Appendix E: Analysis of Incomplete and Unavailable Information

In accordance with Section 1502.21 of the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA), when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement (EIS) and when information is incomplete or unavailable, the agency shall make clear that such information is lacking. When incomplete or unavailable information was identified, the Bureau of Ocean Energy Management (BOEM) considered whether the information was relevant to the assessment of impacts and essential to its analysis of alternatives based upon the resource analyzed. If essential to making a reasoned choice among the alternatives, BOEM considered whether it was possible to obtain the information and if the cost of obtaining it was exorbitant. If it could not be obtained or if the cost of obtaining it was exorbitant, BOEM applied acceptable scientific methodologies to inform the analysis in light of this incomplete or unavailable information.

Because the Programmatic EIS (PEIS) is being prepared prior to the submittal of Construction and Operations Plans (COPs), the specific locations of wind turbine generators (WTGs) and offshore substations (OSSs), interarray cables, offshore and onshore export cable routes, cable landfall locations, and onshore facility locations for the New York Bight (NY Bight) projects are not known at this time. Therefore, site-specific impacts associated with the construction and installation, operations and maintenance (O&M), and conceptual decommissioning of these facilities that deviate from the broad-scale analysis presented in the PEIS will be analyzed in subsequent COP-specific NEPA documents. Because the analysis in the Final PEIS is intended to be programmatic in nature and because future site-specific NEPA analysis will be required for each COP, BOEM does not believe site-specific information on facility locations is essential to the reasoned choice among alternatives. The following sections present an analysis by resource topic of incomplete or unavailable information in the PEIS.

E.1 Incomplete or Unavailable Information Analysis for Resource Areas

E.1.1 Air Quality and Greenhouse Gas Emissions

BOEM expects that any action alternative would lead to reduced emissions regionally and a net improvement in regional air quality because offshore wind energy would displace a portion of the energy generated from fossil fuel combustion. Although a quantitative emissions inventory analysis of the region, and regional modeling of pollutant concentrations over the next 30 to 35 years would more accurately assess the overall impacts of the changes in emissions from the six NY Bight projects, regional air quality conditions would apply to the programmatic alternatives and subsequent project-specific alternatives alike. When specific projects are proposed and undergo Outer Continental Shelf (OCS) air quality permitting, the required air quality modeling will provide additional insight into regional air quality conditions. Construction cannot begin on any project before an air permit is acquired. As such, the analysis provided in the Final PEIS is sufficient to support sound scientific judgments and informed

decision-making related to the use of the offshore portions of the NY Bight lease areas and offshore export cable route corridors. Therefore, BOEM does not believe that there is incomplete or unavailable information on air quality that is essential to making a reasoned choice among alternatives.

E.1.2 Water Quality

At this early analysis stage, there is some inherent uncertainty regarding the impacts of the activities covered in the PEIS on water quality. However, the information that is available is appropriate for this programmatic level of analysis, and subsequent project-specific environmental analysis on water quality will be required for each individual COP before any construction activities may begin. Therefore, BOEM does not believe that there is incomplete or unavailable information that is essential to making a reasoned choice among alternatives for this PEIS.

E.1.3 Bats

Habitat use and distribution of bats vary between seasons and species; therefore, there will always be some level of incomplete information on the distribution and habitat use of bats in the offshore portions of the NY Bight lease areas. Additionally, surveying bat activity offshore provides challenges as limited methods have been developed and tested for surveying within this environment. No BOEM-issued guidance for bat surveys currently exists for renewable energy development on the OCS. However, an evaluation of scientific studies and available, relevant information was examined, including New York State Energy Research and Development Authority (NYSERDA) remote metocean data from two buoys in two of the NY Bight lease areas (see Section 3.5.1.1, *Description of the Affected Environment and Future Baseline Conditions*), to provide a baseline understanding of the presence, abundance, and seasonality of bats that may occur within the NY Bight lease areas.

