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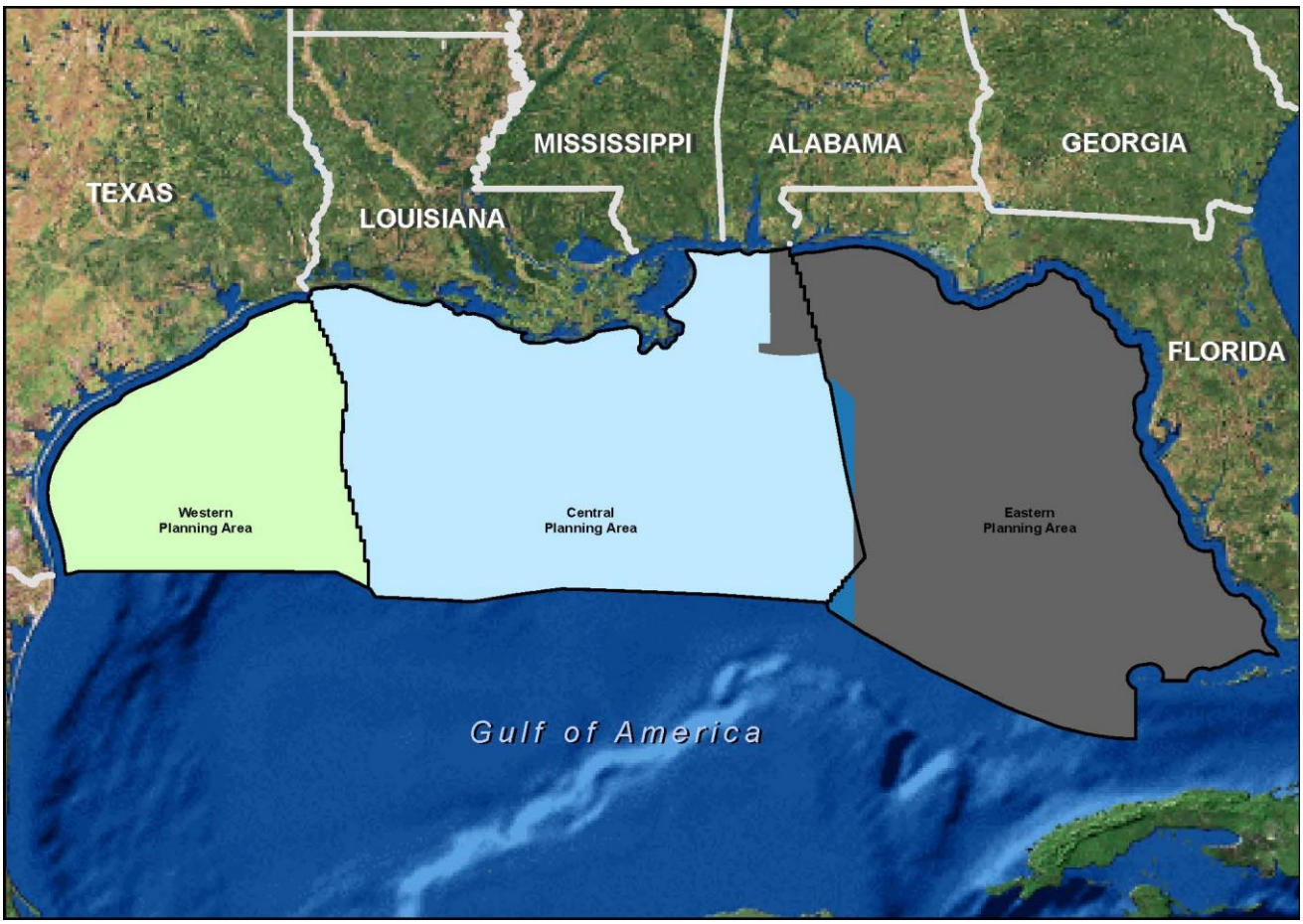
BOEM 2025-042

