement, based on scientifically recognized techniques and methodologies for each of the impacted species: piping plover and red knot; (2) detailed description of the mitigation actions for each species (Piping plover examples: Habitat enhancement, predator control, reduction of disturbance at wintering sites, etc. Rufa red knot examples: habitat restoration, reduce displacement from peregrine falcons, red tide rehabilitation, etc.); (3) the specific location for each mitigation action; (3) a timeline for completion of the mitigation measures; (4) details of the mitigation mechanisms (e.g., conservation bank, in-lieu fee, applicant-proposed mitigation); (5) best available science linking the compensatory mitigation action(s) to the projected level of collision mortality; and (6) monitoring and reporting to ensure the effectiveness of the mitigation actions in offsetting take.	Piping Plover and Red Knot

Measure ID	Measure Name	Description	Resource Area Mitigated
MUL-1	Marine debris awareness and elimination	"Marine trash and debris" is defined as any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper or any other solid, human-made item or material that is lost or discarded in the marine environment by the Lessee or an authorized representative of the Lessee (collectively, the "Lessee") while conducting activities on the OCS in connection with a lease, grant, or approval issued by the BOEM or BSEE. To understand the type and amount of marine debris that may be generated, and to minimize the risk of entanglement in and/or ingestion of marine debris by protected species, the Lessee must implement the following: 1. Marine Debris Awareness Training and Certification: The Lessee must ensure that all vessel operators, employees, and contractors engaged in a Project's offshore activities complete marine trash and debris awareness training initially (i.e., prior to engaging in offshore activities pursuant to the approved COP) and annually. Operators must implement a marine debris awareness training and certification process that ensures that their employees and contractors are adequately trained. The training and certification process must include the following elements: (1) viewing of either a marine debris video or training slide pack posted on the BSEE website (https://www.bsee.gov/debris) or by contacting BSEE; (2) receiving an explanation from management personnel that emphasizes their commitment to the requirements; and (3) documented certification that all personnel listed above have completed their initial and annual training. The Lessee must make this certification available for inspection by BSEE upon request. 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 BSEE at marinedebris@bsee.gov. The training videos, slides, and related material may be downloaded directly from the website. 2. Training Compliance Report: By January 31 of each year, the Lessee must submit to BSEE 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. 3. Marking: Any materials, equipment, tools, containers, and other items that are used in OCS activities and that are of such shape or configuration that make them likely to snag or damage fishing devices or be lost or discarded overboard, must be clearly marked with the vessel or facility identification number, and must be properly secured to prevent loss overboard. All markings must clearly identify the owner and must be able to resist the effects of the environmental conditions to which they may be exposed. 4. Recovery and Prevention: Discarding trash or debris in the marine environment is prohibited. Debris accidentally released by the Lessee into the marine environment while performing any activities associated with the Project must be recovered within 24 hours when the marine debris is likely to (a) cause undue harm or damage to natural resources (e.g., entanglement or ingestion by protected species); or (b) interfere with OCS uses (e.g., snagging or damaging fishing equipment, or presenting a hazard to navigation). If the marine debris was lost within the boundaries of an archaeological resource/avoidance area, or a sensitive ecological/benthic resource area, the Lessee must contact BSEE for concurrence before conducting any recovery efforts. The Lessee must take steps to prevent similar releases of marine debris and must submit a description of these preventative actions to BSEE within 30 days from the date on which the release of marine debris occurred. 5. Notification: The Lessee must notify BSEE within 24 hours of any releases of marine debris and indicate whether the released marine debris was immediately recovered. If the marine debris was not recovered, the Lessee must provide its rationale for not recovering the marine debris (e.g., marine debris is located within the boundaries of a sensitive area, recovery was not possible because conditions were unsafe, or recovery was not practicable and warranted because the released marine debris is not likely to result in items (a) or (b) listed in above). 6. Remedial Recovery: After reviewing the notification and rationale for any decision by the Lessee to forgo recovery, BSEE may order the Lessee to recover the marine debris if BSEE finds that the reasons provided by the Lessee in the notification are insufficient and the marine debris would cause undue harm or damage to natural resources or interfere with OCS uses. 7. Recovery Plan: If BSEE requires the Lessee to recover the marine debris, the Lessee must submit a Recovery Plan to BSEE within 10 days after receiving BSEE's order. Unless BSEE objects within 48 hours after the Recovery Plan has been accepted or is in review status by BSEE in TIMSWeb, the Lessee may proceed with the activities described in the Recovery Plan. Recovery activities must be completed 30 days from the date on which marine debris was released, unless BSEE grants the Lessee an extension.	ESA-listed birds

Measure ID	Measure Name	Description	Resource Area Mitigated
MUL-1 (cont'd)	Marine debris awareness and elimination (cont'd)	8. Recovery Completion Notification: Within 30 days after the marine debris is recovered, the Lessee must provide notification to BSEE that recovery was completed and, if applicable, describe any substantial variance from the activities described in the Recovery Plan that was required during the recovery efforts. 9. Monthly Reporting: The Lessee must submit to BSEE a monthly report, no later than the fifth day of the month, of all marine debris lost or discarded during the preceding month, including, if applicable, information related to 24 Hour Reporting and Recovery Plan and the referenced TIMSWeb Submittal ID (SID). The Lessee is not required to submit a report for those months in which no marine debris was lost or discarded. The monthly report must include the following: a. Project identification and contact information for the Lessee and for any operators or contractors involved; b. Date and time of the incident; c. Lease number, OCS area and block, and coordinates of the object's location (latitude and longitude in decimal degrees); d. A detailed description of the dropped object to include dimensions (approximate length, width, height, and weight), composition (e.g., plastic, aluminum, steel, wood or paper), and buoyancy (floats or sinks); e. Pictures, data imagery, data streams, and/or a schematic or illustration of the object, if available; f. Indication of whether the lost or discarded item could be detected as a magnetic anomaly of greater than 50 nanotesla (nT), a seafloor target of greater than 1.6 feet (0.5 meter), or a sub-bottom anomaly of greater than 1.6 feet (0.5 meter) when operating a magnetometer or gradiometer, side scan sonar, or sub-bottom profiler; g. Explanation of how the object was lost; and h. Description of immediate recovery efforts and results, including photos. 10. Annual Surveying and Reporting – Periodic Underwater Surveys, Reporting of Monofilament and Other Fishing Gear Around WTG Foundations: The Lessee must monitor indirect impacts associated with charter and recreational fishing gear lost from expected increases in fishing around WTG foundations by annually surveying at least 10 of the WTGs in the Lease Area for the first three years following COP approval and every 5 years thereafter. The Lessee may conduct surveys by remotely operated vehicles, divers, or other means to determine the frequency and locations of marine debris. The Lessee must report the results of the surveys to BOEM and BSEE in an annual report, submitted by January 31, for the preceding calendar year. Annual reports must be submitted in both Microsoft Word and Adobe PDF format. Photographic and videographic materials (TIFF or Motion JPEG 2000) must be provided in TIMSWeb with the submittal of the annual report. Photographic and videographic files can also be submitted to marinedebris@bsee.gov if the files cannot be uploaded in TIMSWeb. Survey design and effort (i.e., the number of WTGs and frequency of reporting) may be modified only upon review and concurrence by BOEM and BSEE. a. Annual reports must include a summary of the survey reports that includes survey date(s); contact information of the operator; location and pile identification number; photographic and/or video documentation of the survey and debris encountered; any animals sighted; and the disposition of any located debris (i.e., removed or left in place). Annual reports must also include claim data attributable to the Project from the Lessee's corporate gear loss compensation policy and procedures. Required data and reports may be archived, analyzed, published, and disseminated by BOEM and BSEE. 11. Site Clearance and Decommissioning: The Lessee must include and address information on unrecovered marine debris in the description of the site clearance activities provided in the decommissioning application required under 30 C.F.R. § 285.906.	
MUL-37	Aircraft Detection Lighting System (ADLS)	The Lessee must use an FAA-approved vendor for the ADLS, which will activate the FAA hazard lighting only when an aircraft is in the vicinity of the wind facility to reduce visual impacts at night. The Lessee must confirm the use of an FAA-approved vendor for ADLS on WTGs and OSSs in the FIR.	ESA-listed birds

ADLS = aircraft detection lighting system; BMPs = Best Management Practices; BOEM = Bureau of Ocean Energy Management; BSEE = Bureau of Safety and Environmental Assessment; COP = constructions and operations plan; DOE = Department of Energy; DOI = Department of the Interior; ESA = Endangered Species Act; FAA = Federal Aviation Administration; FDR = federal design report; FIR = final installation report; IR = inadvertent returns; ISO = independent system operator; MMPA = Marine Mammal Protection Act; NARW = North Atlantic right whale; NMFS = National Marine Fisheries Service; NYSERDA = New York State Energy Research and Development Authority; OCS = outer continental shelf; OSS = offshore substation; PATON = Private Aids to Navigation; PEIS = programmatic environmental impact statement; POI = point of interconnection; RTO = regional transmission organization; SAA = state agreement approach; TOYRs = time of year restrictions; USCG = United States Coast Guard; USFWS = United States Fish and Wildlife Service; WTG = wind turbine generator.

5 ESA Species and Critical Habitat within the Action Area

A total of 20 federally listed, proposed listed, and candidate species occur or portantially occur in all or portions of the Action Area. This includes four federally listed birds, two federally listed bats, one proposed listed bat, two federally listed reptiles, seven federally listed plants, three federally listed insects, and one candidate insect. Of these, 14 species were excluded from further analysis (Section 5.1) and seven species were considered for analysis (Section 5.2) in this Programmatic BA. There is no designated critical habitat for these species in the Action Area.

5.1 ESA-Listed Species Considered but Excluded from Further Analysis

Several species have broad ranges that may include the Action Area but are not likely to be affected by the Proposed Action. The 14 ESA-listed species in Table 5-1 were considered for their potential to occur in the Action Area, but were excluded from further analysis because the potential for adverse effects from the Proposed Action were determined to be extremely unlikely to occur and, therefore, ***discountable***[7] with the application of AMMM measures (i.e., conservation measures) (Section 4). Explanations for discounting potential effects for these species are provided in Table 5-1. Given this programmatic analysis precedes the submittal of COPs for the projects, project-specific details are not known at this time. If a project's Proposed Action includes activities or locations not included in this Programmatic BA, re-evaluation of these species will be warranted in project-specific consultations.

[7] "Discountable" effects refer to potential effects that are found to support a "not likely to adversely affect" conclusion because they are extremely unlikely to occur.

Table 5-1. Threatened or endangered species that may occur in the Action Area excluded from further analysis due to discountable effects from the Proposed Action.

Species	Status	Primary Occurrence	Habitat	Reason for Discounting
Mammals				
Indiana bat (*Myotis sodalis*)	E	Onshore	Occurs in interior portions of the eastern and central United States. Hibernation habitat: During the winter, the species hibernates in caves and mines, mainly in the east-central U.S. Summer habitat: most reproductive females occupy roost sites in forested areas or along a wooded edge. Habitats in which maternity roosts occur include riparian zones, bottomland and floodplain habitats, wooded wetlands, and upland communities. Indiana bats typically forage in semi-open to closed forested habitats with open understory, forest edges, and riparian areas. (USFWS 2023a).	For the purposes of this consultation on the Programmatic BA, BOEM assumes Indiana bat maternity roosts could be avoided by Project activities. Hibernacula sites do not overlap with the Action Area. In addition, appropriate measures would be implemented to avoid and minimize impacts to suitable summer habitat for this species during the project-specific analysis.
Birds				
Eastern black rail (*Laterallus jamaicenis ssp. Jamaicensis*)	T	Tidal and non-tidal marsh	Breeding: tidal or non-tidal marsh that can range in salinity from salt to brackish to fresh water. Typically found in salt and brackish marshes with dense vegetation and can also be found in upland areas directly adjacent to marshes. Migratory: wet prairies, wet meadows, and hay fields. (USFWS 2020a).	For the purposes of this consultation on the Programmatic BA, we assume wetland habitat that are known to support Eastern Black Rail could be avoided by Project activities. In addition, appropriate measures would be implemented to avoid and minimize impacts to wetlands suitable for this species during the project-specific analysis.
Reptiles				
Bog turtle (*Glyptemys muhlenbergii*)	T	Wetland	The species occupies wet grassy areas, mossy bogs, and herbaceous meadows that have unpolluted, clear spring-fed streams that flow throughout the year. Open areas are required for basking and nesting. (USFWS 2023b).	For the purposes of this consultation on the Programmatic BA, we assume wetland habitat that are known to support Bog turtles could be avoided by Project activities. In addition, appropriate mitigation would be implemented to avoid and minimize impacts to wetlands suitable for this species during the project-specific analysis.
Plymouth redbelly turtle (*Pseudemys rubriventris bangs*i)	E	Wetland	The species occupies a variety of aquatic habitats in southeastern Massachusetts, including wetland areas such as marshes or swamps that are often covered intermittently with shallow water or have soil saturated with moisture. (USFWS 2023c).	For the purposes of this consultation on the Programmatic BA, we assume wetland habitats that are known to support the Plymouth red belly turtle could be avoided by Project activities. In addition, appropriate mitigation would be implemented to avoid and minimize impacts to wetlands suitable for this species during the project-specific analysis.
Insects				
American burying beetle (*Nicrophorus americanus*)	T	Onshore	The species occupies a variety of onshore habitats, including wet meadows, grassland, riparian zones, and forest.	The only occurrence within the Action Area is on Block Island off the coast of Rhode Island and in reintroduced populations on Nantucket Island off the coast of Massachusetts, though successful overwintering has not been documented in reintroduced populations. For the purposes of this consultation on the Programmatic BA, BOEM assumes these locations will not overlap with any project activities.
Northeastern beach tiger beetle (*Habroscelimorpha dorsalis dorsalis*)	T	Coastal onshore	The species occurs on sandy beaches, with a preference for undisturbed beaches with sufficient width to minimize inundation risk.	For the purposes of this consultation on the Programmatic BA, we assume beaches that are known to support this species could be avoided by Project activities. In addition, appropriate mitigation (e.g., installation of the offshore export at the landfall site using horizontal directional drilling [HDD]) would be implemented thus avoiding impacts to habitat for this species during the project-specific analysis.
Rusty patched bumble bee (*Bombus affiniss*)	E	Onshore	The species occurs in a variety of habitats, including prairies, woodlands, marshes, agricultural landscapes and residential parks and gardens. The rusty patched bumble bee requires areas that support sufficient food, including nectar and pollen from diverse and abundant flowers, as well as undisturbed nesting sites that are in proximity to those floral resources. (USFWS 2023d).	The rusty patched bumble bee exists in very few, highly localized regions and is likely limited to a small portion of Cape Cod, Massachusetts, within the Action Area. For the purposes of this Programmatic BA, BOEM therefore assumes that these areas with known occurrence could be avoided by Project activities.

Species	Status	Primary Occurrence	Habitat	Reason for Discounting
Plants				
American chaffseed (*Schwalbea americana*)	E	Forest and Wetland	The species occurs in sandy (sandy peat or sandy loam), acidic, seasonally moist to dry soils. It is generally found in habitats described as open, moist pine flatwoods, fire-maintained savannas, ecotonal areas between peaty wetlands and xeric sandy soils, and other open grass-sedge systems. (Buchanan and Finnegan 2010).	For the purposes of this Programmatic BA, we assume beaches that are known to support this species could be avoided by Project activities. In addition, appropriate measures (e.g., installation of the offshore export at the landfall site using HDD) would be implemented thus avoiding impacts to habitat for this species.
Knieskern's beaked-rush (*Rhynchospora knieskerniia*)	T	Wetlands	The species is endemic to five counties in the New Jersey Pine Barrens. Restricted to early successional habitats in pitch pine lowland forests within pine barrens. This species prefers a substrate that is nutrient poor, highly acidic, fine-grained mineral soils and can frequently be found over clay deposits and sometimes found on bog iron deposits. This species also prefers areas with a fluctuating water level, bare or sparsely vegetated areas that remain open due to disturbances either natural or human caused. (NatureServe 2020a).	Knieskern's beaked-rush is endemic to the Pinelands region of New Jersey, occurring in moist to wet substrate. For the purposes of this Programmatic BA, we assume wetland habitat that are known to support this species could be avoided by Project activities through project-specific conservation measures. BOEM assumes these measures would be implemented to avoid and minimize impacts to wetlands suitable for this species during the project-specific analysis.
Sandplain gerardia (*Agalinis acuta*)	E	Inland	The species occurs in sandy dry soils of roadsides and grasslands within pine/oak scrub openings often associated with growth of lichens and scattered patches of bare soil and in sandy plains (NHESP 2015a).	For the purposes of this Programmatic BA, we assume that habitat known to support Sandplain gerardia could be avoided by Project activities. Sandplain gerardia occurs in dry, sandy soil in grasslands, along roadsides, and in sandy plains in isolated locations in Massachusetts, Rhode Island, Connecticut, and New York. In addition, appropriate mitigation would be implemented to avoid and minimize impacts to suitable habitat for this species during the project-specific analysis.
Seabeach amaranth (*Amaranthus pumilus*)	T	Coastal onshore	The species occurs on barrier islands, usually on coastal over-wash flats at the accreting ends of the islands and lower foredunes and on ocean beaches above mean high tide. Prefers areas that are not well vegetated (NatureServe 2020b).	For the purposes of this consultation on the Programmatic BA, we assume beaches that are known to support this species could be avoided by Project activities. In addition, appropriate measures (e.g., installation of the offshore export at the landfall site using HDD) would be implemented thus avoiding impacts to habitat for this species during the project-specific analysis.
Sensitive joint-vetch (*Aeschynomene virginica*)	T	Coastal onshore	The species occurs in the intertidal zone of coastal marshes where plants are flooded twice daily. The species seems to prefer the marsh edge at an elevation near the upper limit of tidal fluctuation, where soils may be mucky, sandy, or gravelly. It is usually found in areas where plant diversity is high (50 species per acre) and annual species predominate. Bare to sparsely vegetated substrates appear to be of critical importance to this plant. (USFWS 2023e).	Sensitive joint-vetch typically grows in the intertidal zone of coastal marshes where plants are flooded twice daily. According to the Five-Year Review completed in 2013, only 32 occurrences remain in New Jersey, Maryland, North Carolina, and Virginia, and the species is no longer found in Pennsylvania and Delaware. Given its limited and localized occurrence, for the purposes of this consultation on the Programmatic BA, we assume beaches that are known to support this species could be avoided by Project activities. In addition, appropriate measures (e.g., installation of the offshore export at the landfall site using HDD) could be implemented thus avoiding impacts to habitat for this species during the project-specific analysis.
Small whorled pogonia (*Isotria medeoloides*)	T	Forest	The species, a type of orchid, grows in older hardwood stands of beech, birch, maple, oak, and hickory that have an open understory. Sometimes it grows in stands of softwoods such as hemlock. It prefers acidic soils with a thick layer of dead leaves, often on slopes near small streams. (USFWS 2023f).	The Small whorled pogonia grows in a variety of upland, mid-successional, wooded habitats. For the purposes of this consultation on the Programmatic BA, we assume that appropriate conservation measures would be implemented to avoid and minimize impacts to suitable habitat for this species during the project-specific analysis.
Swamp pink (*Helonias bullata*)	T	Wetland	The species occurs in swampy forested wetlands bordering meandering streams; headwater wetlands; sphagnous hummocky, dense, Atlantic white cedar swamps; blue ridge swamps; meadows; bogs and spring seepage areas. In conjunction with these areas the species also requires habitat that is permanently saturated, but not inundated, by floodwaters. There must be a water table near the surface that fluctuates slightly during spring and summer months. Prefers areas with 20 to 100 percent canopy cover (USFWS 2016).	For the purposes of this consultation on the Programmatic BA, we assume wetland habitat that are known to support Swamp pink could be avoided by project activities. In addition, appropriate measures would be implemented to avoid and minimize impacts to wetlands suitable for this species during the project-specific analysis.