Given the infancy of U.S. offshore wind development, there is some level of uncertainty regarding the potential collision risk to individual bats that may be present within the offshore portions of the NY Bight lease areas. However, sufficient information on collision risk to bats observed at land-based U.S. wind projects exists and was used to analyze and corroborate the potential for this impact as a result of WTG operations in the NY Bight lease areas. In addition, as described in Section 3.5.1, *Bats*, the likelihood of a bat encountering an operating WTG during migration is very low; therefore, the differences among alternatives with respect to bats for wind development in the NY Bight lease areas are expected to be small. As such, the analysis provided in the Final PEIS is sufficient to support sound scientific judgments and informed decision-making related to distribution and use of the offshore portions of the NY Bight lease areas as well as to the potential for collision risk of bats. Consequently, BOEM does not believe that there is incomplete or unavailable information on bat resources that is essential to making a reasoned choice among alternatives.

E.1.4 Benthic Resources

There is uncertainty regarding the spatial and temporal distribution of benthic (faunal) resources and periods during which they might be especially vulnerable to disturbance; however, project-specific COP surveys of benthic resources for other nearby projects and a broad-scale study (Guida et al. 2017)

provided a suitable basis for generally predicting the species, abundances, and distributions of benthic resources within the geographic analysis area. Uncertainty also exists regarding the impact of some impact-producing factors (IPFs) on benthic resources. For example, specific stimulus-response related to acoustics and electromagnetic fields (EMFs) is not well studied, although there is some emerging information from benthic monitoring at European wind facilities and the Block Island Wind Farm in the United States that allows for a broad understanding of the impacts. Similarly, specific secondary impacts, such as changes in diets throughout the food chain resulting from habitat modification and synergistic behavioral impacts from multiple IPFs, are not fully known. Again, results of benthic monitoring at European wind facilities and the Block Island Wind Farm in the United States provide general knowledge of the overall impacts of these IPFs combined, if not individually. Therefore, the analysis provided in the Final PEIS is sufficient to support sound scientific judgments and informed decision-making related to the overall impacts. For these reasons, BOEM does not believe that there is incomplete or unavailable information on benthic resources that is essential to making a reasoned choice among alternatives.

E.1.5 Birds

Habitat use and distribution of birds vary between seasons, species, and years; therefore, there will always be some level of incomplete information on the distribution and habitat use of birds in the offshore portions of the geographic analysis area, including the NY Bight lease areas. Additionally, given the infancy of U.S. offshore wind development, there will be some level of uncertainty regarding the potential for collision risk and avoidance behaviors for some of the bird species that may be present within the offshore portions of the geographic analysis area. For the Final PEIS, publicly available avian survey data (e.g., NYSERDA remote metocean data from two buoys), marine life data and analysis team (MDAT) modeling, and NYSERDA aerial digital avian survey data that covers most of the NY Bight lease areas were used to describe bird presence and inform the analysis of potential adverse impacts on bird resources in the offshore environment.

Bird mortality data are available for onshore wind facilities and, based on several assumptions regarding their applicability to offshore environments, were used to inform the analysis of bird mortality associated with the offshore WTGs analyzed in the Final PEIS. However, uncertainties exist regarding the use of the onshore bird mortality rate to estimate the offshore bird mortality rate due to differences in species groups present and life history and behavior of species as well as differences in the offshore marine environment compared to onshore habitats.

Modeling is commonly used to predict the potential mortality rates for bird species in Europe and the United States (BOEM 2015, 2021). Due to inherent data limitations, these models often represent only a subset of species potentially present. Still, the datasets used by BOEM (e.g., MDAT) to assess the potential for exposure of birds to the NY Bight lease areas represent the best available data and provide context at both local and regional scales. Furthermore, sufficient and relevant information on collision risk and avoidance behaviors observed in related species at European offshore wind projects is available and was used to analyze and corroborate the potential for these impacts as a result of wind farm operations in the NY Bight lease areas (e.g., Skov et al. 2018). As such, the analysis provided in the Final

PEIS is sufficient to support sound scientific judgments and informed decision-making related to distribution and use of the offshore portions of the geographic analysis area as well as to the potential for collision risk and avoidance behaviors in bird resources. Furthermore, the similarity between the different alternatives does not render any of this incomplete and unavailable information essential to making a reasoned choice among alternatives. Therefore, BOEM does not believe that there is incomplete or unavailable information on birds that is essential to making a reasoned choice among alternatives.