Gulf of America Regional OCS Oil and Gas Lease Sales and Post-Lease Activities

Final Programmatic Environmental Impact Statement



U.S. Department of the Interior
Bureau of Ocean Energy Management
Gulf of America OCS Region
New Orleans Office

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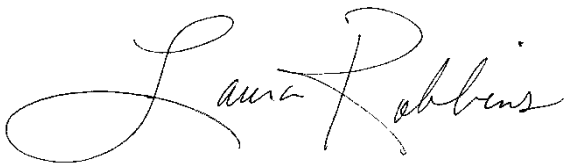
REGIONAL DIRECTOR'S NOTE

This Final Programmatic Environmental Impact Statement (EIS) analyzes the impacts of a representative Gulf of America (GOA) Outer Continental Shelf (OCS) oil and gas lease sale, and the associated potential site and activity specific actions. This document is expected to be used and supplemented as appropriate for decisions on future proposed Gulf of America OCS oil and gas lease sales; to be used for tiering purposes for associated site- and activity-specific OCS oil- and gas-related activity approvals; to help inform extraordinary circumstance reviews to ensure that categorical exclusions are used appropriately; and/or to address remedies for recent litigation over decommissioning and Lease Sale 259.

This Final Programmatic EIS analyzes the potential impacts of a proposed action on the marine, coastal, and human environments. It is important to note that this Final Programmatic EIS was prepared using the best information that was publicly available at the time this document was prepared. This Programmatic EIS's analysis focuses on identifying the baseline conditions and potential environmental effects of oil and natural gas leasing, exploration, development, production, and decommissioning in the GOA. This Programmatic EIS will also assist decisionmakers in making informed, future decisions regarding the approval of operations, as well as leasing.

BOEM's Gulf of America OCS Region, New Orleans Office and its predecessors have been conducting environmental analyses of the effects of OCS oil and gas development since the inception of the National Environmental Policy Act of 1969. We have prepared and published more than 75 draft and final EISs. Our goal has always been to provide factual, reliable, and clear analytical statements in order to inform decisionmakers and the public about the environmental effects of proposed OCS oil and gas-related activities and their alternatives.



Laura Robbins
Acting, Regional Director
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COVER SHEET

Final Programmatic Environmental Impact Statement for Gulf of America Regional OCS Oil and Gas Lease Sales and Post-Lease Activities

	Draft ( )	Final (x)
Type of Action:	Administrative (x)	Legislative ( )

Area of Potential Impact: Offshore Marine Environment and Coastal Counties/Parishes of Texas, Louisiana, Mississippi, Alabama, and northwestern Florida

Agency	Region Contacts
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ABSTRACT

This Final Programmatic Environmental Impact Statement (EIS) analyzes a proposed Federal action: a Gulf of America (GOA) Outer Continental Shelf (OCS) oil and gas lease sale. This document is expected to be used and supplemented as appropriate for decisions on future proposed Gulf of America OCS oil and gas lease sales; to be used for tiering purposes for associated site- and activity-specific OCS oil- and gas-related activity approvals; to help inform extraordinary circumstance reviews to ensure categorical exclusions are used appropriately; and/or to address remedies for recent litigation over decommissioning and Lease Sale 259.

This Final Programmatic EIS provides the following information in accordance with the National Environmental Policy Act and DOI's 2008 implementing procedures. This document includes the purpose of and need for the proposed action, identification of the alternatives, and descriptions of the affected environment. It analyzes the potential environmental impacts of the proposed action, alternatives, and associated activities, including proposed mitigating measures and their potential effects. Potential contributions to cumulative impacts resulting from activities associated with the proposed action are also analyzed. The Bureau of Ocean Energy Management (BOEM) developed hypothetical scenarios on the levels of activities, accidental events that are foreseeable (such as oil spills), and potential impacts that might result if the proposed action is adopted. Activities and disturbances associated with the proposed action on biological, physical, and socioeconomic resources are considered in the analyses.