Status Definitions: C = Candidate for Federal listing; E = Federally listed Endangered; PT = Proposed Threatened; T = Federally listed Threatened.

5.2 ESA-Listed Species Considered for Further Analysis

This section describes the seven threatened, endangered, or candidate species under the USFWS' jurisdiction that may occur in the Action Area or may be affected by the Proposed Action (Table 5-2). Data sources used for the analysis are discussed in Section 5.3. A description of each species and the potential occurrence in the Action Area is provided in Sections 5.4 through 5.9.

Table 5-2. Threatened, endangered, or candidate species that may occur in the Action Area and considered for further analysis.

Species	Status	Primary Occurrence	Habitat(s)
Mammals			
Northern long-eared bat (*Myotis septentrionalis*)	E	Onshore	Hibernates in caves, mines, and occasionally human structures (e.g., barns, sheds) during the winter; roosts and forms maternity colonies in trees with loose bark or cavities during the summer and portions of the spring and fall. Forages within forests.
Tricolored bat (*Perimyotis subflavus*)	PE	Onshore	Hibernates in caves and mines during the winter; roosts primarily among live and dead leaf clusters of live or recently dead deciduous hardwood trees, and occasionally human structures (e.g., barns, bridges) during the summer and portions of the spring and fall. Forages around water and forest edges.
Little brown bat (*Myotis lucifugus)*	C	Onshore	Hibernates in caves, mines, and occasionally human structures (e.g., barns, sheds) during the winter; roosts under rocks, in trees, piles of wood, and human structures; forms maternity colonies primarily in human structures or, occasionally, in hollow trees; or cavities during the summer and portions of the spring and fall.
Birds			
Piping plover (*Charadrius melodus*)	T	Coastal	Oceanfront beaches and barrier islands; forages on intertidal beaches, exposed mudflats and sandflats, wrack lines and bayside shorelines; nests in coastal sandy beaches and dunes. Winter migration as birds travel to wintering grounds, can include nearshore, overland, and over-water routes.
Roseate tern (*Sterna dougallii dougallii*)	E	Coastal	Coastal beaches; protected bays and estuaries; offshore ocean. This species is exclusively marine, usually breeding on small islands, but occasionally on sand dunes at the ends of barrier beaches. Roosting habitats for non-breeding roseate terns along the Northeast/mid-Atlantic Coast include open beaches, coastal inlets, river mouths, sand spits, and tidal flats. Terns may also rest on the surface of open water, and on jetties or other artificial structures.
Rufa red knot (*Calidris canutus rufa*)	T	Coastal	Oceanfront beaches and barrier islands during migration; bayside areas and oceanfront habitats (e.g., tidal flats, spits, shoals, bars, and peat banks) for stop-over habitat. Winter migration as birds travel to wintering grounds, can include nearshore, overland, and over-water routes.
Insects			
Monarch butterfly (*Danaus plexippus*)	C	Onshore & Coastal	Fields, open areas, rights-of-way, wet areas, urban areas, or other areas where milkweed and flowering plants are present. Can feed on many different flowering plants but can only lay eggs on milkweed.

Status Codes: C = Candidate for Federal listing; E = Federally listed Endangered; PE = Proposed Endangered; T = Federally listed Threatened.

5.3 Data Sources for Analysis

Sources of information used in this BA to describe potential occurrences of ESA-listed species in the Action Area, and potential impacts from the Proposed Action, included the USFWS IPaC; recent USFWS Biological Opinions and Biological Assessments from prior mid-Atlantic offshore wind projects; USFWS 5-year reviews, species status assessments, and recovery plans; *Federal Register* publications (i.e., listing rules); tracking studies and surveys of ESA-listed birds and bats in the offshore environment (e.g., Loring et al. 2019); peer-reviewed literature; and other sources as cited herein. Additional sources of information for ESA-listed birds in the Action Area are the National Oceanic and Atmospheric Administration (NOAA) Northwest Atlantic Seabird Catalog data. BOEM's *Information Synthesis on the Potential for Bat Interactions with Offshore Wind Facilities* report (Pelletier et al. 2013) was also referenced for the assessment of bat occurrences in the offshore portion of the Action Area and the likelihood of impacts from offshore activities of the Proposed Action.

5.4 Northern Long-eared Bat

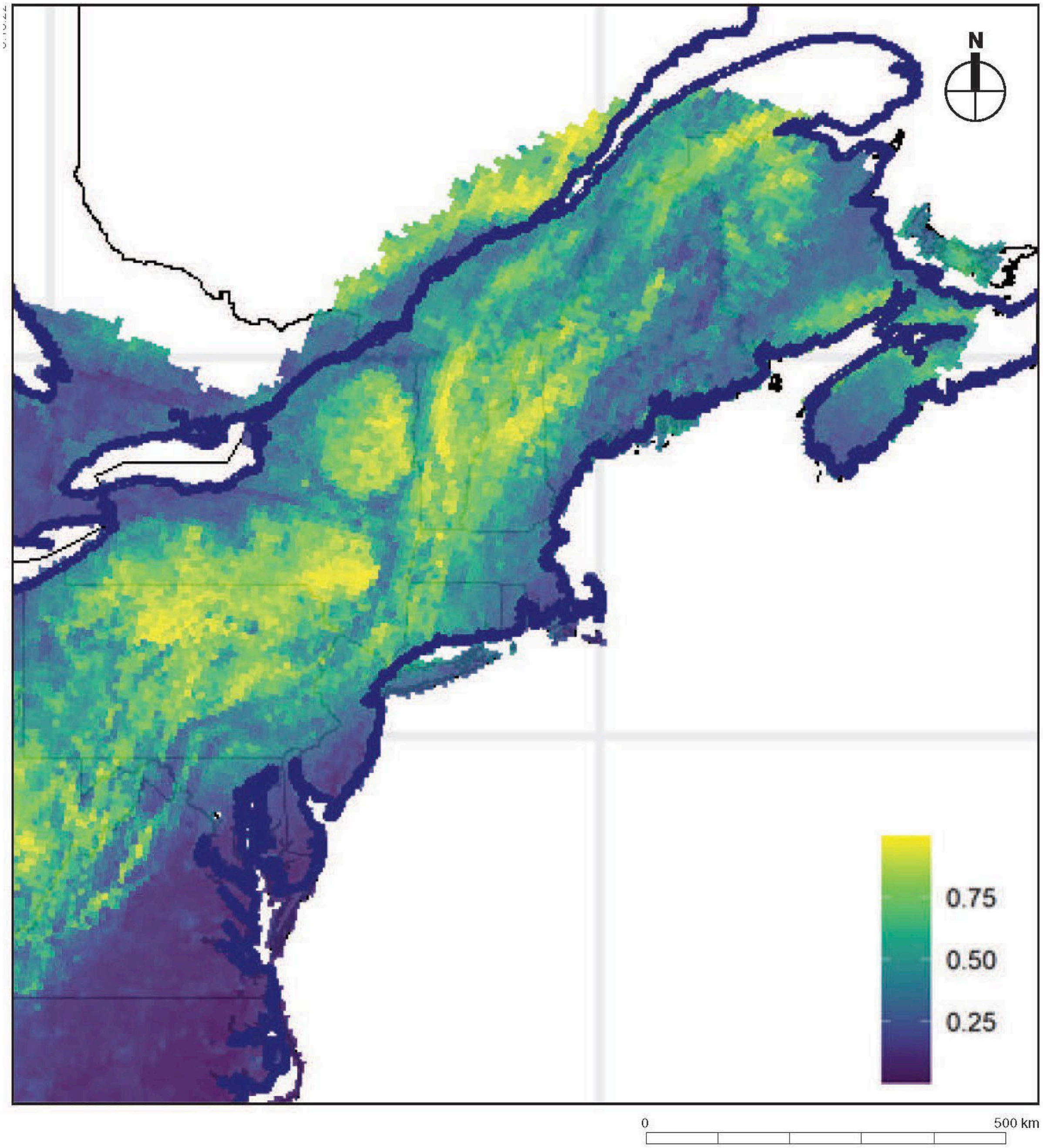
5.4.1 Species Description, Status and Habitats

The northern long-eared bat (*Myotis septentrionalis*) is widely distributed throughout much of eastern and central North America. Following substantial population decline as a result of white-nose syndrome (WNS), a fungal disease of hibernating bats that results in high mortality rates, the northern long-eared bat was federally listed as threatened in 2015 (80 *FR* 17974). On November 29, 2022 USFWS announced a final rule to reclassify the status under ESA as endangered, which went into effect on March 31, 2023 (50 CFR Part 17 [November 30, 2022], 87 *FR* 73488 [January 26, 2023]). Critical habitat was assessed for the species but was determined not prudent in April 2016 (81 *FR* 24707); thus, no critical habitat exists for the northern long-eared bat. There is no definitive estimate of population size for northern long-eared bat across the species range.

The range of the northern long-eared bat includes most of the eastern and midwestern United States and southern Canada (USFWS 2022a). Within the northeastern United States, this species occurs from Maine to Virginia and occurs in both inland and coastal areas. U.S. Geological Survey North American Bat (NABat) Status and Trends data indicate that northern long-eared bat summer occupancy is lower along the Atlantic coast and higher in interior areas and represents the best available data suitable for this Programmatic BA. Documented northern long-eared bat maternity roost locations within the Action Area are not available at this programmatic stage, specific maternity locations will be addressed in the COP-specific consultation.

The annual life cycle of the northern long-eared bat includes winter hibernation, spring staging, spring migration, summer birth of young, fall migration, and fall swarming and mating. The northern long-eared bat overwinters in caves and abandoned mines and will use the same hibernaculum for multiple years. In spring, the bats leave their hibernacula to roost in trees and forage near the hibernaculum in preparation for migration. Trees used are typically greater than or equal to 3 inches (7.6 centimeters) diameter at breast height, within 1,000 feet (305 meters) of forest. They also roost in cracks, crevices, cavities, and exfoliating bark of trees. From approximately mid-May through mid-August, they occupy summer habitat, where they roost under bark and in cavities or crevices of both live and dead trees (Foster and Kurta 1999; Owen et al. 2002; Perry and Thill 2007). Most foraging is within a few meters above the ground in between the understory and forest canopy (Brack and Whitaker 2001) and within a few kilometers of their roost sites (Timpone et al. 2010). Northern long-eared bats are insectivorous, typically foraging on moths, flies, leafhoppers, caddisflies, and beetles (Brack and Whitaker 2001). Females roost in small maternity colonies and males roost alone (Amelon and Burhans 2006). Northern long-eared bats also switch roosts frequently, typically every 2 to 3 days (Carter and Feldhamer 2005; Foster and Kurta 1999; Owen et al. 2002). During breeding and in the summer, northern long-eared bats have small home ranges (less than 25 acres [10 hectares]; Silvis et al. 2016). Individuals congregate in the vicinity of their hibernacula in August or September and enter hibernacula in October and November. Regional migratory movements between seasonal habitats (i.e., summer roosts and winter hubernacula) are typically short, ranging from approximately 35 miles (56 kilometers) to 55 miles (89 kilometers; USFWS 2022a).

Cave-hibernating bats generally exhibit lower activity in the offshore environment than migratory tree bats (Sjollema et al. 2014). Of the offshore survey campaigns for bats on the Atlantic in other lease areas (Kitty Hawk, CVOW-commercial, US Wind, Atlantic Shores South, Empire Wind, Revolution Wind, Sunrise Wind, and Beacon), there was only one of potential detection of Northern long eared bat during geo surveys for South Fork Wind by 2 acoustic bat detectors were deployed on the Fugro Enterprise vessel railing from July 14 to November 15, 2017. A recent tracking study (n = 8; July–October 2016) conducted on Martha's Vineyard did not record any offshore movements of northern long-eared bat (Dowling et al. 2017). Additionally, stationary acoustic detectors positioned on two WTGs within the operational Block Island Wind Farm in Rhode Island did not detect any northern long-eared bat calls over a 3-year period (Stantec 2020). Similarly, acoustic detectors on WTGs in a Coastal Virginia Offshore Wind (CVOW) pilot project off Virginia did not detect northern long-eared bats during a 1-year survey period (Willmott et al 2023), nor did acoustic surveys conducted over an 8-month period in the Empire Wind offshore project area off New York (Tetra Tech 2021a). Overall, any occurrences of the northern long-eared bat in the offshore portion of the Action Area would be expected to be extremely rare.



Source: U.S. Geological Survey, North American Bat Monitoring Program (USGS 2023).

Figure 5-1. *Myotis septentrionalis* mean occupancy probabilities predicted in the modeled species range for 2019

5.4.2 Species Occurrence within the Action Area

Based on their habitat preferences, northern long-eared bat occurrence is relatively low within the Action Area is limited to onshore portions (see Figure 5-1); developed areas and nearshore/coastal habitat are unlikely to provide high-quality foraging or roosting habitat for the species. As discussed in Section 5.4.1, this species is virtually absent from the offshore environment; as a result, presence in the offshore portion of the Action Area is expected to be extremely rare for the northern long-eared bat.

Since this Programmatic BA preceeds COP submittal for the projects, locations and details of onshore project activities are not known at this time. Given this, it is conservatively assumed that any overlap between northern long-eared bat habitat and project-specific activities could result in potential impacts to the species without the application of project-specific conservation measures.

5.5 Tricolored Bat

5.5.1 Species Description, Status and Habitats

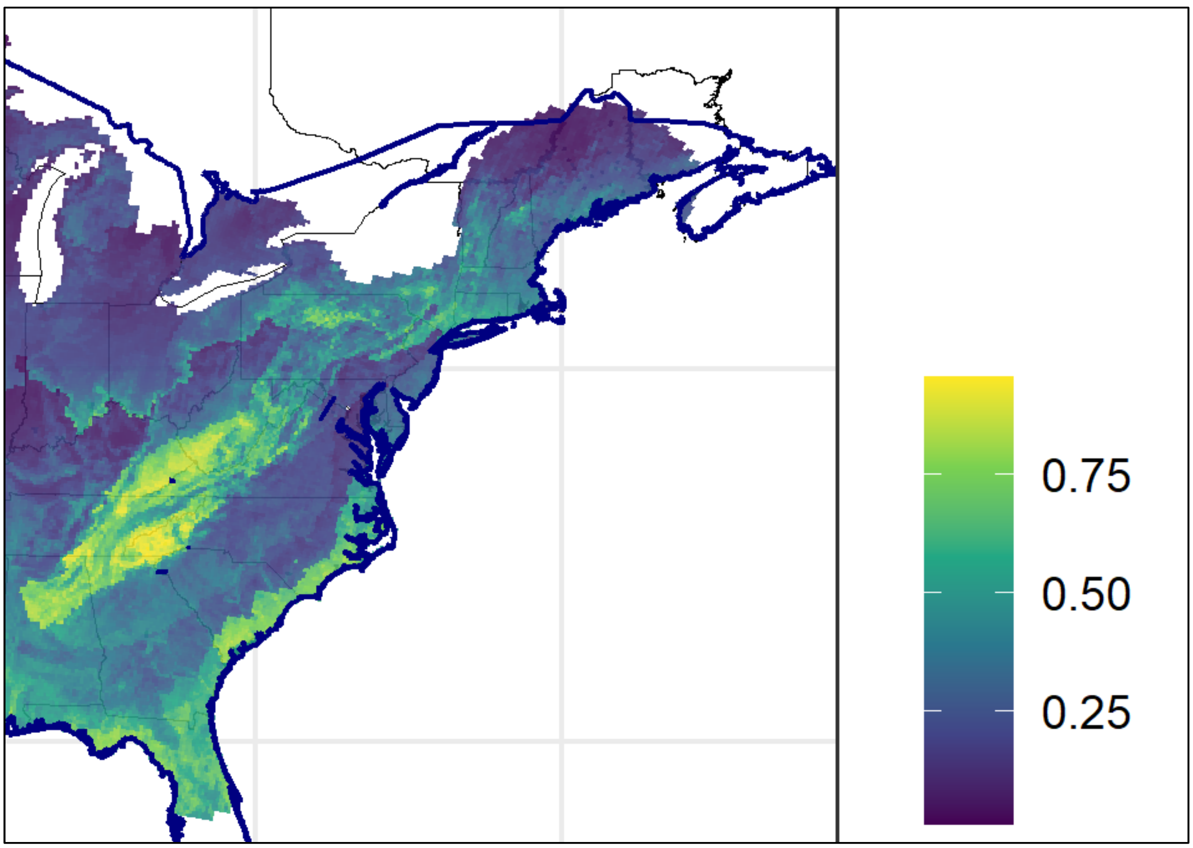
The tricolored bat is a small bat, measuring about 2 inches in body length (up to 3.5 inches including the tail) and weighing up to approximately 8 grams (USFWS n.d). The tricolored bat is distinguished by fur that appears dark at the base, lighter in the middle, and dark at the tip. They often appear yellowish, varying form pale yellow to nearly orange, but may also appear silvery-gray, chocolate brown, or black. Young bats are much darker and grayer than adults. The tricolored bat's range in the United States includes most of the eastern and midwestern United States. The species was once common and has declined by 90 percent to 100 percent in most locations due to impacts from WNS (USFWS 2021a).

The tricolored bat is currently not federally listed, but on September 14, 2022, USFWS issued a proposed rule to list the species as endangered, primarily due to impacts of WNS which is a deadly fungal disease affecting cave dwelling bats (87 *FR* 56381). Figure 5-2 presents mean summer occupancy probabilities for tricolored bat's eastern range (USGS 2023) and represents the best available data suitable for this Programmatic BA. Most hibernacula are located inland (Figure 5-3); however, within the next six years, the number and range of hibernacula are expected to drastically contract inland and virtually dispearing from the coast (Figure 5-4) and will likely result in a decrease in dectections along the edges of its current distribution.

During the spring, summer, and fall—collectively referred to as the non-hibernating seasons—tricolored bats primarily roost among leaf clusters of live or recently dead deciduous hardwood trees, especially oak trees (*Quercus* spp.). In the southern and northern portions of the range, tricolored bats will also roost in Spanish moss (*Tillandsia usneoides*) and *Usnea trichodea* lichen, respectively. In addition, tricolored bats have been observed roosting during summer among pine needles; in eastern red cedar (*Juniperus virginiana*); within artificial roosts like barns; beneath porch roofs, bridges, and concrete bunkers; and rarely within caves. Female tricolored bats exhibit high site fidelity, returning year after year to the same summer roosting locations. Females form maternity colonies and switch roost trees regularly. Males roost singly. During the winter, tricolored bats hibernate in caves and mines; in the southern United States, where caves are sparse, tricolored bats often hibernate in road-associated culverts and sometimes in tree cavities and abandoned water wells. They exhibit high site fidelity, with many individuals returning year after year to the same hibernaculum.