E.1.6 Coastal Habitat and Fauna

Although the preferred habitats of terrestrial and coastal fauna are generally known, specific data on abundances and distributions within the geographic analysis area of various fauna within these habitats are likely to remain unknown without site-specific surveys. However, the species inventories and other general information about the area provide an adequate basis for evaluating the fauna likely to inhabit the onshore geographic analysis area. Additionally, the onshore activities expected to be proposed involve only common, industry-standard activities for which impacts are generally understood. Therefore, BOEM believes that the analysis provided in the Final PEIS is sufficient to make a reasoned choice among the alternatives in terms of coastal habitat and fauna.

E.1.7 Finfish, Invertebrates, and Essential Fish Habitat

There is some uncertainty regarding the spatial and temporal distribution of finfish and invertebrate resources and periods during which they might be especially vulnerable to disturbance; however, project-specific COP aquatic resource surveys for other nearby projects and a broad-scale study (Guida et al. 2017) provided a suitable basis for general predictions of finfish and invertebrate resources with respect to species, densities, and distributions within the geographic analysis area. Future project-specific Biological Assessments (BAs) and essential fish habitat (EFH) assessments will be prepared for each offshore wind project and will provide additional information about impacts on Endangered Species Act (ESA) listed species and EFH. While impacts on specific finfish and invertebrate species are not anticipated to vary from the general impacts provided in the Final PEIS, specific impact discussions for ESA-listed species and EFH will be provided in these future assessments.

Uncertainty also exists regarding the impact of some IPFs on invertebrate resources, such as the effects of EMFs and underwater noise (e.g., generated from pile-driving activities). The available information on invertebrate sensitivity to EMF is equivocal (Hutchinson et al. 2020), and sensitivity to sound pressure and particle motion effects is not well understood for many species, nor are synergistic or antagonistic impacts from multiple IPFs. Similarly, specific secondary impacts such as changes in diets throughout the food chain resulting from habitat modification are not well known for finfish and invertebrates. Where applicable, the analysis drew upon information in the available literature and an increasing number of monitoring and research studies related to wind development, other undersea development, or artificial reefs in Europe and the United States, several of which were recently drafted or published. These monitoring studies help provide a broad understanding of the overall impacts of the combined IPFs, if not individually.

For these reasons, the information provided in the Final PEIS is sufficient to support sound scientific judgments and informed decision-making related to the overall impacts. Therefore, BOEM does not believe that there is incomplete or unavailable information on finfish, invertebrate, and EFH resources that is essential to making a reasoned choice among alternatives.

E.1.8 Marine Mammals

The National Marine Fisheries Service (NMFS) has summarized the most current information about marine mammal population status, occurrence, and use of the region in its stock status reports for the Atlantic OCS and Gulf of Mexico (Waring et al. 2015; Hayes et al. 2019, 2020, 2021, 2022; Palka et al. 2021, 2017). These studies provided a suitable basis for predicting the species, abundances, and distributions of marine mammals in the geographic analysis area. However, population trend data from NMFS are unavailable for 32 species (of which only 7 are common or regular in the NY Bight area), and annual human-caused mortality is unknown for two species (see Table 3.5.6-1 in the Final PEIS). Most species lacking population trend data are offshore species, such as blue whale, fin whale, and non-porpoise odontocetes (e.g., beaked whales and dolphins). As a result, there is uncertainty regarding how the NY Bight lease area project activities and cumulative effects may affect these populations. In addition to species distribution information, effects of some IPFs on marine mammals are also uncertain or ambiguous, as described below.

