

4.1 Unavoidable Adverse Impacts of the Proposed Action

CEQ’s NEPA-implementing regulations (40 CFR 1502.16(a)(2)) require that an EIS evaluate the potential unavoidable adverse impacts associated with a Proposed Action. Adverse impacts that can be reduced by mitigation measures but not eliminated are considered unavoidable. Table 4.1-1 provides a listing of such impacts. Most potential unavoidable adverse impacts associated with the Proposed Action would occur during the construction and installation phase and would be temporary. Chapter 3, *Affected Environment and Environmental Consequences*, provides additional information on the potential impacts listed in the table.

All impacts from planned activities are still expected to occur as described in the No Action Alternative analysis in this Draft EIS, regardless of whether the Proposed Action is approved.

Table 4.1-1. Potential unavoidable adverse impacts of the Proposed Action

Resource Area	Potential Unavoidable Adverse Impacts of the Proposed Action
Physical Resources	
Air Quality	<ul style="list-style-type: none"> Emissions from engines associated with vessel traffic, construction activities, and equipment operation
Water Quality	<ul style="list-style-type: none"> Increase in suspended sediments due to seafloor disturbance during construction and installation, O&M, and decommissioning activities Potential for accidental releases during construction
Biological Resources	
Bats	<ul style="list-style-type: none"> Displacement and avoidance behavior due to habitat loss/alteration, equipment noise, and vessel traffic Individual mortality due to collisions with operating WTGs
Benthic Resources	<ul style="list-style-type: none"> Suspension and re-settling of sediments due to seafloor disturbance Conversion of soft-bottom habitat to new hard-bottom habitat Habitat quality impacts, including reduction in certain habitat types as a result of seafloor alterations Disturbance, displacement, and avoidance behavior due to habitat loss or alteration, equipment activity and noise, and vessel traffic Individual mortality due to construction activities Possible temporary loss of seagrass resources within Chelsea Harbor and Great Thoroughfares due to cable emplacement
Birds	<ul style="list-style-type: none"> Displacement and avoidance behavior due to habitat loss or alteration, equipment noise, and vessel traffic Individual mortality due to collisions with operating WTGs
Coastal Habitat and Fauna	<ul style="list-style-type: none"> Habitat alteration and removal of vegetation, including trees Temporary avoidance behavior by fauna during construction activity and noise-producing activities Individual fauna mortality due to collisions with vehicles or equipment during clearing and grading activities, particularly species with limited mobility

Resource Area	Potential Unavoidable Adverse Impacts of the Proposed Action
Finfish, Invertebrates, and Essential Fish Habitat	<ul style="list-style-type: none"> • Temporary loss of seagrass resources within Chelsea Harbor and Great Thoroughfares due to cable emplacement • Suspension and re-settling of sediments due to seafloor disturbance during construction • Displacement, disturbance, and avoidance behavior due to construction-related impacts, including noise, vessel traffic, increased turbidity, sediment deposition, EMF, and habitat changes • Individual mortality due to construction activities • Changes in habitat and community structure from conversion of soft-bottom habitat to new hard-bottom habitat
Marine Mammals	<ul style="list-style-type: none"> • Increased risk of injury (TTS or PTS) to individuals due to underwater noise from pile-driving activities during construction • Disturbance (behavioral effects) and acoustic masking due to underwater noise from pile driving, vessel traffic, aircraft, geophysical surveys (HRG surveys) and geotechnical drilling surveys, WTG operation, and dredging during construction and operations • Increased risk of individual injury and mortality due to vessel strikes during construction and installation, O&M, and decommissioning • Increased risk of individual injury and mortality associated with fisheries gear
Sea Turtles	<ul style="list-style-type: none"> • Increased risk for individual injury and mortality due to vessel strikes during construction and installation, O&M, and decommissioning • Disturbance, displacement, and avoidance behavior due to habitat disturbance and underwater noise during construction • Potential, but minor, EMF effects on migration
Wetlands	<ul style="list-style-type: none"> • Wetland and surface water alterations, including increased sedimentation deposition and removal of vegetation
Socioeconomic Conditions and Cultural Resources	
Commercial Fisheries and For-Hire Recreational Fishing	<ul style="list-style-type: none"> • Restriction in harvesting activities during construction of Offshore Project elements and during operations of offshore wind facility • Changes in vessel transit and fishing operation patterns • Changes in risk of gear entanglement, navigational hazards, and space-use conflicts associated with the presence of structures • Changes in the availability of target species because of habitat loss and conversion associated with the presence of structures
Cultural Resources	<ul style="list-style-type: none"> • Destruction of or damage to ancient submerged landforms • Although unlikely, unanticipated removal or disturbance of previously unidentified marine or terrestrial archaeological resources • Changes to the integrity of aboveground historic resources or visual disruptions to the historic or aesthetic settings from which these resources derive their significance
Demographics, Employment, and Economics	<ul style="list-style-type: none"> • Disruption of onshore and marine recreational businesses during onshore and offshore construction and cable installation • Potential changes to Ocean Economy sectors due to the long-term presence of the offshore wind facility, including commercial fishing, tourism, and recreation.