This Final Programmatic EIS analyzes the potential impacts of the proposed action on air and water quality, coastal communities and habitats, benthic communities and habitats, pelagic communities and habitats, fishes and invertebrates, birds, marine mammals, sea turtles, commercial fisheries, recreational fishing, recreational resources, land use and coastal infrastructure, social factors, economic factors, and cultural, historical, and archaeological resources. It is important to note that BOEM prepared this Final Programmatic EIS using the best information that was publicly available at the time this document was prepared. Where relevant information about reasonably foreseeable significant adverse impacts is incomplete or unavailable, the need for the information was evaluated to determine if it was essential to a reasoned choice among the alternatives and, if so, was either acquired or, in the event it was impossible or exorbitant to acquire the information, accepted scientific methodologies were applied in its place.

Copies of this Final Programmatic EIS and the other referenced publications may be obtained from the Bureau of Ocean Energy Management, Gulf of America Regional Office, Office of Communications (GM 335A), 1201 Elmwood Park Boulevard, New Orleans, Louisiana 70123-2394, by telephone at 504-736-2519 or 1-800-200-GULF, or at http://www.boem.gov/nepaprocess/ or https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic.

EXECUTIVE SUMMARY

The Bureau of Ocean Energy Management (BOEM) issued the *2024-2029 Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program* (2024-2029 National OCS Oil and Gas Program) (BOEM 2023a). The 2024-2029 National OCS Oil and Gas Program included proposed Gulf of America OCS Region (GOAR) oil and gas lease sales tentatively scheduled in 2025, 2027, and 2029. The GOA Program Area for the three oil and gas lease sales proposed in the 2024-2029 National OCS Oil and Gas Program comprises the Western, Central, and a small portion of the Eastern Planning Areas (WPA, CPA, and EPA, respectively) not subject to Presidential Withdrawal. Secretary of the Interior Doug Burgum (Secretary) issued Secretary's Order (S.O.) 3423, which directed the renaming of the Gulf of Mexico to the Gulf of America (U.S. Secretary of the Interior 2025). As a result, BOEM updated this Programmatic EIS to reflect the name change. Legacy content, such as previously published reports and environmental documents, will remain unchanged, while existing content and new materials were updated accordingly.

BOEM typically conducts region-specific environmental reviews by Program Areas (e.g., GOAR) to support decisions on individual, proposed Outer Continental Shelf (OCS) oil and gas lease sales (lease sales) in those areas. Unless mandated otherwise, the Secretary retains the discretion at the lease sale stage to determine whether, when, and under what terms a lease sale should be held and the precise acreage to be offered. This *Gulf of America Regional OCS Oil and Gas Lease Sales and Post-Lease Activities: Final Programmatic Environmental Impact Statement* (GOAR Oil and Gas Programmatic EIS) analyzes a proposed Federal action, i.e., a Gulf of America OCS oil and gas lease sale, to help inform the Secretary's decision-making process.

Chapter 1 – Purpose and Need

The Proposed Action evaluated in this Programmatic EIS is to hold an oil and gas lease sale on the Federal OCS in the GOA. BOEM may rely on this Programmatic EIS or may supplement it as appropriate for decisions on future proposed GOA oil and gas lease sales that will be made in the normal course. BOEM may also tier from this Programmatic EIS in future National Environmental Policy Act (NEPA) reviews for associated site- and activity-specific OCS oil- and gas-related activity approvals (typically environmental assessments [EAs] for plan approvals, regardless of the lease year), use this Programmatic EIS to inform extraordinary circumstance reviews to ensure categorical exclusions are used appropriately, and/or use this Programmatic EIS to address recent litigation regarding decommissioning and Lease Sale 259.