Potential effects of EMF have not been scaled to consider impacts on marine mammal populations or their prey in the geographic analysis area (Taormina et al. 2018). The widespread ranges of marine mammals and difficulty obtaining permits make experimental studies challenging. As a result, few scientific studies have been conducted that examine the effects of altered EMF on marine mammals. Scientific studies summarized by Normandeau et al. (2011) demonstrate that marine mammals are sensitive to, and can detect, small changes in magnetic fields (Section 3.5.6, *Marine Mammals*), but potential impacts would likely only occur within a few feet of cable segments. Therefore, the current literature does not support a conclusion that EMF could lead to changes in behavior that would cause significant adverse effects on marine mammal populations.

The behavioral effects of anthropogenic noises on marine mammals are increasingly being studied. However, behavioral responses vary depending on a variety of factors such as life stage, previous experience, and current behavior (e.g., feeding, nursing), and they are therefore difficult to predict. In addition, the current NMFS disturbance criteria apply a single threshold for all marine mammals for impulsive noise sources and do not consider the overall duration, exposure, or frequency content of the sound to account for species-dependent hearing acuity. While elevated underwater sound could startle or displace animals, behavioral responses are not necessarily predictable from received levels alone (Southall et al. 2007).

In addition, research regarding the potential behavioral effects of pile-driving noise has generally focused on harbor porpoises and seals; studies that examine the behavioral responses of baleen whales to pile-driving activities are absent from the literature. Of the available research, most studies (e.g., Brandt et al. 2016; Dahne et al. 2013; Benhemma-Le Gall et al. 2021) conclude that, although pile-

driving activities could cause avoidance behaviors or disruption of feeding activities, individual harbor porpoises and seals would likely return to normal behaviors once the activity had stopped; this is unknown for baleen whales and other marine mammals. Uncertainty remains regarding the long-term cumulative acoustic impacts associated with multiple pile-driving projects that may occur over several years. An acoustic narrative in Appendix J, *Introduction to Sound and Acoustic Assessment*, Section, J.4, *Acoustic Assessment,* drawing on the hypothetical case study of two wind farms constructed in New England, provides further insight about the relative risk of multi-project development on select marine mammal species and the factors that should be considered in reducing acoustic impacts. This also applies to other project activities (e.g., vessel traffic, high-resolution geophysical (HRG) surveys, geotechnical drilling, dredging activities) that may elicit behavioral reactions in marine mammals. As a result, it is not possible to predict with certainty the potential long-term behavioral effects on marine mammals from the project-related pile-driving or other activities, as well as ongoing concurrent and cumulative pile-driving and other activities.

The Final PEIS used the best available information when considering behavioral effects related to underwater noise to address this uncertainty. For the assessment of large baleen whales, studies on other impulsive noises (e.g., airguns) were used to inform the potential behavioral reactions to pile-driving noise (Southall et al. 2021, McCauley et al. 1998, Johnson 2002, Richardson et al. 1999). Monitoring studies would provide insight into species-specific behavioral reactions to project-generated underwater noise. Long-term monitoring of concurrent and multiple projects could inform the understanding of long-term effects and subsequent consequences from cumulative underwater noise activities on marine mammal populations.

There is a lack of research regarding the responses of large whale species to extensive networks of new structures due to the novelty of offshore wind development on the Atlantic OCS. Although new structures are anticipated from multiple offshore wind projects in the NY Bight area (see Chapter 2, *Alternatives*), it is expected that spacing would allow large whales to access areas within and between wind facilities. No physical obstruction of marine mammal migration routes or habitat areas are anticipated, but it is unknown if avoidance of offshore wind lease areas due to new structures would occur. Additionally, while there is some uncertainty regarding how hydrodynamic changes around foundations may affect prey availability, these changes are expected to have limited impacts on the local conditions around WTG foundations. The potential consequences of these impacts on marine mammals are unknown. Monitoring studies would provide insight into species-specific avoidance behaviors and other potential behavioral reactions to project structures.

At present, the Final PEIS has no basis to conclude that these IPFs (i.e., noise, EMF, presence of structures) would result in significant adverse behavioral impacts on marine mammal populations.