Resource Area	Potential Unavoidable Adverse Impacts of the Proposed Action
Environmental Justice	<ul style="list-style-type: none"> • Compounded health issues of local environmental justice communities near ports as a result of air quality impacts from engine emissions associated with vessel traffic, construction activities, and equipment operation • Loss of employment or income due to disruption to commercial fishing, for-hire recreational fishing, or marine recreation businesses • Hindrances to subsistence fishing due to offshore construction and operation of the offshore wind facility
Land Use and Coastal Infrastructure	<ul style="list-style-type: none"> • Conversion of undeveloped areas for cable maintenance or replacement • Land use disturbance due to construction as well as effects due to noise and travel delays • Potential for accidental releases during construction
Navigation and Vessel Traffic	<ul style="list-style-type: none"> • Congestion in port channels • Increased navigational complexity, vessel congestion, and collision risk within the WTA • Potential for disruption to marine radar on smaller vessels operating within or in the vicinity of the Project, increasing navigational complexity • Hindrances to SAR missions within the WTA
Other Uses	<ul style="list-style-type: none"> • Disruption to offshore scientific research and surveys and species monitoring and assessment • Increased navigational complexity for military or national security vessels operating within the WTA through decreased effectiveness of individual radar systems • Changes to aviation and air traffic navigational patterns
Recreation and Tourism	<ul style="list-style-type: none"> • Disruption of coastal recreation activities during onshore construction, such as beach access • Viewshed effects from the WTGs altering enjoyment of marine and coastal recreation and tourism activities • Disruption to access or temporary restriction of in-water recreational activities from construction of Offshore Project elements • Temporary disruption to the marine environment and marine species important to fishing and sightseeing due to turbidity and noise • Hindrances to some types of recreational fishing, sailing, and boating within the area occupied by WTGs during operation
Scenic and Visual Resources	<ul style="list-style-type: none"> • Alterations to the ocean, seascape, landscape character units' character, and effects on viewer experience by the wind farm, vessel traffic, onshore landing sites, onshore export cable routes, onshore substations, converter stations or both, and electrical connections with the power grid

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4.2 Irreversible and Irretrievable Commitment of Resources

CEQ’s NEPA-implementing regulations (40 CFR 1502.16(a)(4)) require that an EIS review the potential impacts on irreversible or irretrievable commitments of resources resulting from implementation of a Proposed Action. CEQ considers a commitment of a resource irreversible when the primary or secondary impacts from its use limit the future options for its use. Irreversible commitment of resources typically applies to impacts on nonrenewable resources such as marine minerals or cultural resources. The irreversible commitment of resources occurs due to the use or destruction of a specific resource. An irretrievable commitment refers to the use, loss, or consumption of a resource, particularly a renewable resource, for a period of time.

Table 4.2-1 provides a listing of potential irreversible and irretrievable impacts by resource area. Chapter 3, *Affected Environment and Environmental Consequences*, provides additional information on the impacts summarized below.

Table 4.2-1. Irreversible and irretrievable commitment of resources by resource area for the Proposed Action

Resource Area	Irreversible Impacts	Irretrievable Impacts	Explanation
Physical Resources			
Air Quality	No	No	BOEM expects air pollutant emissions to comply with permits regulating compliance with air quality standards. Emissions would be temporary during construction activities. To the extent that the Proposed Action displaces fossil-fuel energy generation, overall improvement of air quality would be expected.
Water Quality	No	No	BOEM does not expect activities to cause loss of, or major impacts on, existing inland waterbodies or wetlands. Turbidity impacts in marine and coastal environments would be short term.
Biological Resources			
Bats	Yes	No	Irreversible impacts on bats could occur if one or more individuals were injured or killed; however, implementation of mitigation measures developed in consultation with USFWS would reduce the potential for such impacts. Decommissioning of the Project would reverse the impacts of bat displacement from foraging habitat.
Benthic Resources	No	No	Although local mortality of benthic fauna and habitat alteration is likely to occur, and seagrass resource losses may occur, BOEM does not anticipate population-level impacts on benthic organisms; habitat could recover after decommissioning activities.
Birds	Yes	No	Irreversible impacts on birds could occur if one or more individuals were injured or killed; however, implementation