The purpose of the Proposed Action (i.e., a proposed GOA OCS oil and gas lease sale) is to facilitate the potential development of those areas of the OCS that may contain economically recoverable oil and gas. Post-lease development would occur following plan and permit approvals (subject to additional environmental review and regulatory oversight). "Post-lease" describes the period after a lease has been issued (e.g., ancillary activities through decommissioning). This purpose is consistent with BOEM's mandate to further the orderly development of OCS oil and gas resources under the Outer Continental Shelf Lands Act (OCSLA) (43 U.S.C. 1331 et seq.). Each individual proposed oil and gas lease sale would provide qualified bidders the opportunity to bid

upon and lease available acreage in the GOA in order to explore, develop, and produce oil and natural gas.

The Proposed Action is needed to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. 1331 et seq.). Oil and gas from the -Gulf of America OCS contributes to meeting domestic demand. Oil serves as the feedstock for liquid hydrocarbon products, including gasoline, aviation and diesel fuel, and various petrochemicals. Gas is used to heat homes, generate electricity, and as feedstock necessary for the production of numerous other goods. The 2024-2029 National OCS Oil and Gas Program approved under Secretary Haaland included three GOA lease sales to meet the domestic demand for oil and gas. On January 20, 2025, President Donald J. Trump published two relevant Executive Orders (E.O.s): E.O. 14154, “Unleashing American Energy” and E.O. 14156, “Declaring a National Energy Emergency.” E.O. 14154, among other things, sets the policy of the United States to encourage energy exploration and production on Federal lands and waters including the OCS. E.O. 14156 covers several topics and authorizes the heads of executive departments and agencies to identify and exercise any lawful emergency authorities available to them, as well as all other lawful authorities they may possess, to facilitate the identification, leasing, siting, production, transportation, refining, and generation of domestic energy resources, including, but not limited to, on Federal lands. Secretary Burgum implemented these E.O.s through S.O.s 3418 and 3417. Additionally, the One Big Beautiful Bill Act, Pub. L. No. 119-21, signed into law on July 4, 2025, included a minimum of 30 regionwide sales over the next 15 years to meet domestic demand for oil and gas.

Chapter 2 – Alternatives Including the Proposed Action

BOEM considered a reasonable range of alternatives during the Programmatic EIS development process. These alternatives were identified through coordination with Tribal Governments, other Federal and State agencies, and through public comments received during the public scoping period for the Programmatic EIS (**Appendix G**).

- **Alternative A – No Action:** The cancellation of a single OCS oil and gas lease sale.
- **Alternative B (The Proposed Action and the Preferred Alternative)** – **Regionwide OCS Lease Sale:** An OCS oil and gas lease sale to include all available unleased blocks in the GOA lease sale area, with the exceptions of whole and partial blocks within the boundaries of the Flower Garden Banks National Marine Sanctuary as of the July 2008 Memorandum on Withdrawal of Certain Areas of U.S. OCS from Leasing Disposition, whole and portions of blocks currently under Presidential withdrawal, and blocks that are adjacent to or beyond the United States’ Exclusive Economic Zone in the area known as the northern portion of the Eastern Gap.

- **Alternative C –Targeted OCS Lease Sale Area:** An OCS oil and gas lease sale to include all available unleased blocks in the GOA lease sale area, with the exceptions under Alternative B as well as whole and partial blocks subject to the Topographic Features Stipulation; Live Bottom (Pinnacle Trend) Stipulation; Blocks South of Baldwin County, Alabama, Stipulation; whole and partial blocks that contain Significant Sediment Resource Areas (SSRA); Wind Energy Area Options (Areas A, B, C, D, E, F, G, and H) as of April 2024 and final Wind Energy Areas (WEAs) (Areas I, J, K, L, and N); whole and partial blocks within the Rice's whale proposed core distribution area as of March 2025; and whole and partial blocks within the Rice's whale proposed critical habitat area as of March 2025. On July 29, 2025 Secretary Burgum signed S.O. 3437, "Ending Preferential Treatment for Unreliable, Foreign Controlled Energy Sources in Department Decision-Making," which rescinded all designated Gulf of America WEAs. However, these areas are still included in the NEPA analysis of Alternative C to examine the potential for space use conflicts.
- **Alternative D –Targeted OCS Lease Sale Area with Additional Exclusions:** An OCS oil and gas lease sale to include all available unleased blocks in the GOA lease sale area, with the exception of blocks that were excluded from consideration under Alternative C, as well as whole and partial blocks in the EPA; additional whole and partial blocks of the Gulf of America Wind Leasing Call Area; whole and partial blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath to avoid additional impacts to coastal stocks of bottlenose dolphin (*Tursiops truncatus*); whole and partial blocks around the expanded Flower Garden Banks National Marine Sanctuary as of March 22, 2021; and whole and partial blocks identified by the Department of Defense as mission incompatibility areas.