BOEM determined that the overall costs of obtaining the missing information for or addressing these uncertainties are exorbitant, or the means to obtain it are unknown. Therefore, to address these gaps, BOEM extrapolated or drew assumptions from known information for similar species and studies using acceptable scientific methodologies to inform the analysis considering this incomplete or unavailable information, as presented in Section 3.5.6, *Marine Mammals*. The information and methods used to

predict potential impacts on marine mammals represent the best available information, and the information provided in the Final PEIS is sufficient to support sound scientific judgments and informed decision-making. Therefore, BOEM does not believe that there is incomplete or unavailable information on marine mammal resources that is essential to making a reasoned choice among alternatives.

E.1.9 Sea Turtles

There are limited data and information on the distribution and abundance of sea turtle species that occur in the Atlantic OCS and the NY Bight lease areas. Four species of sea turtles are considered in the PEIS: the leatherback sea turtle, loggerhead sea turtle, Kemp's ridley sea turtle, and green sea turtle. A digital aerial baseline survey of marine wildlife was conducted off the southern shores of New York and northern shores of New Jersey by NYSERDA. The survey boundaries overlap with the majority of the NY Bight lease areas. Sea turtle abundance increased from the coastal zones out to the shelf break. Densities of sea turtles were most abundant in the summer months (Normandeau Associates Inc. and APEM Inc. 2021a, 2021b).

Future project-specific BAs will be prepared for each offshore wind project and will provide additional information about impacts on ESA-listed species. While impacts on sea turtles are not anticipated to vary from the general impacts provided in the Final PEIS, specific impact discussions for ESA-listed species will be provided in these future BAs.

Some uncertainty exists about the effects of certain IPFs on sea turtles and their habitats. The effects of EMF on sea turtles are not completely understood. However, the available relevant information is summarized in the BOEM-sponsored report by Normandeau et al. (2011) and a more recent review by Bilinski (2021). Although the thresholds for EMF disturbing various sea turtle behaviors are not known, the evidence suggests that impacts may only occur on hatchlings over short distances, and no adverse effects on sea turtles have been documented to occur from the numerous submarine power cables around the world.

There is also uncertainty about sea turtle responses to NY Bight project construction activities, and data are not available to evaluate potential changes to movements of juvenile and adult sea turtles due to elevated suspended sediments. However, although some exposure may occur, total suspended solid impacts would be limited in magnitude and duration and would occur within the range of exposures periodically experienced by these species. On this basis, any resulting impact on sea turtle behavior due to sediment plumes would likely be too small to be biologically meaningful, and no adverse impacts would be expected (NOAA 2020). Some potential exists for sea turtle displacement, but it is unclear if this would result in adverse impacts (e.g., because of lost foraging opportunities or increased exposure to potentially fatal vessel interactions). Additionally, it is currently unclear whether concurrent construction of multiple projects, increasing the extent and intensity of impacts over a shorter duration, or spreading out project construction with lower intensity impacts over multiple years would result in the least potential harm to sea turtles.

There is also uncertainty regarding the cumulative acoustic impacts associated with pile-driving activities. Information on sea turtle hearing is limited, and there are some discrepancies between

hearing range determinations. Cumulative acoustic impacts associated with pile-driving activities are unknown, including whether sea turtles affected by construction activities would resume normal feeding, migrating, or breeding behaviors once daily pile-driving activities cease, or if secondary impacts would continue. Under the planned activities scenario, individual sea turtles may be exposed to acoustic impacts from multiple offshore wind projects in a single day or from one or more projects over the course of multiple days. Although the consequences of these exposure scenarios have been analyzed with the best available information, some level of uncertainty remains due to the lack of observational data on species' responses to pile-driving activities.