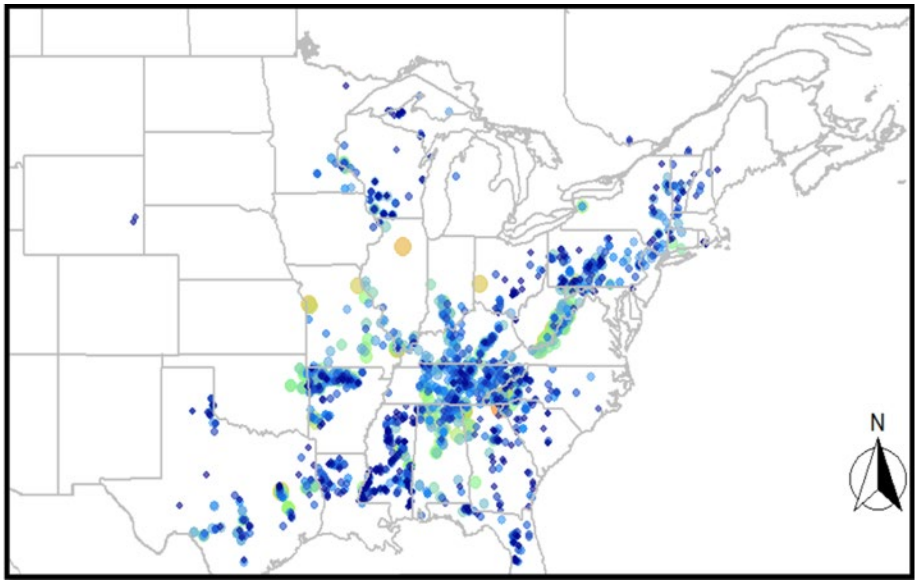
Tricolored bats mate in the fall, hibernate in the winter, and emerge in the spring. They then migrate to summer habitat where females form maternity colonies, where young are born. Bats disperse once young can fly, and then return to winter habitats to swarm, mate, and hibernate. Tricolored bats exhibit site fidelity to both winter and summer roost habitat. Tricolored bats are insectivores, feeding on a variety or insects including moths, beetles, wasps, ants and flies. They emerge early in the evening and forage at treetop level or above but may forage closer to ground later in the evening. This bat species exhibits slow, erratic, fluttery flight while foraging, and they are known to forage most commonly over waterways and forest edges.

Tri-colored bats are relatively rare in offshore areas and are seldom observed offshore during monitoring studies (Solick and Newman 2021). An acoustic survey of bat activity on coastal, island, and offshore sites in the Gulf of Maine, mid-Atlantic coast, and Great Lakes regions from 2012 to 2014 found tricolored bats were the least frequently detected species at offshore sites, though their presence was documented at 53 percent of sampled locations, including at least one site located over 18 miles (30 kilometers) from the mainland (Stantec 2016). Acoustic studies on Martha's Vineyard provide evidence of tricolored bats flying along the coast and potentially crossing open water to reach the mainland (Pelletier et al. 2013). During the offshore construction of the Block Island Wind Farm, no tricolored bats were detected among the 1,546 bat passes by acoustic detectors on boats (Stantec 2018). During post-construction monitoring from August 2017 to Feburary 2020 at the Block Island Wind Farm, only 3.4 percent of the total detections were tricolored bats out of the 2,294 passes recorded by bat acoustic detectors mounted on two turbines 3 miles (4.8 kilometers) from shore (Stantec 2020). In addition, no tricolored bats were recorded by detectors on turbines at Dominion Energy's CVOW pilot project located 23 nautical miles off the coast of Virginia (Willmott et al 2023).



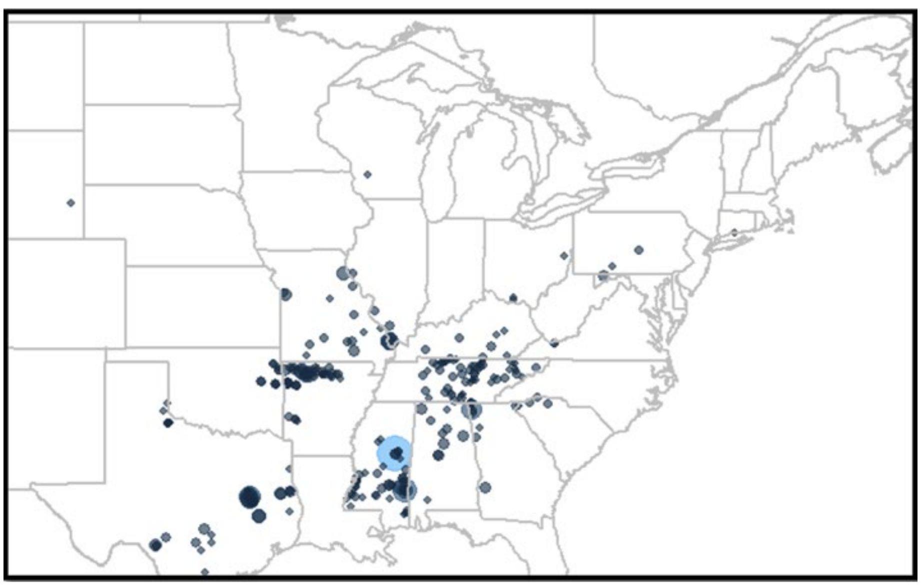
Source: NABat 2019

Figure 5-2. Tricolored bat mean occupancy probabilities predicted in each North American Bat Monitoring Program Grid Cell in the eastern portion of the modeled species range for 2019.



Source: USFWS 2021a
Note: Point color and size corresponds to maximum number of tricolored bats observed at a hibernaculum.

Figure 5-3. Extant hibernacula and winter abundances for tricolored bat in 2000



Source: USFWS 2021a
Note: Point color and size corresponds to maximum number of tricolored bats observed at a hibernaculum.

Figure 5-4. Projected hibernacula and winter abundances for tricolored bat in 2030

5.5.2 Species Occurrence within the Action Area

As discussed in Section 5.2.1, tricolored bats utilize inland and coastal forests and nearby waterways for foraging and roosting. Based on the data presented in Section 5.5.1 (Stantec 2016, 2018, 2020; Pelletire et al. 2013; Dowling and O'Dell 2018), the occurrence of tricolored bats in the offshore portion of the Action Area is possible, but is expected to be relatively low, with occurrences limited to coastal islands.

Prior to WNS in the year 2000 there were several occupied hibernacula in the Action Area from Rhode Island to New Jersey (Figure 5-3) (USFWS 2021a). However, in consideration of current conditions for the species, projected tricolor bat hibernacula in 2030 will be greatly reduced, with a single modeled site remaining within the Action Area, located in Connecticut (Figure 5-4) (USFWS 2021a). This rangewide distributional contraction and reduction in numbers of the tricolor bat would further reduce lower chances of individuals occurring in the Action Area in the future.

Collectively, this information indicates that tricolored bat could occur within the onshore portion of the Action Area during non-hibernation periods, although presence would be extremely limited and in very small numbers. Any occurrence of tricolored bat in the offshore component of the Action Area would be very rare and in very small numbers and therefore discountable.

5.6 Little Brown Bat

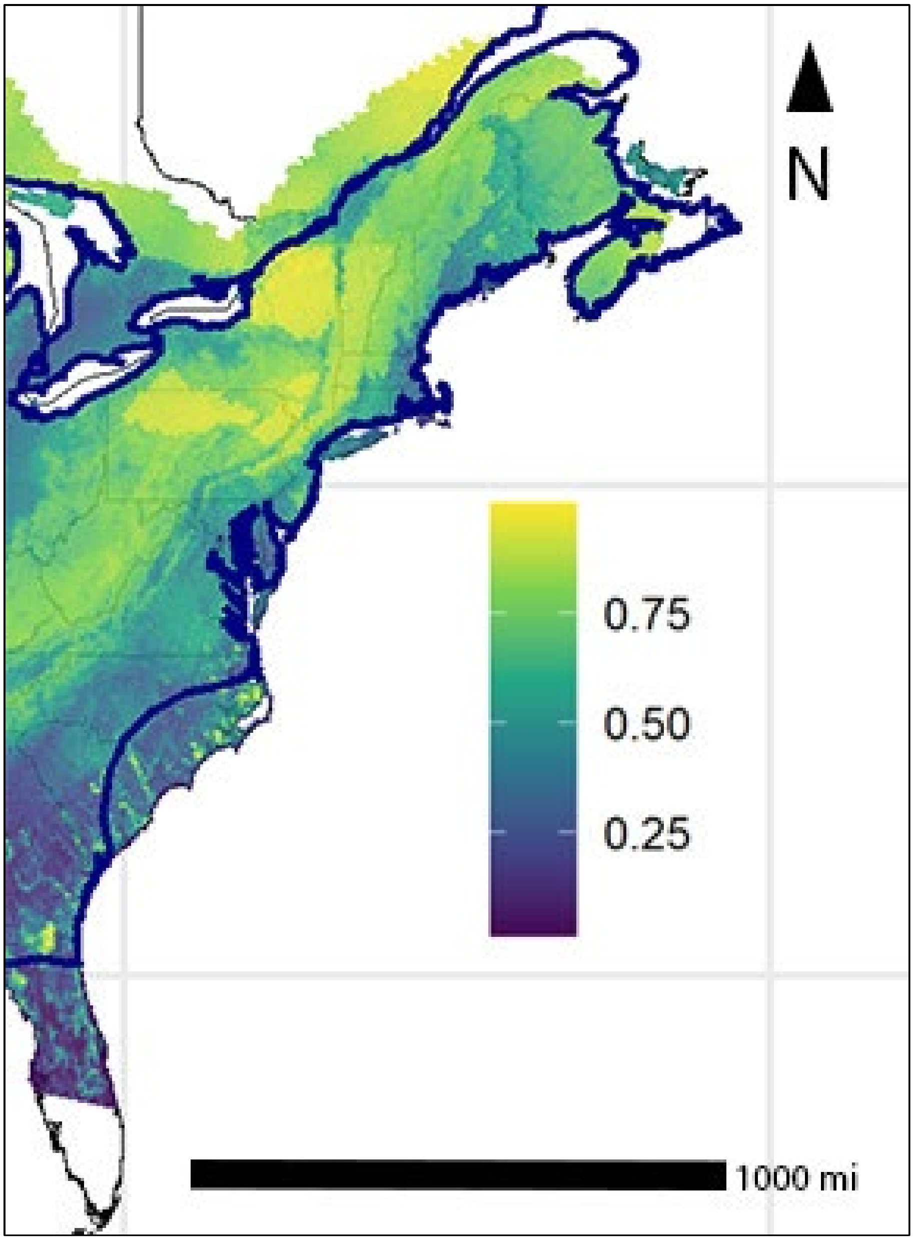
5.6.1 Species Description, Status and Habitats

The little brown bat (*Myotis lucifugus*) is a small cave bat that is widely distributed throughout Canada, the United States, and central Mexico. Figure 5-2 presents mean occupancy probabilities for the little brown bat's eastern range (USGS 2023). BOEM understands that the representation of occupancy probabilities from the North American Bat Monitoring Program shown on Figure 5-5 and represents best available data suitable for this Programmatic BA.

Little brown bats can live up to 30 years and typically reach 8-10 centimeters long, weighing between 7-9 grams at maturity (Davis and Hitchcock 1995; Nature Conservancy of Canada n.d). The little brown bats' diet primarily consists of flying insects (Whittaker and Lawhead 1992) while bats in the most northern sections of their range consume a higher proportion of terrestrial insects (Shively et al. 2018).

The little brown bat's status as not listed is currently under review by USFWS following a substantial population decline due to WNS. In Canada, where half of the species global range occurs it was emergency listed as endangered in the eastern range in 2012 under the Species At Risk Act (S.C. 2002, c. 29).

The little brown bat exhibits a similar life cycle to the other species within the Myotis genus, migrating, swarming, and mating in the fall, hibernating in caves or abandoned mines in the winter, staging and migrating in the spring, and giving birth to a single pup in the summer. While caves and mines are the most important habitat for little brown bats, serving as winter hibernacula and fall swarm locations, the remainder of their time is spent roosting and foraging in forested areas near water sources. Roosting areas for the little brown bat include trees, artificial structures, bat houses, and piles of rocks or wood.



Source: U.S. Geological Survey, North American Bat Monitoring Program (USGS 2023).

Figure 5-5. *Myotis lucifugus* mean occupancy probabilities predicted in the modeled species range for 2019.

5.6.2 Species Occurrence within the Action Area

The little brown bat and other cave dwelling bats have rarely been documented offshore, and, therefore, exposure to construction vessels during construction or maintenance activities, or the rotor-swept zone (RSZ) of operating WTGs in the offshore wind lease areas, is expected to be negligible. A recent nano-tracking study on Martha's Vineyard has been completed to document migration from Martha's Vineyard to mainland hibernacula in Cape Cod. On one occasion a tagged bat appeared to make offshore movements, traveling to Naushon Island or foraging over Vineyard Sound (Dowling et al. 2017).

However, it is suggested that the extent of their migration is generally limited to coastal waters and therefore exposure to the NY Bight lease areas, if it occurs, is anticipated to be minimal.

5.7 Piping Plover

5.7.1 Species Description, Status and Habitats

The piping plover is a small migratory shorebird that breeds along the Atlantic coast, the Great Lakes, and the Great Plains regions of the United States and winters in coastal habitats of the southeastern United States, coastal Gulf of Mexico, and the Caribbean (Elliot-Smith and Haig 2004; USFWS 1996, 2009). The USFWS listed the Atlantic coast breeding population as threatened in 1986 (50 *FR* 50726). Critical habitat for wintering piping plovers has been designated along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas (66 *FR* 36038). The Atlantic coast population occurs within the Action Area during the breeding season, as well as spring and fall migration. Occasional migratory stopovers by Great Lakes piping plovers in New Jersey and Virginia have been documented (Stucker et al. 2010).

The breeding range of the Atlantic coast population includes the Atlantic coast of North America from Canada to North Carolina. The piping plover breeding season extends from April through August, with piping plovers arriving at breeding locations in early- to mid-March and into early May. Post-breeding staging in preparation for migration extends from early July through October (USFWS 1996, 2012). Piping plover breeding habitat consists of generally undisturbed, sparsely vegetated, flat, sand dune-beach habitats such as coastal beaches, gently sloping foredunes, sandflats, and washover areas to which they are restricted (USFWS 1996, 2009). Nests sites are shallow, scraped depressions in a variety of substrates situated above the high tide line (USFWS 1996). Piping plovers forage in the intertidal portions of ocean beaches, washover areas, mudflats, sandflats, as well as shorelines of coastal ponds, lagoons, and saltmarshes where they feed on beetles, crustaceans, fly larvae, marine worms, and mollusks (USFWS 1996).

Post-breeding staging in preparation for migration extends from early July through September, though most migrations southward are initiated before the end of August (USFWS 1996). While a large proportion of the piping plover population likely winter outside the U.S., there are coastal winter populations in Florida, Georgia, South Carolina, and North Carolina, but none have been reported Virginia and northward (Nicholls and Baldassarre 1990). A band resight analysis found that at least 32 percent of the wintering Atlantic coast breeding population winter in the Bahamas (Gratto-Trevor et al. 2016).

The precise migratory pathways and stop-over sites along the Atlantic coast and to the Bahamas were not well known. However, results of Loring et al. (2019, 2020a) suggest that southbound adult piping plovers migrated offshore directly across the mid-Atlantic Bight, from breeding areas in southern New England to stop-over sites spanning from New York to North Carolina. Two northbound piping plovers tagged in the Bahamas in 2017 flew across federal waters of the mid-Atlantic and New York Bight (Loring et al. 2019, Appendix I).

Coastal development, habitat degradation, habitat loss, and recreational disturbance by humans, dogs, and vehicles on sandy beaches and dune habitats are the primary anthropogenic threats to piping plovers (Elliott-Smith and Haig 2020; USFWS 2012; USFWS 2020b). Other threats to the species include contaminants, predation, severe weather, and climate change. Based on a recent review, habitat degradation and recreational disturbances appear to be increasing from 2012 to present, indicating that current conservation methods remain inadequate (USFWS 2020b). The piping plover is among 72 species (out of 177 species on the Atlantic OCS) that ranked moderate in its relative vulnerability to collision with wind turbines (Robinson Willmott et al. 2013).

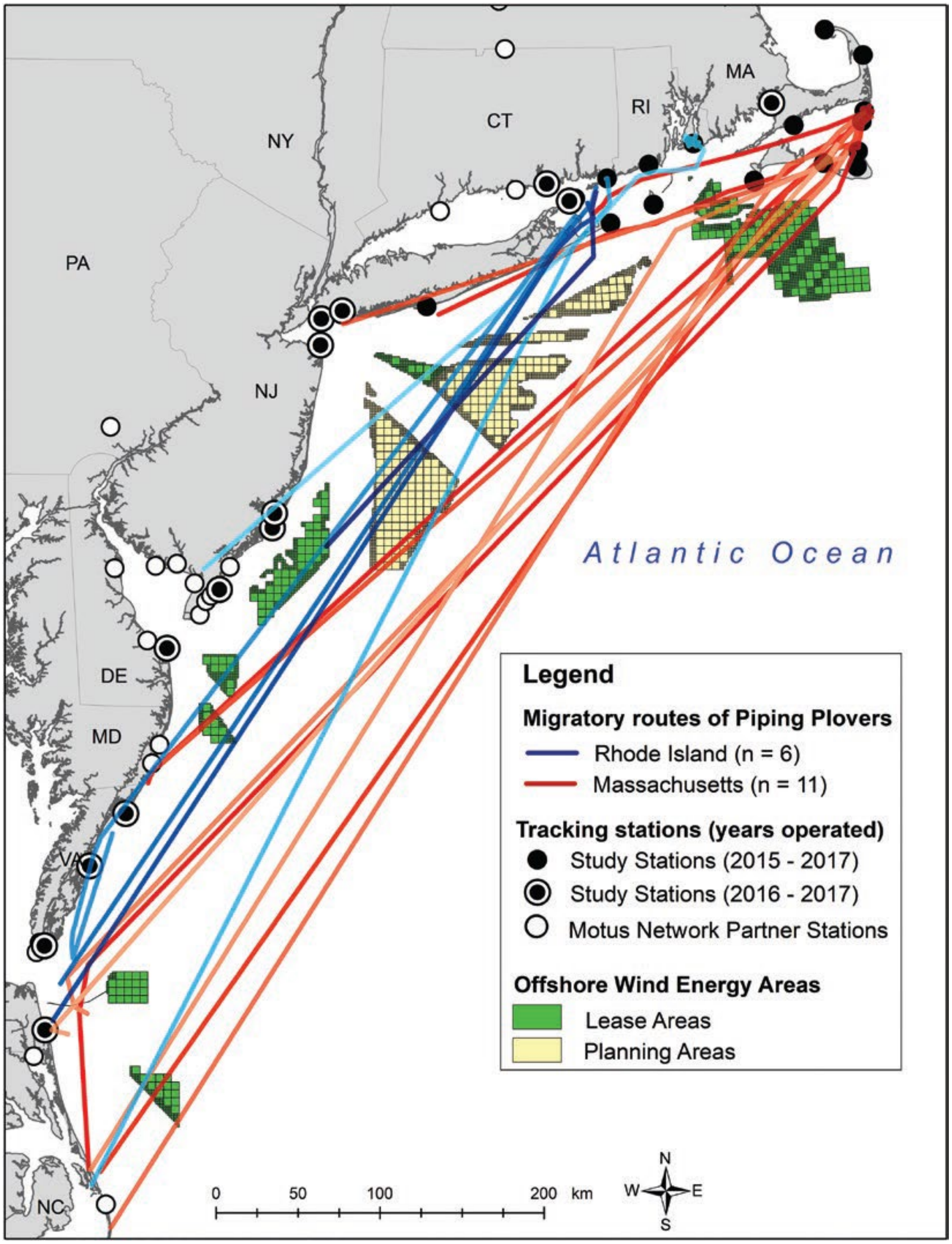
The population growth, from approximately 957 pairs in 1989 to an estimated 2,593 pairs in 2023, has reduced the Atlantic coast piping plover's vulnerability to extinction since listing under the ESA, but the distribution of population growth remains very uneven (USFWS 2024). In 2023, abundance in the New York-New Jersey recovery unit reached a post-listing peak of 631 pairs, 10 percent above the 2021 breeding population and the recovery unit goal of 575 pairs. Declines of the much smaller populations (Canada and US Southern recovery unit) typify long-standing concerns about the uneven distribution of Atlantic Coast piping plovers (Hecht and Melvin 2009, USFWS 2009, USFWS 2020b). Despite much higher long-term average productivity than the other recovery units, the Eastern Canada subpopulation decreased from 233 pairs in 1989 to 158 pairs in 2020 before rebounding to 180 pairs in 2021. Low abundance, a declining overall population trend since 2007, and lack of identified causal factors that can be remedied make the prospects for recovery of the Eastern Canada recovery unit highly uncertain. The New England recovery unit constitutes a stronghold, but there is no evidence of demographically meaningful dispersal to either Eastern Canada or New York-New Jersey, and any future inter-recovery unit "rescue" will be very slow (USFWS 2022b). Plissner and Haig (2000) found little risk of near-term extinction of the Atlantic Coast piping plover population, but more recent Atlantic coast population viability analyses (PVAs) (Calvert et al. 2006, Brault 2007) confirmed the consistent finding of earlier piping plover PVAs (e.g., Melvin and Gibbs 1996), that extinction risk is highly sensitive to small declines in adult and/or juvenile survival rates.