BOEM considers the use of environmental mitigation at all phases of energy development and planning. Mitigations can be applied at the pre-lease stage, typically through applying lease stipulations or specific geological and geophysical (G&G) permits, or at the post-lease stage by applying site-specific mitigating measures to plans, permits, and/or authorizations (refer to **Appendix J** of this Programmatic EIS and Chapter 5 of *Programmatic Description of the Potential Effects from Gulf of Mexico OCS Oil- and Gas-Related Activities: A Supporting Information Document* [GOM Oil and Gas SID]). The mitigations implemented through lease stipulations being considered in this analysis are the Military Areas; Evacuation; Coordination; Protected Species; Topographic Features; United Nations Convention on the Law of the Sea Royalty Payment; Agreement between the United States of America and the United Mexican States Concerning Transboundary Hydrocarbon Reservoirs in the Gulf of America (Transboundary Stipulation); Live Bottom (Pinnacle Trend); Blocks South of Baldwin County, Alabama; Restrictions due to Rights-of-Use and Easements for Floating Production Facilities; and the Royalties on All Produced Gas Stipulations. These stipulations may be considered for adoption in the Record of Decision by the decisionmaker, as applicable, under authority delegated by the Secretary of the Interior. Since publication of the draft Programmatic EIS, the One Big Beautiful Bill Act (Pub. L. 119-21) was

enacted. Among other things, the Act requires the Department of Interior to hold 2 mandated sales in the GOA, with specific limitations on acreage size and requires the application of the financial terms, economic conditions, and lease stipulations previously applied in Gulf of Mexico Lease Sale 254. For those congressionally mandated sales, therefore, the required stipulations will be applied; the discussion of the stipulations included in this Programmatic EIS would only be applicable to GOA sales not mandated by Pub. L. 119-21. The Topographic Features and Live Bottom (Pinnacle Trend) Stipulations have been applied as programmatic mitigation in the 2024-2029 National OCS Oil and Gas Program EIS (BOEM 2023a) and Record of Decision (BOEM 2023c) and, therefore, would apply to all leases issued for GOA oil and gas lease sales held pursuant to the 2024-2029 National OCS Oil and Gas Program in designated lease blocks.

Following an oil and gas lease sale, a lessee seeks approvals to develop their lease by preparing and submitting OCS plans and permits. These OCS plans and permits are reviewed by BOEM and the Bureau of Safety and Environmental Enforcement (BSEE), as appropriate, and, depending on what is proposed to take place on a specific lease, plans or permits may be denied, approved, or approved with conditions of approval (COA). The COAs become part of the approved post-lease authorization and may include environmental protections, requirements that maintain conformance with law, the requirements of other agencies having jurisdiction, or safety precautions.

Chapter 3 – Activities, Scenarios, and Impact-Producing Factors

This chapter describes the potentially occurring actions associated with a single representative oil and gas lease sale and the cumulative activities that provide a framework for a detailed analysis of the potential environmental impacts. Exploration and development scenarios estimate the level of offshore activity that could result from a proposed action. Impact producing factors (e.g., infrastructure and activities) are the outcomes or results of any proposed or ongoing OCS oil- and gas-related activities that could potentially affect the biological, physical, and socioeconomic resources in the GOA. **Table ES-1** includes the impact-producing factor categories analyzed for routine OCS oil- and gas-related activities, OCS oil and gas accidental events, and cumulative activities.