Some uncertainty exists regarding the potential for sea turtle responses to Federal Aviation Administration (FAA) hazard lights and navigation lighting associated with offshore wind development. Specific projects would limit lighting on WTGs and OSSs to minimum levels required by regulation for worker safety, navigation, and aviation. Although sea turtles' sensitivity to these minimal light levels is unknown, sea turtles do not appear to be adversely affected by oil and gas platform operations, which produce far more artificial light than offshore wind structures (BOEM 2019). The placement of new structures would be far from known nesting beaches, so no impacts on nesting female or hatchling sea turtles are anticipated.

Considerable uncertainty exists about how sea turtles would interact with the long-term changes in biological productivity and community structure resulting from the reef effect of offshore wind farms across the geographic analysis area. Artificial reef and hydrodynamic impacts could influence predator-prey interactions and foraging opportunities in ways that influence sea turtle behavior and distribution. Also, the extent of sea turtle entanglement on artificial reefs and shipwrecks is not captured in sea turtle stranding records, and the significance and potential scale of sea turtle entanglement in lost fishing gear are not quantified. These impacts are expected to interact with the ongoing influence of climate change on sea turtle distribution and behavior over broad spatial scales, but the nature and significance of these interactions are not predictable. BOEM anticipates that ongoing monitoring of offshore energy structures will provide some useful insights into these synergistic effects.

BOEM considered the level of effort required to address the uncertainties for sea turtles and determined that the methods necessary to do so are lacking or the associated costs would be exorbitant. Therefore, where appropriate, BOEM inferred conclusions about the likelihood of potential biologically significant impacts from available information for similar species and situations to inform the analysis considering this incomplete or unavailable information. These methods are described in greater detail in Section 3.5.7, *Sea Turtles*. Therefore, the analysis provided is sufficient to support sound scientific judgments and informed decision-making about the NY Bight projects with respect to impacts on sea turtles. For these reasons, BOEM does not believe that there is incomplete or unavailable information on sea turtles that is essential to making a reasoned choice among alternatives.

E.1.10 Wetlands

At this early analysis stage, there is some inherent uncertainty regarding the impacts of the activities covered in the PEIS on wetlands. However, the information that is available is appropriate for this

programmatic level of analysis, and subsequent project-specific environmental analysis on wetlands will be required for each individual COP before any construction activities may begin. Therefore, BOEM does not believe that there is incomplete or unavailable information that is essential to making a reasoned choice among alternatives for this PEIS.

E.1.11 Commercial Fisheries and For-Hire Recreational Fishing

Fisheries are managed in the context of an incomplete understanding of fish stock dynamics and effects of environmental factors on fish populations. The commercial fisheries information used in this assessment has limitations. For example, vessel trip report data are only an approximation because this information is self-reported and may not account for all trips. The vessel trip report data also do not include all commercial fishing operations that may be affected by offshore wind development in the NY Bight lease areas and only represent vessel logbook data for species managed by the Greater Atlantic Regional Fisheries Office. While these data include incidental catch of Atlantic menhaden, highly migratory species, or species managed by the NMFS Southeast Regional Office (e.g., wahoo and mahi mahi), when targeting other species, they are not specifically identified as a subset of total catch of these species within the NY Bight lease areas. Additionally, available historical data lack consistency, making comparisons challenging.

Vessel monitoring system (VMS) data are also limited, with a number of factors contributing to their limitations.

- VMS coverage is not universal for all fisheries, with some fisheries (summer flounder, scup, black sea bass, bluefish, American lobster, spiny dogfish, skate, whiting, and tilefish) not covered at all by VMS.
- There is limited historical coverage for most fisheries (e.g., monkfish is optional and elective on a yearly basis, 2005 or earlier for herring, 2006 for groundfish and scallops, 2008 for surfclams/ocean quahogs, 2014 for mackerel, and 2016 for longfin squid/butterfish).
- Trip declaration does not necessarily correspond to actual operation.
- Hourly position pings limit area resolution based on speed.
- Fishing time/location can be mis-estimated by operational assumptions (speed and direction) that are affected by externalities (weather, sea state, mechanical issues).
- Catch data are limited for where there is no information on catch rates, retained catch composition is limited to target species and some bycatch species, and the data are not universal.
- Catch information is for the full trip, not sub-trips.
- Not all information is collected from all fisheries (gear type).