5.7.2 Species Occurrence within the Action Area

The Atlantic coast population of piping plovers occurs in the Action Area. Further, occasional migratory stopovers by Great Lakes piping plovers in New Jersey have also been documented. Suitable habitat for nesting and foraging by piping plover occurs along the beaches of the Action Area; therefore, this species could be present during migration and/or breeding seasons.

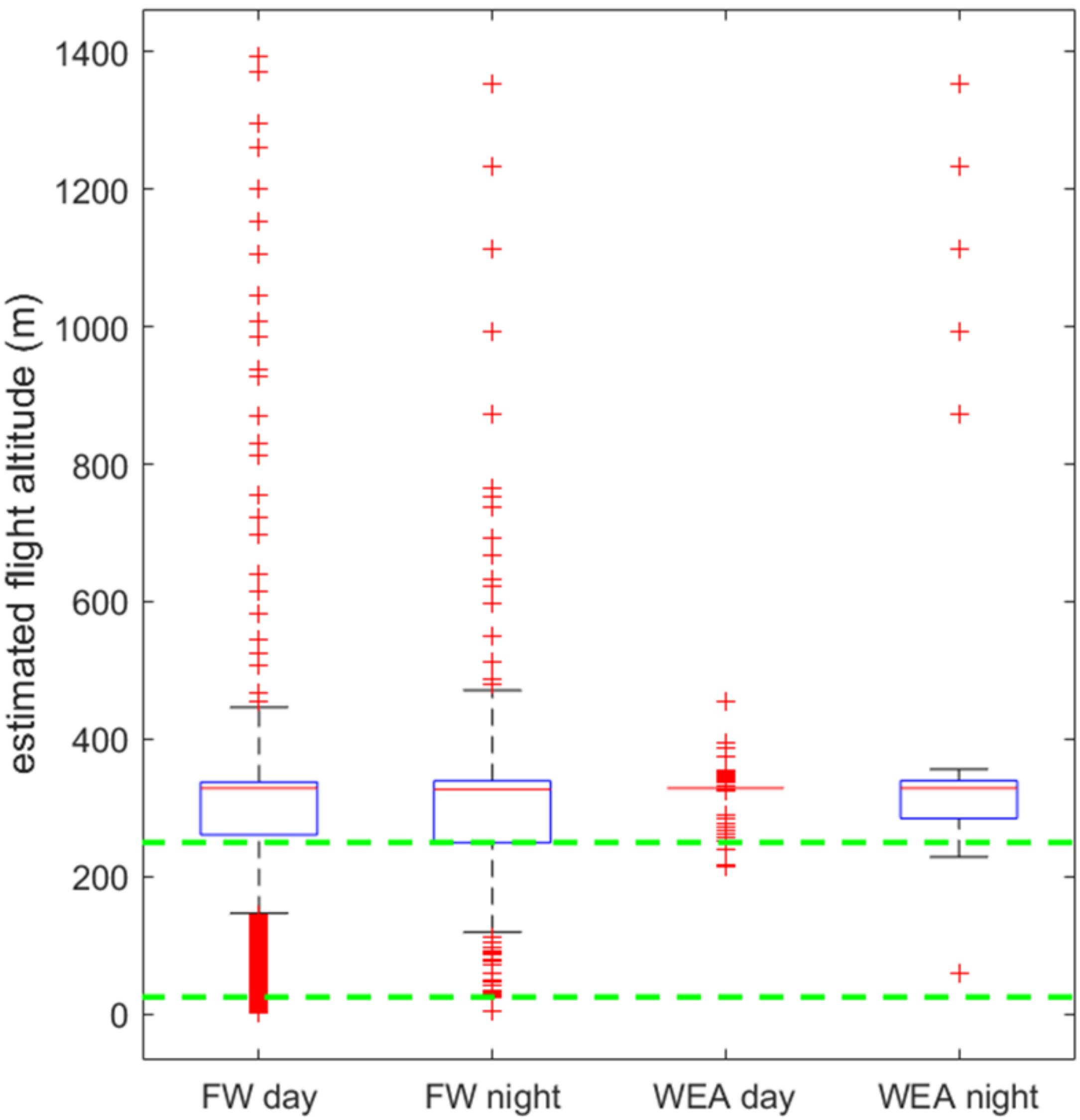
The offshore component of the Action Area lies within the migratory corridor for plovers leaving nesting and staging grounds in New England in the fall, and an unknown percentage of adult and subadult migrant piping plovers may fly over the offshore component of the Action Area (Figure 5-6). Loring et al. (2020a) found that 71 percent (12 out of 17) of interpolated flights of radio-tagged plovers leaving breeding areas in Massachusetts and Rhode Island during fall migration flew through lease areas within the Action Area, although it is possible that additional plovers flew beyond the range of the land-based receiver network and passed through or near the lease areas without detection. These numbers also represent a course estimation of interpolated flight paths that is based on a subset of individuals (17 of 52; 33 percent) that were detected anywhere south of eastern Long Island (Loring et al. 2020a) and may not be representative of plover populations departing from locations outside of Massachusetts and Rhode Island.

The northbound migratory routes of piping plovers from wintering grounds to breeding grounds in the northeastern United States remain largely unknown, but may include travel over the OCS. Loring et al. (2019) results for two northbound piping plovers tagged in the Bahamas in 2017 documented flights of piping plovers across federal waters of the mid-Atlantic and New York Bight, rather than a longer route following the coast. These limited data also provided some indication of piping plovers flying offshore in low visibility conditions (<200 meters) during spring migration (Figure 5-7). Loring et al (2019) reported that an estimated 21.3 percent of piping plover flights in federal waters occurred within a hypothetical RSZ extending from 25 to 250 meters above sea level. Adams et al. (2022) further analyzed this data set to generate a flight height distribution for collision risk modeling using a Monte Carlo process to account for variance in the process across individuals. This flight height distribution represents best available information. Examples of the percentage of piping plovers in the RSZ of proposed projects reviewed in 2023 include 24 percent (Ocean Wind 1, offshore New Jersey) and 24.2 percent (Atlantic Shores South, offshore New Jersey).



Source: Loring et al. 2020b.

Figure 5-6. Modeled migratory routes of tagged piping plovers from breeding areas in Rhode Island (n = 6) and Massachusetts (n = 11), tracked across a broader portion of the mid-Atlantic Bight



Source: Loring et al. 2019.
Note: The green-dashed line represents the lower limit of the RSA: 25 meters (82 feet).

Figure 5-7. Estimated flight altitude ranges (meters) of piping plovers during exposure to federal waters (altitude when crossing from state into federal waters) and Wind Energy Areas (altitude when flying day and night)

5.8 Roseate Tern

5.8.1 Species Description, Status and Habitats

The roseate tern is a small colonial tern, with Atlantic and Caribbean discrete population segments that breed from Long Island, New York, north and east to Quebec and Nova Scotia and the eastern and western Caribbean Sea, respectively, and winter along the northeastern coast of South America (USFWS 1998; USFWS 2010). Roseate terns in the northwestern Atlantic population are listed under the ESA as endangered, while terns in the Caribbean population are listed as threatened (USFWS 2010). No critical habitat has been designated for this species (52 *FR* 42064 [November 2, 1987]). The roseate tern is one among 61 species (out of 177 on the Atlantic OCS) that ranked high in its relative vulnerability to collision with wind turbines (Robinson Willmott et al. 2013). This high ranking is partially driven by the amount of time the species spends foraging on the ocean, and if time on the ocean was restricted to migration the population would be ranked medium. The historical population size in northeastern North America was estimated at a maximum of 8,500 breeding pairs in the 1930s (Gochfeld and Burger 2020). The most current range-wide estimate is 4,374 breeding pairs in 2019 in Canada and the United States (USFWS 2020c).

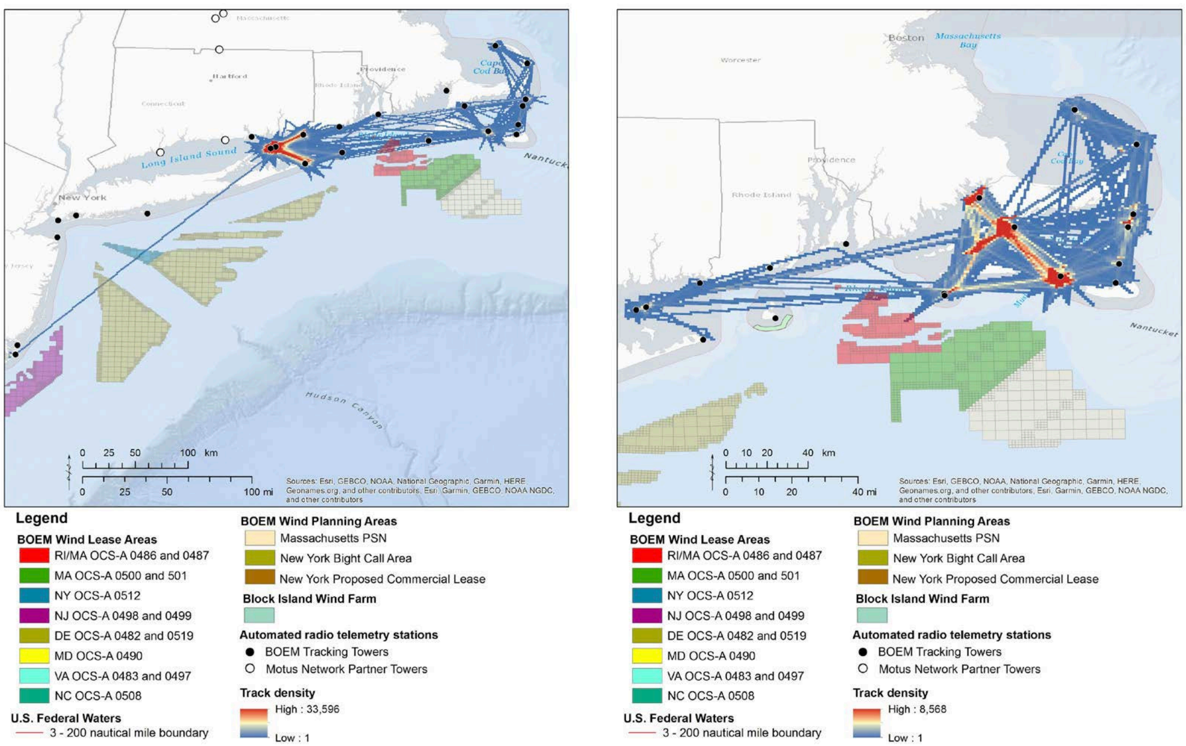
The Northeast roseate tern population breeds on small islands or on sand dunes at the ends of barrier beaches along the Atlantic coast, occurring in mixed colonies with common terns (*Sterna hirundo*). The species nests on the ground in dense colonies that can consist of hundreds to thousands of birds. The breeding population of roseate terns is currently restricted to a small number of colonies located on islands from Nova Scotia to Long Island, New Yorkwith as many as 87 percent breeding within just three colonies on islands off of Massachusetts and New York (Bird Island and Ram Island in Buzzards Bay, Massachusetts, and Great Gull Island in Long Island Sound, New York) (Loring et al. 2019; Gochfeld and Burger 2020; USFWS 2020c). Historically, the Northeast roseate tern population was known to breed as far south as Virginia, but the species currently does not breed south of Long Island, New York (USFWS 1998).

In the northern portion of their distribution, Roseate terns in the Gulf of Maine forage in both inshore and offshore areas and have been documented foraging up to 35.2 miles from relatively small breeding colonies on the coast of Maine (Yakola and Lyons 2023). Roseate tern foraging flights are slow and range from 10 to 39 feet (3 to 12 meters) above the ocean surface. Roseate tern foraging behavior and ecology are well described. Roseate terns dive less than 1.6 feet (0.5 meters) into the water to forage primarily for the inshore sand lance (*Ammodytes americanus*) in shallow, warmer waters near shoals, inlets, and rip currents close to shore (Safina 1990; Heinemann 1992; Rock et al. 2007). The American sand lance is the preferred forage fish for roseate terns and is a small to medium size of 1.9 to 6.6 inches (4.8 to 16.7 centimeters long), chiefly found in shallow (less than 6.5 feet (2 meters)) coastal waters and estuaries and not found offshore (Collette and Klein-MacPhee 2002). The sand lance relies on the presence of coarse-grained sand which the fish routinely bury themselves in at night to hide from predators. Other forage species include: Atlantic herring, hake, bay anchovy, etc. (Yakola 2019, Bratton et al. 2022).

The northeastern roseate tern population generally migrates through the mid-Atlantic to and from its wintering grounds on the northeastern coast of Brazil and arrive at their northwest Atlantic breeding colonies in late April to late May, with nesting occurring between roughly mid-May and late July. Post-breeding roseate terns can occur more than 62 miles (100 kilometers) from shore (Goyert et al. 2014; Loring et al. 2019), typically at flight heights of less than 82 feet (25 meters) (Figure 4-5). When departing breeding areas north of the Action Area (Great Gull Island, New York; Buzzards Bay, Massachusetts) on fall migration, some individuals appear to make long, non-stop, overwater flights towards the Caribbean and north and east coasts of South America while others stay closer to the shoreline and stage in the southeastern United States (Nisbet et al. 2011; Nisbet and Mostello 2015).

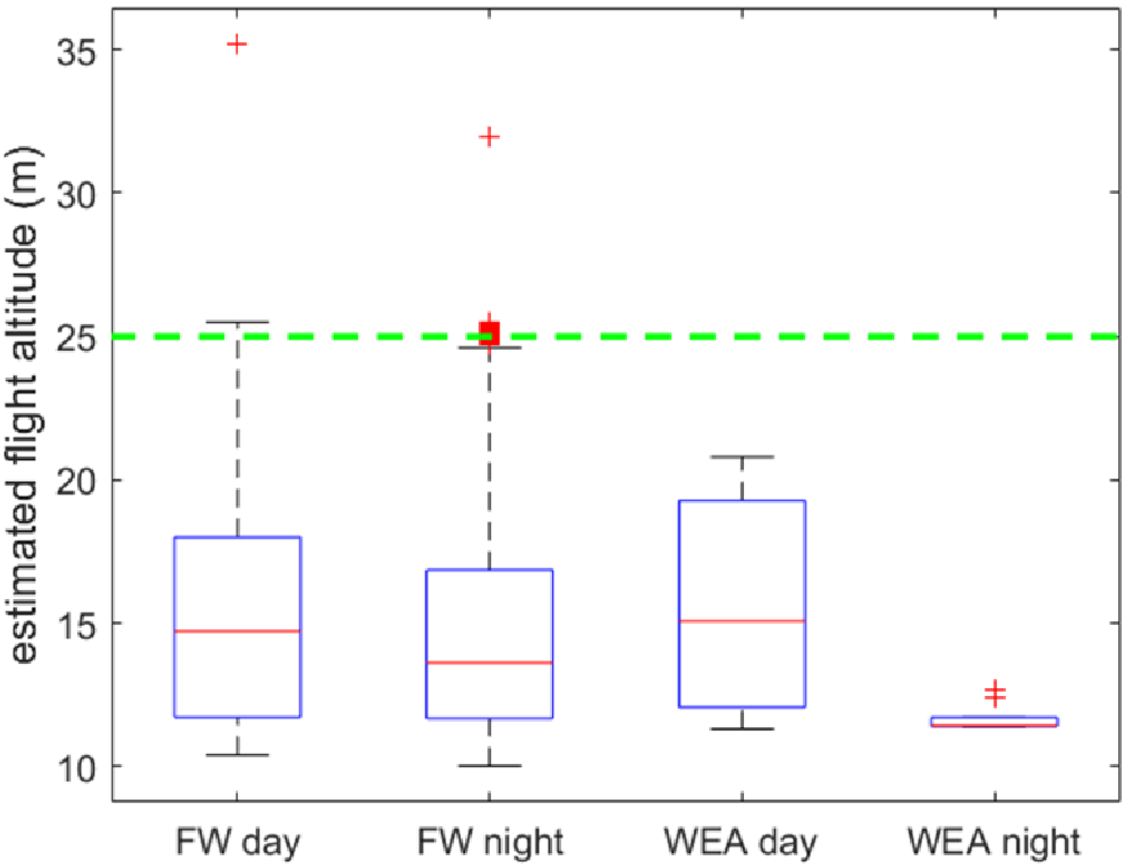
5.8.2 Species Occurrence within the Action Area

Breeding colonies are located on three islands off of Massachusetts and New York: Bird Island and Ram Island in Buzzards Bay, Massachusetts, and Great Gull Island in Long Island Sound, New York; all three colonies are located within the northern portion of the Action Area. Presence at these sites is expected from spring through fall, with highest occurrences in nearshore coastal areas (Figure 5-8). Coastal beaches elsewhere within the Action Area provide suitable stop-over and resting areas for some birds during migration, limited to the spring and fall months (late April to September). Given that roseate terns migrate mainly offshore during spring and fall (Nisbet et al. 2014), it is possible that some birds pass through the Offshore Action Area during migration. Offshore occurrence is likely limited to early spring (April and May) or during post-breeding period (August through September) while they are staging. Loring et al. (2019) tracked terns during the mid- incubation period to the post-breeding dispersal period. The estimated flight heights from this study were below rotor swept area (Figure 5-9) and is consistent with estimated flight heights from boat based surveys and with other tern species (e.g., common tern) reported in the Northwestern Atlantic Seabird Catalog. Loring et al. (2019) also found that terns flew offshore when visibility was greater than 3.1 miles (5 kilometers).