Table ES-1. Impact-Producing Factors Related to Routine Activities, Accidental Events, or Cumulative Activities.

Routine Activities	Accidental Events	Cumulative Activities
Air Emissions and Pollution	Unintended Releases into the Environment	Air Emissions and Pollution
Discharges and Wastes	Response Activities	Discharges and Wastes
Bottom Disturbance	Strikes and Collisions	Bottom Disturbance
Noise	-	Noise
Coastal Land Use/Modification	-	Coastal Land Use/Modification
Lighting and Visual Impacts	-	Lighting and Visual Impacts
Offshore Habitat Modification/ Space Use	-	Offshore Habitat Modification/ Space Use

Routine Activities	Accidental Events	Cumulative Activities
Socioeconomic Changes and Drivers	-	Socioeconomic Changes and Drivers
-	-	Other Environmental Factors

Offshore activities are described in the context of scenarios for ongoing OCS oil- and gas-related activities, a single OCS oil and gas lease sale, and for the cumulative Gulf of America OCS Oil and Gas Program (**Chapter 3.3.2**). The BOEM Gulf of America OCS Region developed these scenarios to provide a framework for detailed analyses of potential impacts of an oil and lease sale. The scenarios are presented as ranges (low to high) of the amounts of undiscovered, unleased hydrocarbon resources estimated to be leased and produced as a result of a proposed action. The scenarios encompass a range of routine activities (e.g., the installation of platforms, drilling wells, and pipelines; and the number of helicopter operations and service-vessel trips) that would be needed to develop and produce the amount of forecasted oil and gas resources, as well as reasonably foreseeable accidental events (e.g., oil spills). See the *Gulf of Mexico Catastrophic Spill Event Analysis: High-Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on the Gulf of Mexico Outer Continental Shelf; 2nd Revision* (GOM Catastrophic Spill Event Analysis) technical report (BOEM 2021) for an assessment of potential impacts resulting from a low-probability catastrophic spill in the GOA similar in nature to the *Deepwater Horizon* explosion, oil spill, and subsequent response, which is not part of a proposed action. This analysis is separate from the Oil Spill Risk Analysis (OSRA) model used for a single oil and gas lease sale and the Cumulative OCS Oil and Gas Program evaluated in this Programmatic EIS.

Chapter 4 – Affected Environment and Environmental Consequences

This chapter examines and summarizes the affected environment, the potential impacts of a single representative OCS oil and gas lease sale under Alternatives A-D, and describes the ongoing and cumulative impacts of OCS oil- and gas-related activities. Detailed affected environment and potential impact descriptions are included by resource in the GOM Oil and Gas SID (BOEM 2023b), which is hereby incorporated by reference. Analysis of the alternatives for each resource considers ongoing activities, routine activities, accidental events, cumulative impact analysis, and incomplete or unavailable information. Summaries of the resources included in this analysis and their expected impact levels by alternative are included below. Impact-level conclusions were considered with and without the application of BOEM stipulations since the Secretary has the discretion to choose which stipulations are applied for each oil and gas lease sale decision.

BOEM has included an updated life-cycle greenhouse gas (GHG) emissions analysis based on a single representative GOA oil and gas lease sale (**Chapter 4.0.2.1** and **Appendix K**). BOEM analyzed potential space-use conflicts between OCS use for OCS oil and gas operations, using OCS sediment for coastal resiliency, the use of the WEA Options (Areas A, B, C, D, E, F, G, and H) as of April 2024, final WEAs (Areas I, M, J, K, L, and N) for OCS wind energy development, Wind Energy Lease OCS-G 37334, and potential future use for carbon capture and sequestration projects (**Chapter 4.0.2.2**). BOEM has also included an expanded description of decommissioning activities,

which are then analyzed in each resource section in Chapter 4. BOEM discusses these issues and their relationship to the proposed action in **Chapter 4.0.2**.