However, these data represent the best available data, and sufficient information exists to support the findings presented in the Final PEIS.

A second limitation is that recent annual revenue for for-hire recreational fishing in the NY Bight lease areas is not available. NMFS completed planning-level assessments of revenues from recreational party and charter vessels for each of the six lease areas (NMFS 2022a–f), but the assessments do not include detailed information on revenues from for-hire recreational fishing charters. However, BOEM does not believe that there is incomplete or unavailable information on commercial fisheries and for-hire recreational fishing resources that is essential to making a reasoned choice among alternatives.

E.1.12 Cultural Resources

At this stage of analysis, BOEM does not have enough information available from the lessees and their COPs or Project Design Envelopes (PDEs) to delineate either a cultural resources geographic analysis area or Programmatic Area of Potential Effects (APE) that would fully encompass all areas that may be subject to potential effects from NY Bight offshore wind project development. Specific areas associated with anticipated NY Bight offshore wind project development but excluded from delineation of the NY Bight Final PEIS cultural resources geographic analysis area and Programmatic APE are:

- Any other offshore areas, aside from the six NY Bight lease areas, potentially physically affected by seabed-disturbing activities (i.e., other marine areas in which temporary or permanent construction or staging areas are proposed to occur, such as offshore export cable route corridors and horizontal directional drilling [HDD] locations, which may have physical impacts on cultural resources).
- All onshore areas potentially physically affected by ground-disturbing activities (i.e., terrestrial areas in which temporary or permanent construction or staging areas are proposed to occur, such as onshore export cable route corridors, substations, or HDD locations, which may have physical impacts on cultural resources).
- Any other areas within the viewshed of offshore renewable energy structures measuring greater than 1,312 feet in height.
- Any other onshore areas potentially visually affected by the presence of onshore renewable energy structures (e.g., the viewshed from which onshore structures would be visible, such as onshore export cable routes, substations, or switching stations, and which may have visual impacts on cultural resources).

As discussed in Section 3.6.2, *Cultural Resources*, and Appendix I, *NHPA Section 106 Summary*, BOEM conducted background research to identify cultural resource types in the Programmatic APE. However, other cultural resources and cultural resource types subject to potential impacts and not identified in BOEM's background research are possible.

As part of compliance with federal and state requirements, offshore wind project applicants are required to conduct requisite cultural resource and historic property identification studies and commit to measures for avoiding, minimizing, or mitigating identified resources. BOEM will require each lessee

to complete the requisite cultural resource technical studies per BOEM (2020) historic property identification guidelines including, but not limited to, the delineation of a preliminary APE (PAPE) per the COP PDE, completion of associated cultural resource and historic property identification efforts, assessment of potential effects, and development of potential avoidance, minimization, mitigation, and monitoring (AMMM) measures for identified historic properties. BOEM will then delineate the COP APE and assess the specific impacts on historic properties in the APE in COP-specific NEPA and National Historic Preservation Act (NHPA) documents.

BOEM considered the level of effort required to address the incomplete data described above for historic properties and determined that there is insufficient project definition to establish a comprehensive and sufficient cultural resources geographic analysis area that would account for all areas where project activities have the potential to result in impacts on marine cultural, terrestrial archaeological, or historic aboveground resources. Therefore, where appropriate, BOEM inferred conclusions about the likelihood of potential impacts from available information on cultural resource types likely to be present in the Programmatic APE to inform the analysis in light of this incomplete or unavailable information. These methods are described in greater detail in Section 3.6.2 and Appendix I. Therefore, the analysis provided is sufficient to support sound judgments and informed decision-making about the alternatives with respect to their impacts on cultural resources. For these reasons, BOEM does not believe that there is incomplete or unavailable information on cultural resources that is essential to making a reasoned choice among alternatives at this stage.