Source: Loring et al. 2019.
BOEM = Bureau of Ocean Energy Management; DE = Delaware; MA = Massachusetts; MD = Maryland; NC = North Carolina; NJ = New Jersey; NY = New York; PSN = Proposed Sale Notice; RI = Rhode Island; VA = Virginia

Figure 5-8. Track densities (10-minute tracks/1 square kilometer) of roseate terns (n=90) from the colony on Great Gull Island during the breeding and post-breeding periods in 2015 to 2017 (pooled) (left); Roseate terns (n=60) from colonies in Buzzards Bay during the breeding and post-breeding periods in 2016 and 2017 (pooled) (right)



Source: Loring et al. 2019.
m = meters; FW = federal waters; RSA = rotor-swept area; WEA = wind energy area
Note: The green-dashed line represents the lower limit of the RSA: 25 meters (82 feet).

Figure 5-9. Model-estimated flight altitude ranges of roseate terns during exposure to federal waters and Atlantic Outer Continental Shelf Wind Energy Areas during the mid-incubation period to the post-breeding dispersal period. This study does not include fall or spring migration periods.

5.9 *Rufa* Red Knot

5.9.1 Species Description, Status and Habitats

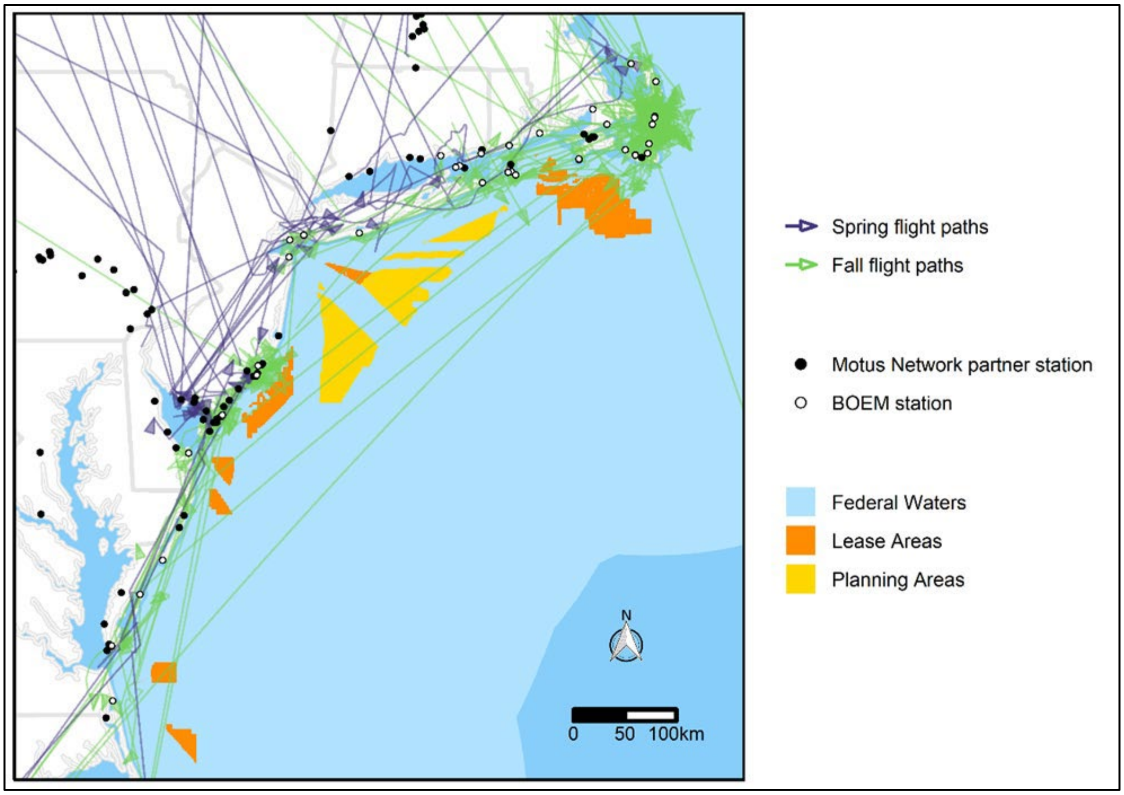
The *rufa* red knot is a medium-sized member of the sandpiper family with one of the longest migrations in the world between its breeding grounds in the Canadian Arctic and wintering habitat along the northwest coast of the Gulf of Mexico, along the north coast of Brazil, along the U.S. Atlantic coast from Florida to North Carolina, and along the Atlantic coasts of Argentina and Chile (USFWS 2014, 2021b). In 2015, the USFWS listed the species as threatened under the ESA (79 *FR* 73706). The USFWS proposed critical habitat for the *rufa* red knot in 2021 (86 *FR* 37410) and revised the proposal in 2023 (88 FR 22530), but no final rule has been published to date. Proposed critical habitat is limited to the coasts and proposed units overlap the onshore portion of the the Action Area. From the 1980s to the early 2010s, the longest-distance migrants declined approximatly 75 percernt, driving a decline of the species as whole (USFWS 2020d). The USFWS currently estimates the population size to be about 65,000 (W. Walsh pers. comm. 2023). The *rufa* red knot is composed of four distinct populations defined by their overwintering regions: in Argentina/Chile, northern Brazil and the northern coast of South America, the western Gulf of Mexico extending from Mississippi through Central America (including Pacific South America), and the

Southeast United States/Caribbean. The best available population estimates in the wintering areas are: 15,500 in Southeast United States/Caribbean, 31,000 in northern Brazil and the northern coast of South America, 5,500 in the western Gulf of Mexico/Central America/Pacific South America, and 11,600 in Argentina/Chile (USFWS 2020d).

Reduced availability of horseshoe crab (*Limulus polyphemus*) eggs in Delaware Bay arising from elevated harvest of adult crabs is considered the key causal factor driving the past decline (USFWS 2014, 2020). Horseshoe crab eggs are an important dietary component during migration (Niles et al. 2008; USFWS 2014). The USFWS has determined that the horseshoe crab bait harvest has been adequately managed to avoid further impacts to rufa red knots since at least 2013 (USFWS 2014, 2021d). Current threats to the *rufa* red knot population are the loss of breeding and non-breeding habitat due to climate change, sea level rise, and coastal development; disruption of natural predator cycles on breeding grounds; and the decoupling of the migratory cycle and favorable weather conditions and food availability. Coastal wind energy development is also considered a threat to the *rufa* red knot population. (USFWS 2020d) and the population was ranked "medium" in relative vulnerability to collision with offshore wind turbines (Robinson Willmott et al. 2013).

Rufa red knot migration northward through the contiguous United States occurs in April to June and southward migration occurs in July to November. During the spring and fall migration, the red knot is known to migrate over the Atlantic OCS and use stop-over sites along the Atlantic coast to refuel and rest (Burger et al. 2012a). Northerly migrants are known to congregate in shoreline foraging areas in the mid-Atlantic region during the spring, while concentrations of southern migrants congregate in the north Atlantic region during the fall (Niles et al. 2010; Normandeau 2011; Burger et al. 2012a, 2012b). In spring, short-distance migrants overwintering in the Southeast United States are joined by others from the Caribbean to travel northward. Some birds may take an inland route while others will travel up the coast. After stopping in Delaware Bay and other U.S. Atlantic sites, most will travel inland to breeding areas in Canada while some birds may continue to travel up the coast before turning west to head to breeding areas. These birds are not likely to travel offshore during spring migration; this is confirmed by the latest data from birds fitted with GPS in spring of 2024 (https://www.movebank.org/cms/webapp?gwt_fragment=page%3Dsearch_map_linked%2CsensorTypeId%3D82798%2CstudyIds%3D3006216787%2Clat%3D34.41846733318884%2Clon%3D-67.17695875000003%2Cz%3D3).

After breeding, these birds fly back and stage on Atlantic coast beaches working their way south down to their overwintering grounds. Birds south of Delaware may continue to fly south near the coast or depart to the Caribbean (see previous BOEM BAs, i.e Atlantic Shores, Revolution Wind, Empire Wind, Mayflower, New England, CVOW commercial and others for more information). In fall, red knots leave their breeding grounds in Canada to return to their overwintering grounds (Figure 5-10; Loring et al. 2020a). Birds from the Southeast U.S. and Caribbean population reach the Atlantic coast and work their way south along the coast to the Southeast U.S. to remain or fly and overwinter in the Caribbean. The largest staging ground is along the Mingan Archipelago Quebec, Canada, where 9,450 birds use the area (Lyons et al. 2018). A recent telemetry study found that 97 percent (out of 244 tagged birds in Mingan Archipelago) were not detected by land-based Motus stations extending from Cape Cod, MA to Back Bay, VA. Without accounting for tag loss or birds flying outside detection range of land-based stations (15 km), these results indicate that red knots departing from staging areas in the Mingan Archipelago used long-distance migratory routes that would take them beyond U.S. Federal waters in the New York Bight Programmatic area (Loring et al. 2018).



Source : Loring et al. 2020a

Figure 5-10. Modeled flight paths of red knots from Motus data crossing the study area during spring migration (*n* = 31) and fall migration (*n* = 146) from 2014 to 2017

5.9.2 Species Occurrence within the Action Area

Rufa red knot occurrence within the Action Area is mainly seasonal, though some individuals may be present for several months. For example, Burger et al. (2012a) found that rufa red knots outfitted with geolocators and recaptured in Massachusetts spent over half the year migrating, at stopovers, and wintering along the Atlantic coast. *Rufa* red knots are present along the Atlantic coast during spring (northbound) and fall (southbound) migratory periods (Perkins 2022). They use key staging and stop-over areas to rest and feed, especially Delaware Bay (Niles et al. 2010), which supports 50 to 80 percent of all *rufa* red knots during spring migration (USFWS 2014). The southbound migration period is generally July through October but may extend as late as November for some individuals (Loring et al. 2018). In addition to Delaware Bay, important spring and/or fall migration stop-over sites or winter foraging and roosting habitat within the Action Area are also found along New Jersey and Massachusetts coastlines (USFWS 2021c).

During stopovers along the Atlantic coast, *rufa* red knots utilize sandy coastal beaches at or near tidal inlets or the mouths of bays and estuaries, peat banks, salt marshes, brackish lagoons, tidal mudflats, mangroves, and sandy/gravelly beaches where they feed on primarily on mollusks, especially small bivalves. The eggs of horseshoe crabs, which come ashore to spawn in May and June, are a preferred resource wherever they occur. The spring migration coincides with the spawning season for the horseshoe crab, which is an important food for migrating birds. Mussel beds on the New Jersey coast are also an important food source (USFWS 2021d). After stopping along the mid-Atlantic, some *rufa* red knots travel up the coast, but the vast majority travel directly overland to breeding areas in Hudson Bay andCanada.

and The number of northbound migrants on the coast north of Delaware Bay is quite small. Nearly all southbound birds utilize coastal or open-ocean migraton routes.

Based on GPS telemetry studies of *rufa* red knots southbound migrations over U.S. Atlantic OCS waters (Feigin et al. 2022, see Figures 5-11 & 5-12) and short-distance migrants in coastal New Jersey (BRI and Wildlife Restoration Partners 2022), most tracked birds fly above the RSZ (1,887 feet [575 meters]) and the rest flew below; only one tracked within the RSZ (Feigin et al. 2022; BRI and Wildlife Restoration Partners 2022). In constrast to inferences drawn from low quality Motus data, it is reasonable to assume that it is unlikely that migrating red knots will collide with turbines based high quality GPS data.

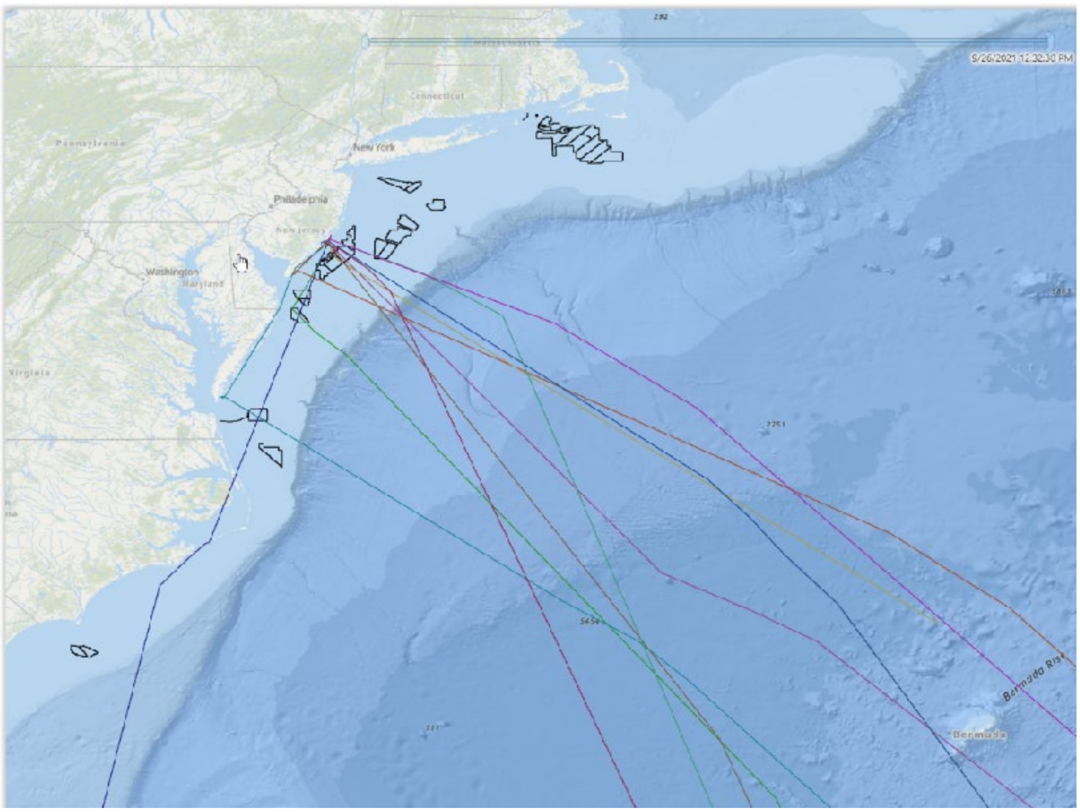


Figure 5-11 2020 Fall Migration Routes of *Rufa* Red Knot (adapted from Feigin et al. 2022)

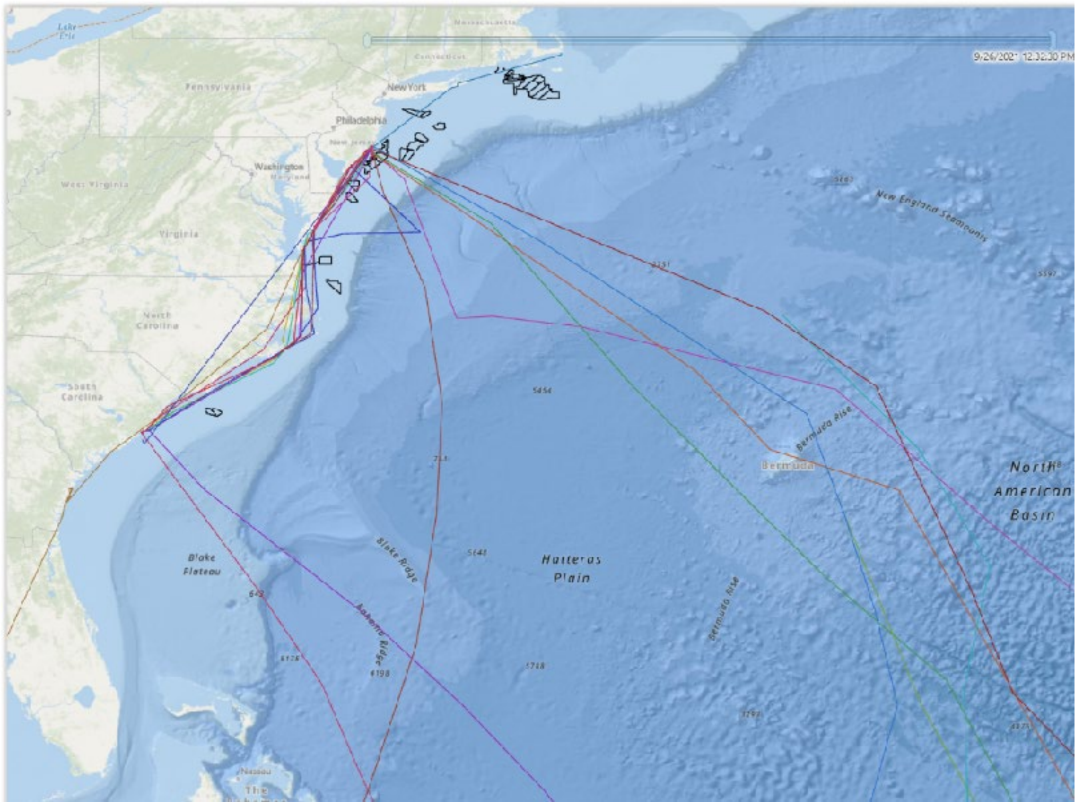


Figure 5-12 2021 Fall Migration Routes of *Rufa* Red Knot (adapted from Feigin et al. 2022)

5.10 Monarch Butterfly

5.10.1 Species Description, Status and Habitats

The monarch butterfly (*Danaus plexippus*) occurs throughout the United States during the spring, summer, fall and is a candidate species for federal listing (79 *FR* 78775). Candidate species are not required to be analyzed for Section 7 consultation, but the monarch butterfly is evaluated here to streamline consultation should this species become listed in the future. Monarch butterfly populations east of the Rocky Mountains, which is the largest of all populations, have declined by 88 percent from 1996 to 2020 and are facing declining overall health (USFWS 2020e). USFWS (2020e) estimated the Eastern North American population's probability of extinction in 60 years under current conditions ranges from 48 to 69 percent. The USFWS determined in 2020 that listing the monarch butterfly as an endangered or threatened species is warranted but precluded by higher priority actions (85 *FR* 81813). Because the monarch butterfly is not currently listed under the ESA, no critical habitat is designated for the species.

East of the Rocky Mountains, most monarch butterflies migrate north in successive generations from overwintering areas in central Mexico to as far north as southern Canada (USFWS 2020e). As monarch butterflies migrate north, they mate, deposit their eggs, and die. The offspring typically survive 2 to 5 weeks in the adult stage, moving north generation by generation as temperatures warm and plants flower. After three to four generations, the population reaches the northern United States and southern Canada; the final generation makes the return migration in the fall to overwintering sites. Unlike previous generations, the last generation of each year lives for 6 to 8 months over winter and begins the multi-generational migration the following spring (USFWS 2020e).