Resource Area	Irreversible Impacts	Irretrievable Impacts	Explanation
			of mitigation measures developed in consultation with USFWS would reduce the potential for such impacts. Decommissioning of the Project would reverse the impacts of bird displacement from foraging habitat.
Coastal Habitat and Fauna	No	No	Although limited removal of habitat associated with clearing and grading for construction of the onshore cable and substations, converter stations, or both are likely to occur, BOEM does not anticipate population-level impacts on flora or fauna; coastal habitat could recover after construction in some areas, and after decommissioning activities in other areas.
Finfish, Invertebrates, and Essential Fish Habitat	No	No	Although local mortality of finfish and invertebrates, and habitat alteration and temporary loss of seagrass resources could occur, BOEM does not anticipate population-level impacts on finfish, invertebrates, and essential fish habitat. It is expected that the aquatic habitat for finfish and invertebrates would recover following decommissioning activities.
Marine Mammals	No	Yes	Irreversible impacts on marine mammal populations could occur if one or more individuals of an ESA-listed species were injured or killed or if those populations experienced behavioral effects with severe consequences. With implementation of mitigation measures, developed in consultation with NMFS (e.g., timing windows, vessel speed restrictions, safety zones), the potential for an ESA-listed species to experience behavioral effects with severe consequences or be injured or killed would be reduced. No irreversible high-severity behavioral effects from Project activities are anticipated; however, due to the uncertainties from lack of information that are outlined in Appendix E, <i>Analysis of Incomplete and Unavailable Information</i> , these effects are still possible. Irretrievable impacts could occur if growth of individuals or populations is retarded as a result of displacement from the Project area.
Sea Turtles	No	Yes	Irreversible impacts on sea turtles could occur if one or more individuals of species listed under the ESA were injured or killed; however, the implementation of mitigation measures, developed in consultation with NMFS, would reduce potential impacts on listed species. Irretrievable impacts could occur if growth of individuals or populations is retarded as a result of injury or mortality due to vessel strikes or entanglement with fisheries gear caught on the structures, or due to displacement from the Project area.
Wetlands	No	No	BOEM does not expect activities to cause loss of, or major impacts on, existing inland waterbodies or wetlands.

Resource Area	Irreversible Impacts	Irretrievable Impacts	Explanation
Socioeconomic Conditions and Cultural Resources			
Commercial Fisheries and For-Hire Recreational Fishing	No	Yes	Based on the anticipated duration of construction and installation and O&M activities, BOEM does not anticipate irreversible impacts on commercial fisheries. The Project could alter habitat during construction and installation and O&M, limit access to fishing areas during construction and installation, or reduce vessel maneuverability during O&M. However, the conceptual decommissioning of the Project would reverse those impacts. Irretrievable impacts (lost revenue) could occur due to the loss of use of fishing areas at an individual level.
Cultural Resources	Yes	Yes	Impacts on ancient submerged landforms could result in irreversible and irretrievable impacts. Although unlikely, unanticipated removal or disturbance of previously unidentified marine or terrestrial archaeological resources could result in irreversible and irretrievable impacts.
Demographics, Employment, and Economics	No	Yes	Construction activities could temporarily increase contractor needs, housing needs, supply requirements, and demand for local businesses, leading to an irretrievable loss of workers for other projects. These factors could lead to increased housing and supply costs.
Environmental Justice	No	Yes	Impacts on environmental justice communities could occur due to loss of income or employment for low-income workers in marine industries; this could be reversed by Project decommissioning or by other employment, but income lost during Project O&M would be irretrievable.
Land Use and Coastal Infrastructure	Yes	Yes	Land use required for construction and installation and O&M activities could result in a minor irreversible impact. Construction and installation activities could result in a minor irretrievable impact due to the temporary loss of use of the land for otherwise typical activities. Onshore facilities may or may not be decommissioned. Depending largely on future consultations with state and municipal agencies, onshore facilities (e.g., onshore substations and converter stations and buried duct banks) will either be retired in place or reused for other purposes.
Navigation and Vessel Traffic	No	Yes	Based on the anticipated duration of construction and installation and O&M activities, BOEM does not anticipate impacts on vessel traffic to result in irreversible impacts. Irretrievable impacts could occur due to changes in transit routes, which could be less efficient during the life of the Project.
Other Uses	No	Yes	Disruption of offshore scientific research and surveys would occur during proposed Project construction and installation,

Resource Area	Irreversible Impacts	Irretrievable Impacts	Explanation
			O&M, and decommissioning activities, constituting irretrievable impacts.
Recreation and Tourism	No	No	Construction and installation activities near the shore could result in a minor, temporary loss of use of the land for recreation and tourism purposes.
Scenic and Visual Resources	No YES!	No YES!	Long-term (until post-decommissioning) seascape unit, open ocean unit, and landscape units' character alterations, and effects on viewer experience, by the wind farm, vessel traffic, onshore landing sites, onshore export cable routes, onshore substations, converter stations or both, and electrical connections with the power grid would occur.

The explanation describes irreversible impact