E.1.13 Demographics, Employment, and Economics

At this early analysis stage, there is some inherent uncertainty regarding the impacts of the activities covered in the PEIS on demographics, employment, and economics. However, no specific incomplete or unavailable information related to the analysis of impacts on demographics, employment, and economics was identified.

E.1.14 Environmental Justice

Evaluations of impacts on communities with environmental justice concerns rely on the assessment of impacts on other resources. As a result, incomplete or unavailable information related to other resources, as described in this appendix, also affects the completeness of the analysis of impacts on communities with environmental justice concerns.

As discussed in other sections, BOEM has determined that incomplete and unavailable resource information for environmental justice or for other resources on which communities with environmental justice concerns rely was either not relevant to assess reasonably foreseeable significant adverse impacts, was not essential to making a reasoned choice among alternatives, alternative data or methods could be used to predict potential impacts and provided the best available information, or the overall costs of obtaining the information were exorbitant or the means to do so were unknown. Therefore, the information provided in the Final PEIS is sufficient to support sound scientific judgments and informed decision-making related to the proposed uses of the onshore and offshore portions of the geographic analysis area.

Meaningful engagement with communities with environmental justice concerns is an essential element of assessing environmental justice impacts. For the PEIS, BOEM held a series of quarterly environmental justice forums with federal and state partners and community-based organizations that serve environmental justice and underserved communities (https://www.boem.gov/renewable-energy/state-activities/new-york-new-jersey-offshore-wind-environmental-justice-forums). As BOEM receives COPs for NY Bight projects, additional engagement opportunities, which provide information on locations for offshore and onshore infrastructure, will support COP-specific reviews.

E.1.15 Land Use and Coastal Infrastructure

At this early analysis stage, there is some inherent uncertainty regarding the impacts of the activities covered in the PEIS on land use and coastal infrastructure. However, the information that is available is appropriate for this programmatic level of analysis, and subsequent project-specific environmental analysis on land use and coastal infrastructure will be required for each individual COP before any construction activities may begin. Therefore, BOEM does not believe that there is incomplete or unavailable information that is essential to making a reasoned choice among alternatives for this PEIS.

E.1.16 Navigation and Vessel Traffic

At this early analysis stage, there is some inherent uncertainty regarding the impacts of the activities covered in the PEIS on navigation and vessel traffic. However, the information that is available is appropriate for this programmatic level of analysis, and subsequent project-specific environmental analysis on navigation and vessel traffic will be required for each individual COP before any construction activities may begin. Therefore, BOEM does not believe that there is incomplete or unavailable information that is essential to making a reasoned choice among alternatives for this PEIS.

E.1.17 Other Uses

At this early analysis stage, there is some inherent uncertainty regarding the impacts of the activities covered in the PEIS on other uses, including marine minerals, national security and military use, aviation and air traffic, cables and pipelines, radar systems, and scientific research and surveys. However, the information that is available is appropriate for this programmatic level of analysis, and subsequent project-specific environmental analysis on other uses will be required for each individual COP before any construction activities may begin. Therefore, BOEM does not believe that there is incomplete or unavailable information that is essential to making a reasoned choice among alternatives for this PEIS.

E.1.18 Recreation and Tourism

At this early analysis stage, there is some inherent uncertainty regarding the impacts of the activities covered in the PEIS on recreation and tourism. However, the information that is available is appropriate for this programmatic level of analysis, and subsequent project-specific environmental analysis on recreation and tourism will be required for each individual COP before any construction activities may begin. Therefore, BOEM does not believe that there is incomplete or unavailable information that is essential to making a reasoned choice among alternatives for this PEIS.

E.1.19 Scenic and Visual Resources

At this early analysis stage, there is some inherent uncertainty regarding the impacts of the activities covered in the PEIS on scenic and visual resources. However, the information that is available is appropriate for this programmatic level of analysis, and subsequent project-specific environmental analysis on scenic and visual resources will be required for each individual COP before any construction activities may begin. Therefore, BOEM does not believe that there is incomplete or unavailable information that is essential to making a reasoned choice among alternatives for this PEIS.

E.2 References

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