Monarch butterflies may occur offshore as, occasionally, mass flights may be blown offshore, or monarchs may use offshore structures for resting during migration. Ross (1998) observed large numbers of monarchs resting on oil platforms 72 miles offshore in the Gulf of Mexico during migration.

Monarch butterflies require a variety of blooming nectar resources throughout their migration and while on breeding grounds. Monarchs are milkweed (*Asclepias* spp.) specialists. Adults lay eggs, and larva feed almost exclusively on milkweed, while the butterflies feed on nectar from various flowers; milkweed is required for egg deposits and subsequent larval feeding. Successful migrations and breeding are succinctly linked with the availability of nectar plants and milkweed; a match in timing of both plants and the monarchs is critical for the species' survival (USFWS 2020e).

Threats identified in the petition to list monarch butterflies include loss and degradation of habitat and loss of milkweed resulting from herbicide application, conversion of grasslands to cropland, loss to development and aggressive roadside management, loss of winter habitats from logging, forest disease, pesticides and contaminants, and climate change (Center for Biological Diversity [CBD] et al. 2014; Wilcox et al. 2019; USFWS 2020e). The reduced availability, spatial distribution, and quality of milkweed and nectar plants associated with breeding and use of insecticides are most responsible for their decline (85 *FR* 81813).

5.10.2 Species Occurrence within the Action Area

Monarch butterflies are widespread in the mid-Atlantic and Northeast U.S. during the spring, summer, and fall, and can be found anywhere in the onshore portions of the Action Area where milkweed and nectar plants occur, including roadside margins and other small, degraded habitat patches. During their southward migration in fall, adult monarch butterflies rest and refuel at stop-over sites and other sites along the coastline throughout the Action Area. Due to the presence of suitable habitat, monarch butterflies are considered to have the potential to occur within the Action Area during spring, summer, and fall. Adult monarch butterflies may also occur in coastal, nearshore, and offshore areas of the Action Area during fall migrations.

6 Effects of the Proposed Action

Pursuant to ESA requirements, this BA analyzes the potential direct, indirect, and cumulative impacts of the Proposed Action on northern long-eared bat, tricolored bat, little brown bat, piping plover, roseate tern, *rufa* red knot, and monarch butterfly and/or their habitats to determine if the Proposed Action is likely to adversely affect these species or their habitats (50 CFR § 402.12). Effects of the action are all consequences to listed species or critical habitat that are caused by the Proposed Action, including the consequences of other activities that are caused by the Proposed Action. A consequence is caused by the Proposed Action if the effect would not occur but for the Proposed Action and the effect is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

Effects of the Proposed Action are evaluated for the potential to result in harm to listed species. If a project-related activity may affect a listed species, the exposure level and duration of effects are evaluated further for the potential for those effects to harass or injure listed species. The following sections present the potential project-related effects on ESA-listed species from the construction/installation, O&M, and decommissioning stages over the lifetime of a representative project with the application of AMMM measures.

This effects analysis uses the following definitions in the effects determinations[8]:

- No effect: A listed resource is not exposed to the Proposed Action; therefore, no impacts (positive or negative) would occur.
- May affect, not likely to adversely affect: This is the appropriate determination if effects on listed species are:
  - *Beneficial*, meaning entirely positive, with no adverse effects;
  - *Insignificant*, which are related to the size of the impact and include effects that are too small to be measured, evaluated, or are otherwise undetectable; or
  - *Discountable*, which are effects that are extremely unlikely to occur.
- May affect, likely to adversely affect: This is the appropriate determination if any direct or indirect adverse effects on listed species that are not entirely beneficial, insignificant, or discountable would occur as a result of the Proposed Action

The stressors of the Proposed Action on ESA-listed Species under USFWS jurisdiction and their anticipated level of effect are summarized in Table 6-1. An effects analysis is conducted for all species for each relavent stressor for one represenataive project within the Action Area.

Each AMMM measure that is proposed to avoid or reduce impacts on ESA-listed bats, birds, and monarch butterfly are discussed in context of the stressor responsible for impact and the mechanism in which impact may be reduced (Section 4; Table 4-1). Several AMMM measures are referred to in the context of multiple stressors and resources whereas others are only applicable once. These AMMM measures are considered in the final impact determination for each stressor and resource analyzed.

Table 6-1. Stressors of the Proposed Action on ESA-listed species and their anticipated level of effect for one and eight projects.

Species	Stressor	Level of Effect
Northern long-eared bat Tricolored bat Little brown bat	Accidental Releases	Not applicable
	Cable Emplacement and Maintenance	Not applicable
	Land Disturbance	Not Likely to Adversely Affect
	Lighting	Not Likely to Adversely Affect
	Noise	Not Likely to Adversely Affect
	Presence of Structures	Not Likely to Adversely Affect
	Traffic	Not applicable
Piping plover Roseate tern Rufa red knot	Accidental Releases	Not Likely to Adversely Affect
	Cable Emplacement and Maintenance	No effect piping plover and *rufa* red knot Not Likely to Adversely Affect roseate tern
	Land Disturbance	Not Likely to Adversely Affect
	Lighting	Not Likely to Adversely Affect
	Noise	Not Likely to Adversely Affect
	Presence of Structures	Likely to Adversely Affect piping plover and *rufa* red knot Not Likely to Adversely Affect roseate tern
	Traffic	Not Likely to Adversely Affect
Monarch Butterfly	Accidental Releases	Not applicable
	Cable Emplacement and Maintenance	Not applicable

[8] When the terms "discountable" or "discountable effects" appear in this document, they refer to potential effects that are found to support a "not likely to adversely affect" conclusion because they are extremely unlikely to occur. The use of these terms should not be interpreted as having any meaning inconsistent with the ESA regulatory definition of "effects of the action."

	Land Disturbance	Not Likely to Adversely Affect
	Lighting	Not applicable
	Noise	Not applicable
	Presence of Structures	Not Likely to Adversely Affect
	Traffic	Not applicable

6.1 Considerations and Assumptions for Analysis of One Project

The analysis of one project evaluates the potential effects of the Proposed Action for a single project within the Action Area. Proposed Action activities considered for any single projects are described in Section 2.1. The effects determination assesses the contribution of each stressor resulting from these activities during one project. The location of this single project could fall in any lease areas considered in this Programmatic BA (Figure 1-1). Because the maximum RPDE is applied, if any stressor within any portion of the Action Area is likely to adversely affect any ESA-listed species, then that effects determination is applied to the stressor as a whole for that species. For example, if a stressor is determined to result in adverse effects within the the northern portion of the Action Area, but not elsewhere, then the determination for that stressor defaults to may affect, likely to adversely affect for one project within the Action Area. Since regional differences indicate that the effects may not be equal throughout the entire Action Area, project-specific analyses would be recommended. Effects determinations for stressors that are not likely to have an adverse effect on any ESA-listed species for one project are applicable across all regions and would not require project-specific analysis if activities fall within the RPDE.

6.2 Considerations and Assumptions for Analysis of Eight Projects

The effects determination for eight projects considers the full build out of all eight lease areas included in this Programmatic BA (Figure 1-1). Similar to the analysis for one project, the effects determinations for each stressor under eight projects considered any spatially differentiated risks and impacts. Additionally, an analysis of the entire Action Area was performed to assess how stressors contribute across all lease areas for projects that are constructed and operational either simultaneously or in close succession. Some stressors were determined to not likely adversely affect any ESA-listed species for eight projects. Therefore, for these stressors, if individual project activities fall under the RPDE, those activities are not likely to adversely affect ESA-listed species regardless of location or timing of the individual project.

The same stressors and mechanisms of impact described for activities associated with one project also apply to eight projects for all species considered in this Programmatic BA. In addition, the same caveates to the effects determinations for one project also apply to eight projects. For example, since this Programmatic BA preceeds the submittal of project-specific COPs, exact details regarding construction activities and plans, include potential locations of landfall sites, onshore facilites, or onshore and offshore export cable routes, are not available. While this limits the extent of the analyses provided in this Programmatic BA, certain generalizations may be made about the construction and O&M of eight projects based on the extrapolated one project RPDE. When considering the potential effects of the development of all eight offshore wind projects in the Action Area, the analysis included the following assumptions and considerations which are carried through all the analysis in Sections 6.2 through 6.3:

- Complete alignment of the construction schedules for all eight projects is considered extremely unrealistic. This is due in part to the staggered and different timelines from the lease sale date to the start of construction that is likely to be experienced by each individual project. In addition, construction and installation schedules will likely be resource-limited, which will result in a staggered construction schedule for most projects. As a result, simultaneous construction of all eight projects is not expected; it is more likely that construction of the eight projects will be staggered to some extent. Projects with the same lease effective dates are more likely to enter construction near the same time.

However, based on an analysis of timelines for all ongoing offshore wind projects on the Atlantic OCS that have COPs submitted, projects with the same lease effective dates may still receive issuance of a Record of Deciesion (ROD) and initiate construction years apart. It is possible that construction of multiple projects located in either the same or different Action Areas could overlap, though the degree of overlap between individual project construction schedules remains unknown at this time.

- It is estimated that O&M phases of all eight projects could overlap for up to 21 to 28 years, though this is highly dependent on the construction schedule for each project, which currently remains unknown. The assumptions used to estimate the range of O&M overlap for eight projects include: 1) the start of construction on any given project may range from 8 to 15 years from the lease effective date; 2) the construction period for all projects is assumed to be three years; and 3) the O&M period for all projects is assumed to be 35 years.
- The spatial and temporal coverage of each stressor considered where and when the effect would be additive with eight projects versus where and when stressors would affect ESA-listed species as a single project as part of the full eight project build out. The majority of stressors produce localized, temporary impacts; given the spatial scale of the Action Area (139,288 km^2; Figure 1-1), localized, temporary impacts would not be expected to have additive effects on ESA-listed species. Additionally, ESA-listed species will not be equally affected by an stressor across the entire Action Area at a given time due to the seasonal movements of individuals.
- The spatial coverage of a given stressor compared to the overall size of the Action Area was considered when assessing the potential for additive impacts. All eight lease areas comprise approximately 2,668 km^2, or 1.9 percent of the overall Action Area. Stressors accounting for small portions of the overall lease areas, inherently account for an even smaller proportion of the Action Area. Therefore, the additive nature of those stressors would be diminished.

6.3 Bats (Northern Long-eared Bat, Tricolored Bat, and Little Brown Bat)

Potential stressors from the construction, operation, and decommissioning of the Proposed Action on northern long-eared bat, tricolored bat and little brown bat include land disturbance, noise, light, and presence of structures.

6.3.1 Land Disturbance

6.3.1.1 One Project

Land disturbance impacts associated with construction (and decommissioning) of onshore elements of the Proposed Action could occur if construction activities took place during the active season of northern long-eared, tricolored, and little brown bats (generally April through November 15). Tree clearing during this time could result in injury or mortality of individuals, particularly pups who are unable to flush from a roost. Fragmentation of habitat could occur depending on spatial extent and footprint of tree clearing activities. The primary effects on northern long-eared bats, tricolored, and little brown bats from the onshore components would be potential loss of suitable roosting and foraging habitat.

Given this Programmatic BA preceeds the submittal of project-specific COPs, exact details regarding onshore construction activities and plans, include potential locations and estimated acreage of tree clearing and land disturbance associated with any onshore facilites or export cable routes, is not available. However, based on other U.S. East Coast offshore wind projects (e.g., Atlantic Shores; CVOW; Equinor Wind, New England Wind), onshore constuction, including onshore cable routes, substation and converter stations, and O&M facilities are most typically located in currently urbanized areas and occur in already disturbed land, which would minimize the overall extent of new tree clearing and land disturbance for a given project. Under the Proposed Action, BB-3 and BB-4 would require monitorning plans and reporting, which while would not directly reduce impacts, the data gathered would be evaluated and considered to inform future mitigation and monitoring needs which will serve to reduce future impacts.

BOEM assumes that coordination with applicable agencies, including USFWS and state and local agencies, would occur during project-specific planning and consultations to determine appropriate conservation measures so the risk of direct mortality or injury during construction would be further minimized.

With the application of programmatic AMMM measures, BOEM anticipates only a small area of bat habitat could be affected under one project. Potential effects to bats such as injury, mortality, behavior modification and/or habitat modification resulting from land disturbance are extremely unlikely to occur to northern long-eared, tricolored bats, and little brown bats. Impacts are therefore considered to be ***discountable***. If a project proposes tree clearing without time of year restrictions, then additional analysis would be conducted during the project-specific consultation.

6.3.1.2 Eight Projects

Eight projects, with implementation of AMMM measures, would increase the total spatial extent of land disturbance within the Action Area. However, the total disturbance from eight projects is still expected to represent only a small proportion of the available habitat in the Action Area. Additionally, all habitat in the eight projects would not be disturbed at the same time as concurrent construction of all eightprojects is not expected. The risk to northern long-eared, tricolored, and little brown bats therefore, would minimally increase under eight projects and impacts as a result of eight projects is not expected to differ appreciably from one project. Therefore, any effects that do occur as a result of land disturbance from eight projects is considered ***discountable***.

6.3.2 Noise and Lighting

6.3.2.1 One Project

Noise associated with the Proposed Action could result in temporary and highly localized impacts on northern long-eared, tricolored, and little brown bats should they be present at the time noise is generated. Impacts, if any, are expected to be limited to behavioral avoidance of noise or light generating construction activities.

Onshore construction would produce noise in excess of ambient conditions due to vehicles and heavy equipment used to construct the cable landfall adjacent to the nearshore zone (e.g., HDD installation), the onshore interconnection cables, and the substations and/or converter stations. Construction activity would be temporary and localized, but night time work may also be required which would produce light in excess of ambient conditions. Activities could generate noise and light sufficient to cause avoidance behavior by individual bats (Schaub et al. 2008). Some bats foraging or roosting in the vicinity of construction activities may be disturbed during construction. These individuals would be expected to move to different foraging areas or roosting areas farther from construction noise and light. If there are any known maternity areas, bats cannot move due to disturbance during the pup season (approx. mid-May through end of July). Before issuing project-specific approvals the USFWS may require a survey for maternity areas and require additional measures (BIR-2) if maternity areas are identified. A bat friendly lighting plan can be implemented to reduce light pollution at the facility.

Normal operation of the substation/converter station may generate a small amount of noise into the surrounding environment. Operational noise, however, is expected to be significantly less than noise associated with construction and bats are not likely to be sensitive to such disturbances. If northern long-eared bats, tricolored, and little brown bats were present, no auditory impacts on bats would be expected to occur. Recent literature suggests that bats are less susceptible to temporary or permanent hearing loss from exposure to intense sounds (Simmons et al. 2016), and bats are tolerant to anthropogenic noise as documented instances have shown bats roosting in noisy environments near airports and highways (FAA 1992; Brack et al. 2004).

Offshore, the greatest potential impact of noise during construction would likely be caused by localized pile-driving activities during construction (if a pile-driven foundation solution is selected). This impact would likely be limited to behavioral avoidance of pile driving. Once construction is completed, the WTGs would produce operational airborne noise in the offshore marine environment. The frequency and sound level generated from operating WTGs depends on WTG size, wind speed and rotation, foundation type, water depth, seafloor characteristics, and wave conditions. BOEM (2019) noted that the level of noise appeared to be significantly influenced by natural ambient noise, suggesting the airborne noise from WTG operation would likely be less than 65 decibels equivalent continuous sound pressure level ($L_{Aeq,1m}$), measured at 164 feet (50 meters) from a WTG tower, and even this level of noise appears to be significantly influenced by natural ambient noise. This level is not much greater than ambient noise in a large city and would thus be unlikely to impact bats in the vicinity of WTGs. It is expected that noise levels associated with decommissioning activities would be similar in scope, nature, and intensity to noise impacts associated with construction, as described above. Similarly, noise impacts resulting from decommissioning would be localized and temporary, lasting only for the duration of structure removal.

The temporary and localized nature of potential noise impacts, and the expected insignificant response to those impacts, the impact of onshore and offshore construction noise, operational WTGs, and decommissioning activities on northern long-eared, tricolored, and little brown bats is considered to be ***discountable***. If a project proposes noise-producing activites or tree removal in the vicinity of a known maternity roost without time of year restrictions, then additional analysis would be conducted during the project-specific consultation.

6.3.2.2 Eight Projects

The same mechanisms and effects described for noise and lights associated with one project applies for eight projects. Though consideration of construction, O&M, and eventual decommissioning of all eight projects would result in an increase in noise and light present in the Action Area compared to just one project, the risk of behavioral effects on ESA-listed bats would not be expected to substantially differ from one project given the limited spatial extent of noise ensonification. Any behavioral effects, if they were to occur, would be temporary and minor. Given the application of programmatic AMMM measures, the temporary and localized nature of potential noise and light impacts, and the expected insignificant response to those impacts, the impact of onshore and offshore construction noise, operational WTGs, and decommissioning activities on northern long-eared, tricolored, and little brown bats from eight projects is considered ***discountable***.

6.3.3 Presence of Structures

6.3.3.1 One Project

Although bat mortality is not uncommon at onshore wind farms in North America (Cryan and Barclay 2009; Hayes 2013; Smallwood 2013; Martin et al. 2017; Pettit and O'Keefe 2017; Smallwood 2020), cave-hibernating bats such as the northern long-eared bat,tricolored bat, and little brown bat are less likely to be killed by offshore WTGs than are migratory tree bats (AWWI 2018; Kunz et al. 2007), because they are unlikely to occur over the open ocean.

There are few records of *Myotis* bat species and other cave dwelling bats occurring offshore in the mid-Atlantic (Sjollema et al. 2014; Solick and Newman 2021), and all evidence to date suggests these species do not typically forage offshore (Dowling et al. 2017). A 2016 nano-tracking study of three tagged little brown bats detected offshore movements as well as migrations from Martha's Vineyard to Cape Cod, indicating the ability of little brown bats to migrate short distances offshore (Dowling et al. 2017). Likewise, tricolored bat calls were recorded indicating that they are capable of migrating short distances, less than 1 mile (1.6 kilometers) between Assateague Island National Seashore and the mainland (Johnson et al. 2011). However, during the offshore construction of the Block Island Wind Farm, bats were monitored with acoustic detectors on boats, and no northern long-eared bats and a small number of tricolored bats were detected among the 1,546 recorded bat passes (Stantec 2018). During post-construction monitoring from August 2017 to Feburary 2020, no northern long-eared bats or tricolored bats were detected out of the 2,294 passes recorded by bat acoustic detectors mounted on two turbines 3 miles (4.8 kilometers) from shore (Stantec 2020), and only 3.4 percent of the total detections were tricolored bats. In addition, no northern long eared bats or tricolored bats were recorded by detectors on turbines at Dominion Energy's CVOW pilot project located 23 nautical miles off the coast of Virginia (Willmott et al 2023).

If northern long-eared and tricolored bats were to migrate over water, movements would likely occur closer to the mainland than where WTGs are proposed. Bats are agile fliers, making it likely that they would avoid colliding with vessels and stationary structures in the Offshore Action Area. Further, as seen with some birds (Masden et al. 2012, Peschko et al. 2021), wide spacing between WTG rows is expected to reduce barrier effects by providing bats ample space to fly through wind farms while staying far away from the nearest WTG.

Under the Proposed Action, BB-3 would require monitorning plans and reporting, which while wouldn't directly reduce impacts, the data gathered would be evaluated and considered to inform future mitigation and monitoring needs which will serve to reduce future impacts. Required reporting of dead or injured bats observed or resulting from construction or operational activities is included under the Proposed Action (BB-1 and BB-2). While these measures will not directly reduce impact to bats, it will serve to improve the overall understanding of bat interactions with offshore wind farms.

Collectively, this information indicates that occurrence of northern long-eared, tricolored, and little brown bats in the offshore portions of the Offshore Action Area is likely to be very rare, in very small numbers of individuals, and only likely when winds are below the cut-in speed of WTGs. Therefore, with the application of programmatic AMMM measures, exposure would be minimal and would only occur on rare occasions during migration, is unlikely to occur, and is thus ***discountable;*** the impacts on these species would be too small to be measured or evaluated and would be considered ***insignificant***.

6.3.3.2 Eight Projects

The same mechanisms and effects described for the representive project above applies for the eight projects. Obviously, eight projects, with implementation of AMMM measures, would increase the total number of structures in the Action Area by approximately 797 WTGs and 44 OSS. While this represents a large increase in the number of offshore structures, the foundations would be restricted to just the eight lease areas which represent approximately 1.9 percent of the overall available space within the Action Area. The occurrence of northern long-eared bats, tricolored bats, and little brown bats in the offshore portions of the Offshore Action Area is likely to be very rare, with very small numbers of individuals, and more likely when winds are below the cut-in speed of WTGs. Given these factors and with the application of programmatic AMMM measures, measurable impacts due to the presence of structures for eight is considered unlikely for northern long-eared, tricolored, and little brown bats and is ***discountable***.

6.4 Birds (Piping Plover, Roseate Tern, *Rufa* Red Knot)

Potential stressors from the construction, operation, and decommissioning of the Proposed Action on piping plover, roseate tern, and *rufa* red knot include accidental releases, cable emplacement and maintenance, land disturbance, lighting, noise, and presence of structures, and traffic.

6.4.1 Accidental Releases

6.4.1.1 One Project

The roseate tern is the only federally listed species considered in this BA with the potential to be affected by accidental releases in the offshore environment. Offshore accidental releases are unlikely to affect piping plover or *rufa* red knot as these species do not forage offshore. However, accidental releases could impact piping plover and *rufa* red knot if the release drifts and washes up on breeding beaches (piping plover) and foraging/staging habitats (piping plover and *rufa* red knot). Some potential exists for bird mortality, decreased fitness, and health effects due to the accidental release of fuel, hazardous materials, and trash and debris from vessels and activities associated with construction, O&M, and decommissioning of the Offshore project elements, as well as from the WTGs and OSSs themselves. Ingestion of fuel and other hazardous contaminants has the potential to result in lethal and sublethal impacts on birds, including decreased hematological function, dehydration, drowning, hypothermia, starvation, and weight loss (Briggs et al. 1997; Haney et al. 2017; Paruk et al. 2016). Additionally, even small exposures that result in oiling of feathers can lead to sublethal effects that include changes in flight efficiencies and result in increased energy expenditure during daily and seasonal activities, including chick provisioning, commuting, courtship, foraging, long-distance migration, predator evasion, and territory defense (Maggini et al. 2017). Vessels may potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris. BOEM expects accidental trash releases from offshore vessels to be rare and localized in nature. In the unlikely event of a release, lethal and sublethal impacts on individuals could occur as a result of blockages caused by both hard and soft plastic debris (Roman et al. 2019).

BOEM prohibits the discharge or disposal of solid debris into offshore waters during any activity associated with construction and operation of offshore energy facilities (30 CFR 250.300). USCG also prohibits dumping of trash or debris capable of posing entanglement or ingestion risk (International Convention for the Prevention of Pollution from Ships, Annex V, Public Law 100–200 [101 Stat. 1458]). Project activities would comply with the federal requirements for the prevention and control of oil and fuel spills, reducing the likelihood of an accidental release. Further, implementation of an oil spill response plan (OSRP), which is required information with any project COP (30 CFR 585.627(c)), would decrease potential impacts from spills and informational training on proper storage and disposal practices would reduce the likelihood of accidental discharges and spills from occurring. Further, under the Proposed Action, the implementation of AMMM measure MUL-1, which requires marine debris awareness and elimination protocols, will reduce the instances of accidental releases of marine trash and debris, and will therefore reduce impact to ESA-listed species.

Accidental releases of fuel, hazardous materials, and trash and debris occurring at the onshore project locations have the potential to affect bird species present in the Action Area, including the piping plover, roseate tern, and *rufa* red knot. However, the implementation of an OSRP would be expected to contain offshore accidental releases close to their origin and away from shore. The release of nontoxic drilling mud during HDD at the export cable landfall sites would be unlikely, but possible.

These protocols, along with those described in the chemical and waste management plan described above, would minimize effects on bird species resulting from the accidental release of debris, fuel, hazardous materials, or waste at onshore and offshor eporject locations. As a result, releases, if any, would occur infrequently at discrete locations and vary widely in space and time; as such, BOEM expects localized and short-term impacts on roseate tern. Therefore, potential effects of accidental releases are extremely unlikely to occur and are therefore ***discountable***, and the size of any impact, were it to occur, would be too small to be measured or evaluated and thus ***insignificant***.

6.4.1.2 Eight Projects

The risk of impacts from accidental releases associated with one project and eight projects are the same, as the mechanisms and effects are not expected to differ appreciable. Accidental releases, if any, would occur infrequently at discrete locations and vary widely in space and time for eight projects. As described above, the roseate tern is the only federally listed species considered in this BA with the potential to be affected by accidental releases. As such, BOEM expects localized and short-term impacts on roseate tern. Therefore, potential effects of accidental releases from eight projects are extremely unlikely to occur and are therefore ***discountable***, and the size of any impact, were it to occur, would be too small to be measured or evaluated and thus ***insignificant***.

6.4.2 Cable Emplacement and Maintenance

6.4.2.1 One Project

Unlike roseate terns, seafloor disturbance resulting from cable emplacement and maintenance would not affect piping plovers and *rufa* red knots, as these species are strictly terrestrial foragers and do not use aquatic habitats for foraging. Installation activities described in Section 2.1.1 that could potentially occur from May through September have the potential to result in short-term disturbance of individual staging roseate terns due to the potential overlap in foraging terns and construction activities (USFWS 2008). The potential impacts relate to temporary seabed and water column disturbance that could alter forage fish behavior and potentially affect foraging efficiency for the species. Specifically, impacts on benthic habitats and increased turbidity during cable-laying activities have the potential to affect sand lance, an important prey resource for roseate terns (USFWS 2008).

The installation of array cables and offshore export cables would include site preparation activities and cable installation using jet trenching, plowing/jet plowing, mechanical trenching, and dredging (Section 2.1.1), which can cause temporary increases in turbidity and sediment resuspension. Other projects using similar installation methods have been characterized as having minor impacts on water quality due to the temporary and localized nature of the disturbance (Latham et al. 2017). In general, suspended sediments due to jet plowing are expected to be temporary, with sediments settling quickly to the seabed and potential plumes generally confined to just above the seabed. Dredging, which may also occur along the cable routes in locations where sand waves (naturally mobile slopes on the seabed) are encountered or when crossing federal and state navigation channels, would produce similar effects, but with plumes likely to last longer and extend farther out.

A sediment transport model conducted for the Revolution Wind Offshore Wind Farm (RPS 2022), which is used in this Programmatic BA to be representative for lease areas within the Action Area, indicated that displacement of sediments would be low, with suspended sediments remaining for a short period of time (4 hours), and typically dissipating to background levels in relative proximity to the disturbance. Suspended sediment concentrations during cable installation by jet plowing are predicted to be less than 500 mg/L, short-term lasting for minutes to hours, and limited in extent to within a few feet vertically and a few hundred feet horizontally during trenching for the offshore export cables and the interarray cables. All sediment plumes are expected to settle out of the water column entirely within 24 hours after the completion of jetting operations. The jet plow embedment process for cable installation will, therefore, result in short-term and localized heightened turbidity. Trenching with a jet plow in areas of shallower water depths could cause plumes to nearly reach the surface of the water, and alternate cable emplacement methods may be required for some areas.

Only intermittent, localized cable maintenance is predicted during the O&M phase of one project. In case of insufficient burial or cable exposure, whether attributable to natural or human-caused issues, appropriate remedial measures will be taken including reburial or placement of additional protective measures. If a cable failure occurs, an appropriate cable repair spread will be mobilized. During these remedial activities, if they occur, sediment plumes would be limited to directly above the seabed and not extend into the water column. Suspended sediments due to jet plowing are expected to remain localized to the area of disturbance and settle quickly to the seafloor. Elevated turbidity levels would be short-term, highly localized, and temporary.

Impacts on benthic habitats and increased turbidity during cable-laying activities have the potential to affect sand lance, an important prey resource for roseate terns (USFWS 2008). Given the nature of the construction techniques, adverse impacts such as increased turbidity would be short-term in duration and localized in nature and would not directly affect terns because the activity would be underwater. Water quality effects and disturbance of benthic habitats resulting from the installation of offshore export cables are not expected due to the short-term duration of disturbance and water column sedimentation from cable installation activities (USFWS 2008). Based on the data analyzed, it is estimated that water turbidity conditions in the immediate area would return to normal within a few hours of cable installation. Recovery of overall water quality and seabed conditions will be dependent on site-specific sediment types, oceanographic conditions, and cable installation methods. As such, adverse effects on roseate terns, if any, resulting from installation and maintenance of the offshore export and interarray cables would be ***insignificant*** and ***discountable***. Cable-laying activities would have ***no effect*** on piping plover and *rufa* red knots for reasons described above.

6.4.2.2 Eight projects

The same mechanisms and effects described for one project above applies for eight projects. Given the nature of the construction techniques, adverse impacts such as increased turbidity and benthic habitat disturbance would be short-term in duration and localized in nature. As described above, the roseate tern is the only federally listed species considered in this BA with the potential to be affected by cable emplacement and maintenance activities. However, only short-term and highly localized impacts on roseate tern would occur. As such, adverse effects on roseate terns, if any, resulting from installation and maintenance of the offshore cables for eight projects would be ***insignificant*** and ***discountable***. Cable-laying activities for eight projects would have ***no effect*** on piping plover and *rufa* red knots for reasons described in Secgion 6.3.2.1.

6.4.3 Land Disturbance

6.4.3.1 One Project

Land disturbance could affect federally listed birds if they were to occur in the vicinity of the onshore project elements (i.e., near landfall sites, onshore cable routes, onshore substations and/or converter stations, and O&M facilities) during construction, maintenance, and decommissioning. ESA-listed bird species are not expected to occur outside of the tidal habitats; therefore, land disturbances outside of this area is not discussed here. Given this, landall sites are the only expected overlap between project activities and ESA-listed birds. Since landfall sites are not yet known at this time, for the purposes of this Programmatic BA, the analysis focuses broadly on land disturbances in coastal areas within the Action Area. Habitat disturbance due to construction at the landfall sites could adversely affect habitats and disturb individuals of any of the three ESA-listed bird species if activities are performed at times of year that the birds are typically present.

Piping plovers, which could nest in areas identified for cable landfall, would be especially sensitive to disturbance. The presence of humans is stressful for adults and chicks, forcing them to spend significantly less time foraging, which may result in decreased overall reproductive success. Excessive disturbance may cause piping plovers to leave a breeding area or to desert the nest, exposing eggs or chicks to the summer sun and predators. Interrupted feedings may stress juvenile birds during critical periods in their development, and foot and vehicle traffic may crush eggs or chicks (USFWS 1996).

Under the Proposed Action, BB-3 would require monitorning plans and reporting, which while wouldn't directly reduce impacts, the data gathered would be evaluated and considered to inform future mitigation and monitoring needs which will serve to reduce future impacts.

The use of HDD, would serve to avoid and minimize adverse impacts to coastal habitat during cable installation at the landfall site. Based on other project COPs recieved to date, BOEM assumes that HDD will be used for offshore export cable landfall. The use of HDD methods to make the offshore to onshore transition would primarily go under beaches and would avoid beach habitat for nesting shorebirds. As a result, the onshore export cable installation is unlikely to disturb coastal habitat at the landfall sites. There is potential for collisions between birds and vehicles or construction equipment. However, these temporary impacts, if any, would be negligible, as most individuals would avoid noisy construction areas (Bayne et al. 2008; Goodwin and Shriver 2010; McLaughlin and Kunc 2013). The application of programmatic AMMM measures, and the use of HDD at landfall locations to avoid disturbance to shorelines and coastal habitats, will avoid impacts to the piping plover, roseate tern, and *rufa* red knot. Therefore, potential effects from land disturbance are extremely unlikely to occur and are considered ***discountable***.

6.4.3.2 Eight projects

Impacts due to land disturbances associated with one project and eight projects are the same, as the mechanisms and effects are not expected to differ appreciable. Using the same assumptions as presented above for one project (i.e., HDD will be used for offshore export cable landfall), the onshore export cable installation is unlikely to disturb coastal habitat at the landfall sites and would avoid beach habitat for nesting shorebirds. The application of programmatic AMMM measures, including the use of HDD at landfall locations to avoid disturbance to shorelines and coastal habitats to the extent practicable, is expected to minimize impact to the piping plover, roseate tern, and *rufa* red knot. Therefore, potential effects from land disturbance for eight projects are extremely unlikely to occur and are considered ***discountable***.

6.4.4 Lighting

6.4.4.1 One Project

Artificial lighting may influence the orientation of migrating birds, resulting in a disruption in their nocturnal flight paths (Adams et al. 2021; Chernetsov 2016; Drewitt and Langston 2008; Gauthreaux et al. 2006). This disruption can result in a "capture" or "trapping" effect in which birds are less likely to exit an illuminated area (Drewitt and Langston 2008; Gauthreaux et al. 2006). This effect is most pronounced in poor visibility conditions (i.e., cloudy, foggy, rainy), with some migrating birds becoming disoriented and circling lighted structures instead of continuing on their migratory path, thus increasing their metabolic expenditure as well as risk of collision (Hüppop et al. 2006).

Artificial lighting on offshore structures would have the greatest impact on bird species during evening hours when nocturnal migration occurs. Research on the effects of lighting on birds indicates that solid-steady burning bright lights can attract nocturnal migrants (Van Doren et al. 2017). However, red flashing aviation obstruction lights are commonly used at land-based wind facilities without any observed increase in avian mortality compared with unlit turbine towers (Kerlinger et al. 2010). At terrestrial wind projects, flashing red aviation hazard lights have been demonstrated to have the same attraction response as non-lit turbines and, in general, birds are expected to have a much lower response to flashing lights (Gehring et al. 2009; Kerlinger et al. 2010). Similarly, nocturnally migrating birds over the North Sea were less attracted to blinking lights (red, yellow, green, blue, and white) in the offshore environment than to steady burning lights, thus the use of blinking lights is preferred over continuous light (Rebke et al. 2019).

BOEM assumes onshore project facilities would be located in developed areas with existing ambient light sources since projects would be using existing points of interconnection. Any birds present nearby would be temporarily exposed to light pollution introduced during onshore construction, O&M, or decommissioning, which would represent a risk of collision with structures. Using bird-safe windows and building designs in all onshore construction projects could reduce light pollution and potential collisions with windows.

BIR-2 proposes that the top of each navigation light on WTGs and OSSs be shielded to minimize upward illumination to minimize the potential of attracting migratory birds and any effects on nocturnal foraging seabirds. MUL-37 would implement an Aircraft Detection Lighting Systems (ADLS) to only activate WTG lighting when aircraft enter a predefined airspace. The short-duration synchronized flashing of the ADLS would significantly reduce the amount of time lights on WTGs would be illuminated and therefore have less impact on birds at night than the standard continuous, medium-intensity red strobe light aircraft warning systems. In addition, the measure includes practices to otherwise reduce or manage the amount of light that project infrastructure would generate. This measure in particular will serve to reduce potential impacts to ESA-listed birds by reducing the amount of artificial light introduced to the environment.

During construction and decommissioning activities, there would be a temporary increase in lighting from construction equipment and vessels. Vessel traffic and associated vessel lighting during O&M would occur at a lower frequency than during construction and decommissioning. The risk of increased collision due to attraction to lighting during nighttime construction activities is considered to be temporary (Fox et al. 2006) and is unlikely to affect bird populations. In addition to applicable USCG and BOEM requirements, BIR-2 also requires that, upon approval of PATONs for each offshore structure, USCG, BOEM, and USFWS will work together to determine the color, intensity, and duration of any light from maritime lanterns that is likely to reach the typical flight heights of ESA-listed bird.

BOEM expects the application of programmatic AMMM measures will avoid and minimize lighting effects on ESA-listed birds. Therefore, the potential impacts from artificial lighting on piping plover, roseate tern, and *rufa* red knot would be extremely unlikely to occur and ***discountable***.

6.4.4.2 Eight projects

Eight projects, with implementation of AMMM measures, would increase the total spatial extent of light disturbance within the Action Area. However, given the highly localized spatial extent of light impacts as described above, the total disturbance from eight projects is still expected to represent only a small proportion of the available habitat in the Action Area. The risk to ESA-listed birds would increase under eight projects. However, with the implementation of AMMM measures designed to minimize lighting effects, impacts as a result of eight projects is not expected to differ appreciably from one project given the highly localized area affected around each individual turbine. Therefore, the potential impacts from artificial lighting from eight projects on piping plover, roseate tern, and *rufa* red knot would be extremely unlikely to occur and ***discountable***.

6.4.5 Noise

6.4.5.1 One Project

Federally listed bird species present within the Action Area may be exposed to periodic construction noise exceeding ambient levels due to construction of offshore wind structure foundations, construction of onshore project elements, and use of construction vessels/vehicles. Combined with the visual disturbance created by construction activity, this exposure could theoretically lead to behavioral effects, including potential species avoidance of the affected area. There are currently no established in-air noise exposure thresholds for the federally listed birds analyzed in this BA, so potential species effects are evaluated based on extent and magnitude of effects relative to baseline ambient conditions and the likelihood of species exposure.

Given onshore construction is assumed to occur in the vicinity of existing developed areas, BOEM expects project construction vehicle use would not significantly alter baseline noise levels, and no vehicle use would occur on or in proximity to shoreline habitats known or potentially used by ESA-listed birds. ESA-listed birds in proximity to the landfall sites may be able to detect noise created by construction and maintenance equipment, but that disturbance is likely insignificant relative to existing baseline conditions. Individual responses may range from escape behavior to mild annoyance, but are not expected to be biologically significant. Similarly, construction and maintenance vehicle activity would also not significantly increase or alter the existing levels of disturbance within onshore areas. Noise-related effects on federally listed bird species in the vicinity of construction activities would be temporary and localized. Normal operation of the substation and converter station would generate continuous noise, but BOEM expects negligible long-term impacts when considered in the context of baseline conditions in existing developed areas. Onshore noise therefore is not anticipated to affect the migratory movements or behaviors of ESA-listed birds.

Vessel and offshore construction noise could disturb ESA-listed bird species in the vicinity, but they would likely acclimate to the noise or move away, potentially resulting in a temporary loss of habitat (BOEM 2012). Installation of offshore WTG and OSS foundations using an impact pile driver (if a pile-driven foundation solution is selected) would produce the loudest airborne noise effects associated with project construction. The area potentially affected by pile driving at any given time would be limited to the effect radius around the pile being installed. *Rufa* red knots, roseate terns, and piping plovers would only be exposed to impact hammer noise if monopile or pin pile installation occurs during the migratory period and if the species happened to be present as far offshore as the lease area when pile driving is occurring. Based on observed flight behavior, migrating birds would be able to detect and avoid noise-producing activities at a considerable distance with a minimal shift in flight path. Individual birds may hear construction noise, including pile driving, but would be able to limit exposure without significantly altering behavior. This conclusion is supported by the fact that these species are periodically exposed to elevated baseline noise levels from sources like large ships without apparent harm.

Once construction is completed, the WTGs would produce operational airborne noise in the offshore marine environment the same as described for bat species in Section 6.2.2 for one project. The frequency and sound level generated from operating WTGs would not differ from those described for bats, and are expected to be less than 65 decibels equivalent continuous sound pressure level at 164 feet (50 meters) from a WTG tower. This level would be unlikely to impact birds in the vicinity of WTGs. Similarly, noise levels associated with decommissioning acitivities would be the same for birds as described for bats in Section 6.2.2. If these activities were to occur during the migration period, most *rufa* red knots, roseate terns, and piping plovers, if even present in the area, would be flying well above the Action Area. However, should any federally listed birds occur in the area, they would be expected to easily fly around the noise source; therefore, the noise generated is not anticipated to adversely affect bird movement or behavior through the Action Area.

This information indicates that exposure to noise would be minimal and is not likely to result in biologically significant behavior changes. Onshore construction noise would be temporary, and any noise related to the project would not be anticipated to affect baseline noise conditions given the anticipated developed condition of the onshore Action Area. Potential effects from noise may affect the piping plover, roseate tern, and *rufa* red knot, but adverse impacts would be unlikely to occur and the size of the impact, were it to occur, would be too small to be measured or evaluated; therefore, the potential impacts of noise on ESA-listed bird species would be ***insignificant*** and ***discountable***.

6.4.5.2 Eight projects

The same mechanisms and effects described for noise associated with one project applies for eight projects. Though consideration of construction, O&M, and eventual decommissioning of all eight projects would result in an increase in noise present in the Action Area compared to just one project, the risk of behavioral effects on ESA-listed birds would not be expected to substantially differ from one project given the limited spatial extent of noise ensonification. Any behavioral effects, if they were to occur, would be temporary and minor. Given the application of programmatic AMMM measures, the temporary and localized nature of potential noise impacts, and the expected insignificant response to those impacts, the impact of onshore and offshore construction noise, operational WTGs, and decommissioning activities on piping plover, roseate tern, and *rufa* red knot from eight projects is considered ***discountable***.

6.4.6 Presence of structures

6.4.6.1 One Project

This section discusses the potential for impacts on federally listed species resulting from collisions with WTGs for one project. Piping plover, red knot, and roseate tern are agile fliers and are extremely unlikely to collide with stationary offshore structures or moving vessels. Most structures would likely be spaced 0.6 to 1 nm (1 to 1.9 kilometers) apart, thus providing ample space between WTGs should allow birds that are not flying above WTGs to fly through individual lease areas without changing course or to make minor course corrections to avoid operating WTGs. The three species are agile flyers with no records of colliding with stationary structures such as bridges, communication towers, skyscrapers, or moving vessels (e.g., boats). These species are expected to avoid colliding with fixed structures including met towers, WTG towers, OSSs, and vessels. As such, the likelihood of collisions with fixed structures or vessels associated with the Proposed Action is considered to be ***insignificant*** and ***discountable***.

The primary hazard posed to the three ESA-listed birds from offshore wind energy development would be collision mortality associated with the operational WTGs. The section below focuses on the collision risk for the piping plover, roseate tern, and *rufa* red knot, and uses the most relevant information about known occurrences and species' interactions with offshore wind on the Atlantic OCS.

6.4.6.2 Eight projects

BOEM used the SCRAM 2.0 (Goyert et al. 2024)to estimate the relative annual number of fatalities due to collisions with WTGs. The SCRAM model requires relatively detailed project level information that simply is not available at this programmatic stage. However, rough estimates of the design inputs can be used to move this programmatic consultation forward and to understand the relative impacts. The exact number of turbines per lease is currently not known at this time, so BOEM used the estimated number of turbines/substations from the planned offshore wind projection described in Table D-3 in the Maryland Offshore Wind FEIS. The analysis of eight representative offshore wind projects within the Action Area includes up to 797 WTGs (Table 6.2). Turbine specifications are not know at this time, so BOEM used the average values across other projects from previous consultations (Table 6.3).

For piping plover, the estimated number of annual collisions when summed across 8 projects is 0.23, and the annual number collsions for red knot is 0.84 (Table 6-5); therefore, the Proposed Action is **likely to adversely affect** piping plover and *rufa* red knots during all of the projects' operation periods combined. For roseate terns, the estimated annual number of collisions in the NY Bight is 0.0 (Table 6-4), therefore the Proposed Action is ***not likely to adversely affect*** roseate terns.

Table 6-2. Planned offshore wind project construction as of February 15, 2024 from Maryland Offshore Wind FEIS Table D-3.

Region	Lease (s)	Foundations [a]
NY Bight	A (0538, 0539, & 0542) [b]	349
	B (0544)	104
	C (0537)	82
	D (0541)	95
New England	Bay State Wind	96
Mid-Atlantic	Skipjack	71
SUM		**797**

[a] WTGs and substations.
[b] Analyzed as a single project "A" because the three leases are in the same 50x50 km^2 occupancy pixel.

Table 6-3. Project details from other offshore wind Biological Assessments prepared by BOEM.

Project	Turbines	Model	Rotor radius (m)	Air gap (m)	Max blade width (m)
Revolution Wind	79	SG DD-200 11	100	39.79	5.75
Sunrise Wind	87	SG DD-200 11	97	40	5.8
New England Wind	130	Unknown	143	27	9
South Coast Wind	147	Unknown	110	23	5.77
Empire Wind	147	V236-15MW	116	27.8	5.77
Atlantic Shores Offshore Wind (ASOW)-South	200	V236-15MW	115.5	23.8	5.1
Ocean Wind 1	98	Haliade-X	107	22	5.77
US Wind	114	Unknown	125	36	5.77
CVOW-C	176	SG-14-222 DD	108	33.8	6.3
		Mean	**113.5**	**30.4**	**6.1**

Table 6-4. Estimated annual number of collisions with 95 percent predication intervals in parentheses.

Region	Lease (s)	Piping Plover	Red Knot	Roseate tern
NY Bight	A (0538, 0539, & 0542)	0.06 (0-0.26)	0.15 (0.03-0.42)	0 (0-0.00)
	B (0544)	0.03 (0.01-0.09)	0.05 (0.02-0.13)	0 (0-0.00)
	C (0537)	0.02 (0-0.07)	0.02 (0.00- 0.09)	0 (0-0.00)
	D (0541)	0.03 (0.00-0.10)	0.24 (0.14-0.38)	0 (0-0.00)
New England	Bay State Wind	0.05 (0.01-0.16)	0.20 (0.10-0.40)	0 (0-0.00)
Mid-Atlantic	Skipjack	0.01 (0.00-0.02)	0.16 (0.10-0.25)	0 (0-0)
SUM		**0.23 (0.02-0.69)**	**0.84 (0.38-1.66)**	**0 (0-0.00)**

6.4.7 Traffic (Aircraft)

6.4.7.1 One Project

Aircraft traffic during construction, O&M, and decommissioning could pose a collision threat to federally listed birds that may be in the area of aircraft use. General aviation traffic accounts for approximately two bird strikes per 100,000 flights (Dolbeer et al. 2019). Because aircraft flights associated with project activities are expected to be minimal in comparison to baseline conditions, aircraft strikes with federally listed birds are highly unlikely to occur. Aircraft use is primarily expected during construction and decommissioning activities to transport crew and equipment to and from the lease area. Therefore, potential effects from aircraft-related collisions are extremely unlikely to occur and would be ***discountable***.

6.4.7.2 Eight projects

Impacts due to aircraft traffic associated with one project and eight projects are the same, as the mechanisms and effects are not expected to differ appreciable. Given the minimal expected use of aircraft for eight projects and that bird strikes are highly unlikely to occur for the reasons described in Section 6.3.7.1, potential effects from aircraft-related collisions for eight projects would be ***discountable***.

6.5 Monarch Butterfly

6.5.1 Land Disturbance

6.5.1.1 One Project

Potential effects on the monarch butterfly associated with land disturbance could occur during onshore facility construction in the vicinity of undeveloped lands where milkweed and other native nectar plants may be present. While adult monarch butterflies have the mobility to avoid construction equipment, larval stages could be vulnerable to being crushed by construction equipment, particularly during land clearing and ground excavation. Some adult monarch butterflies could also be affected by vehicle collisions (McKenna et al. 2001; Kantola et al. 2019). Also, there is some evidence that monarch caterpillars exposed to highway noise for short periods had elevated heart rates, a sign that they may experience stress along loud roadsides (Davis et al. 2018).

Although project construction, O&M, and decommissioning could potentially affect a small number of monarch butterflies, impacts are anticipated to be limited to behavioral avoidance of construction activity. Collision with Project vehicles and equipment is unlikely because the projects would not cause a noticeable increase in traffic. The Project would not cause an increase in noise to the extent that they would adversely affect monarch butterflies. If any adult butterflies were disturbed by Project activities, they would likely utilize adjacent habitat and repopulate these areas once construction ceases. Temporarily disturbed habitat would be restored to pre-existing conditions. If suitable monarch butterfly habitat is permanently affected by construction activities mitigation could replace it by using native plants, including milkweed, to landscape around builidings and ROW, which would be a measure applied during the project-sepcific consultation.

Based on the above analysis, potential effects on monarch butterflies from land disturbance and related activities (e.g., construction vehicle use) would be unlikely and would therefore be ***discountable***. The size of any impact, were it to occur, would be too small to be measured or evaluated and would therefore be ***discountable***.

6.5.1.2 Eight projects

Eight projects, with implementation of AMMM measures, would increase the total spatial extent of land disturbance within the Action Area. However, the total disturbance from eight project is still expected to represent only a small proportion of the available habitat in the Action Area. Additionally, the same mechanisms and effects as described for one project (Section 6.4.1.1) would apply to eight projects. The risk to monarch butterfly would increase under eight projects, but impacts as a result of eight projects is not expected to differ appreciably from one project when AMMM measures are implemented. Therefore, measurable effects, if any, that do occur as a result of land disturbance from eight projects are considered ***discountable***.

6.5.2 Presence of Structures

6.5.2.1 One Project

Monarch butterflies are generally reluctant to cross over water (Brower 1995). Although monarchs are far-ranging fliers, they are easily blown off course, often by storms, and there have been reports of monarch butterflies on offshore oil platforms and ships at sea (Ross 1998). This would be a small proportion of the overall migratory population, and large numbers of monarch butterflies would not be found on the Atlantic OCS. Therefore, collision risk would only exist for a small number of individuals during their fall migratory period.

There is limited information about butterfly mortalities caused by collisions with wind turbines, especially for monarch butterflies in the offshore environment. Some studies have investigated the density of insect splatter on onshore wind turbine blades and concluded that there was a negligible effect on insects (Gipe 2015), while others have suggested that the impacts of wind turbines on insect populations, in general, may be significant (Trieb et al. 2018; Voigt 2021). Monarch butterfly migration is well studied, and the species has been recorded to fly at heights over 10,000 feet (3,048 meters) above ground elevation, taking advantage of favorable winds and moving downwind at high elevation (Monarch Joint Venture 2014), though the majority of travel occurs at approximately 800 to 1,200 feet (244 to 366 meters) (Gibo 1981; Monarch Joint Venture 2014). Therefore, while their flight patterns could occasionally put them within the blade heights of WTGs, monarch butterflies would be unlikely to occur within the RSZ of the projects during migration due to their high-altitude migrations.

Because migration is the only time period when monarch butterflies could occur offshore, there is little to no evidence to suggest that collision with WTGs on the Atlantic OCS poses a threat to the species. Therefore, because the occurrence of monarch butterflies in the offshore portions of the Action Area is anticipated to be very rare and they migrate at higher elevations than the RSZ, potential collisions with structures are extremely unlikely to occur and ***discountable***; the size of any impact, were it to occur, would be too small to be measured or evaluated and would be ***insignificant***.

6.5.2.2 Eight projects

The same mechanisms and effects described for one project above applies for eight projects. Eight projects, with implementation of AMMM measures, would increase the total number of structures in the Action Area. For eight projects, there could be approximately 797 WTGs and 44 OSS within the Action Area. While this represents a large increase in the number of offshore structures, the foundations would be restricted to just the eightlease areas which represent approximately 1.9 percent of the overall available space within the Action Area. The occurrence of monarch butterflies in the offshore portions of the Offshore Action Area is likely to be rare and in only a small numbers of individuals. Given these factors and with the application of programmatic AMMM measures, measurable impacts due to the presence of structures for eight is considered unlikely for monarch butterflies and is ***discountable***.

7 Determination of Effects

Based on the analysis presented in Section 6, Table 7-1 lists the effects determinations for one project and Table 7-2 lists the effects determinations for eight projects for each ESA-listed species analyzed in this assessment by stressors that were not already excluded in Section 5.1. Following is a summary of the effects determination for each ESA-listed species included in this Programmatic BA.

Table 7-1. Effects determination summary for threatened, endangered or candidate species that may occur in the Action Area for one project.

Stressor/Impact-Producing Factor	Northern Long-Eared Bat	Tricolored Bat	Little Brown Bat	Piping Plover	Roseate Tern	*Rufa* Red Knot	Monarch Butterfly
Accidental Releases	–	–	–	NLAA	NLAA	NLAA	–
Cable Emplacement and Maintenance	–	–	–	NE	NLAA	NE	–
Land Disturbance	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Lighting	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	–
Noise	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	–
Presence of Structures	NLAA	NLAA	NLAA	LAA	NLAA	LAA	NLAA
Traffic	–	–	–	NLAA	NLAA	NLAA	–
Overall Effects Determination	**NLAA**	**NLAA**	**NLAA**	**LAA**	**NLAA**	**LAA**	**NLAA**

– = not applicable for resource; LAA = likely to adversely affect; NE = no effect; NLAA = not likely to adversely affect

Table 7-2. Effects determination summary for threatened, endangered or candidate species that may occur in the Action Area for eight projects.

Stressor/Impact-Producing Factor	Northern Long-Eared Bat	Tricolored Bat	Little Brown Bat	Piping Plover	Roseate Tern	*Rufa* Red Knot	Monarch Butterfly
Accidental Releases	–	–	–	NLAA	NLAA	NLAA	–
Cable Emplacement and Maintenance	–	–	–	NE	NLAA	NE	–
Land Disturbance	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Lighting	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	–
Noise	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	–
Presence of Structures	NLAA	NLAA	NLAA	LAA	NLAA	LAA	NLAA
Traffic	–	–	–	NLAA	NLAA	NLAA	–
Overall Effects Determination	**NLAA**	**NLAA**	**NLAA**	**LAA**	**NLAA**	**LAA**	**NLAA**

– = not applicable for resource; LAA = likely to adversely affect; NE = no effect; NLAA = not likely to adversely affect

7.1 Bats (Northern Long-eared Bat, Tricolored Bat, Little Brown Bat)

Given that individual northern long-eared, tricolored, and little brown bats occur in portions of the Action Area and as described in Section 5.4 through 5.6, there is potential risk to the species during construction, O&M, and decommissioning (Section 6.3). However, few (if any) northern long-eared, tricolored, little brown bats are expected in the offshore portions of the Action Area, though suitable habitat may exist in the onshore portion of the Action Area for the three species. The application of programmatic AMMM measures would further avoid and minimize any impacts that could occur. For these reasons, the potential effects related to land disturbance, noise, and the presence of structures are extremely unlikely to occur and are therefore, ***discountable***. Moreover, the size of any effect, were it to occur, would be too small to be measured or evaluated and would therefore be ***insignificant***. For these reasons, BOEM anticipates that one project and eight projects under the Proposed Action ***may affect, not likely to adversely affect*** the northern long-eared bat, the tricolored bat, and the little brown bat.

7.2 Birds (Piping Plover, Roseate Tern, *Rufa* Red Knot)

The potential onshore impacts on ESA-listed birds within the Action Area would be limited to the vicinity of the export cable landfall locations, where beach/dune/tidal wetland habitat is present. Trenchless technology (e.g., HDD) for export cable landing sites would avoid and minimize potential impacts on these species. As such, impacts on these species from construction activities at the landfall location would be avoided or minimized.

The effects of noise and aircraft traffic would be temporary and localized, and unlikely to impact any of these species. Impacts from structure lighting would also be significantly minimized with the installation of an FAA-approved ADLS on WTGs and OSSs, such that lighting would only be on when aircraft are detected in the vicinity of the windfarm.

Given that the piping plover, roseate tern, and *rufa* red knot are known to occur in portions of the Action Area, particularly during their migratory periods, and considering the potential risks to the species during construction, O&M, and decommissioning, as described in Section 6.4, both one project and eight projects may affect these bird species. The SCRAM collision risk model results predicted there would be <1 piping plover collisions, <1 *rufa* red knot collisions, and 0 roseate tern collisions annually for the eight project scenario. By extrapolating these annual estimates over a 35-year operational period under the Proposed Action, the SCRAM model predicted there would be <8 piping plover collisions, 29 *rufa* red knots collisions, and 0 roseate tern collisions. Due to uncertainties with the inputs, the estimated number of collisions should not be viewed as absolute numbers but as relative numbers.

The application of programmatic AMMM measures would avoid and minimize any impacts that could occur. Overall, potential effects from the stressors to the roseate tern for one project are extremely unlikely to occur and would be ***discountable***. Moreover, the size of any effect, were it to occur, would be too small to be measured or evaluated and would therefore be ***insignificant***. However, BOEM anticipates that for eight projects under the Proposed Action **may affect, not likely to adversely affect** the roseate tern. Because the chances of mortality of piping plover and *rufa* red knots predicted by the SCRAM model are greater than zero over the summed project's operational life, it can be concluded one project and eight projects under the Proposed Action is **likely to adversely affect** the piping plover and *rufa* red knot.

7.3 Monarch Butterfly

Given that the monarch butterfly may occur in portions of the Action Area and, as described in Section 6.3, there is potential risk to the species during construction, O&M, and decommissioning. The proposed projects may therefore affect the monarch butterfly. Within the offshore portions of the Action Area, collision with WTGs is unlikely because monarch butterflies are known to migrate at higher elevations that the RSZ. Based on the specific habitat preferences of the monarch butterfly, any potential effects on monarch butterfly, were these effects to occur, would be temporary and localized. The application of programmatic AMMM measures would avoid and minimize any impacts that could occur. Therefore, potential effects from the stressors are extremely unlikely to occur and would be ***discountable***. Moreover, the size of any effect, were it to occur, would be too small to be measured or evaluated and would therefore be ***insignificant***. If the USFWS were to list the monarch butterfly as Threatened or Endangered in the future, BOEM anticipates one project and eight projects under the Proposed Action **may affect, not likely to adversely affect** monarch butterfly.

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Appendix A: IPAC Official Species List