Global GHG emissions are expected to increase under the proposed action. BOEM's combined quantitative and qualitative GHG analyses represent the best available and scientifically credible approach for comparison of GHG emissions from the proposed action and the No Action Alternative (Alternative A). BOEM's GHG modeling baseline for this Programmatic EIS includes the laws and policies current as-of 2022 which is the most current assessment as explained in **Appendix K.5.2**. BOEM also explains its consideration of updating the modeling baseline to account for changes in laws and policy since 2022 in **Chapter K.5.2** as well as the "Implications of Changes to MarketSim Baseline" report at https://www.boem.gov/oil-gas-energy/energy-economics/oil-and-gas-economic-modeling.

BOEM has identified potential space-use conflicts or competing interests between BOEM's Program Areas within the proposed OCS oil and gas lease sale areas considered under Alternatives B-D. However, if incompatibilities would arise, BOEM could use lease stipulations to help mitigate the potential conflicts. Because some SSRAs may be in the blocks available for OCS oil and gas leasing under Alternative B, BOEM would use regulations, Information to Lessees and Notices to Lessees and Operators (NTLs) to inform lessees of SSRAs and areas of active dredging if this alternative was selected. In these blocks, the BOEM NTLs inform lessees of the regulatory requirements and additional guidance to avoid, to the maximum extent practicable, significant OCS sediment resources. Measures may include modification of operations and monitoring of pipeline locations after installation. Alternatives C and D exclude blocks containing SSRAs and would, therefore, have less space-use conflicts with GOA oil and gas development than Alternative B.

Space use conflicts with wind energy development could occur under Alternative B. It could be difficult to place OCS oil and gas infrastructure and drill for oil and gas within the same areas as the renewable energy infrastructure due to the size of the wind field and seafloor cables. Under Alternatives C and D, GOA oil and gas leasing is excluded from the WEAs and GOA Wind Leasing Call Area, respectively. These exclusions would minimize the space-use conflicts between OCS wind energy and oil and gas development, although conflicts with vessel traffic may still occur. Pursuant to the Presidential Memorandum, "Temporary Withdrawal of All Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects," issued on January 20, 2025, the President temporarily withdrew all areas within the OCS, as defined in section 2 of the OCS Lands Act, 43 U.S.C. 1331, from disposition for wind energy leasing. The withdrawal became effective on January 21, 2025, and remains in effect until such time that the Presidential Memorandum is revoked. Therefore, any space use conflicts with unleased areas for wind energy would be removed as long as the offshore wind energy withdrawal is in force. On July 29, 2025 Secretary Burgum signed S.O. 3437, "Ending Preferential Treatment for Unreliable, Foreign Controlled Energy Sources in Department Decision-Making," which rescinded all designated GOA Wind Energy Areas. However, these areas are still included in the NEPA analysis to examine the potential for space use conflicts.

The Bipartisan Infrastructure Law authorized BOEM to regulate carbon sequestration activities on the OCS; however, at this time, BOEM and BSEE are examining potential regulations that address the transportation and long-term storage of carbon dioxide (CO_2) on the OCS. These projects are expected to be initially limited to areas of decreased oil and gas development interest (reduced oil and gas saline reservoirs or depleted oil and gas reservoirs occurring closer to shore). Space-use conflicts under Alternatives B and C between carbon sequestration and OCS oil- and gas-related activities could be mitigated and even further reduced under Alternative D by removing areas more area suitable for carbon sequestration projects.

Alternative A would limit adding more OCS oil- and gas-related infrastructure, therefore minimizing space-use conflicts that could occur with other OCS activities, including in the SSRA blocks, Wind Energy Options as of April 2024, final identified WEAs, Wind Energy Lease(s) (i.e., OCS-G 37334), and carbon sequestration-related activities.

OCSLA and its implementing regulations, as well as the terms and conditions of the offshore oil and gas leases, rights of way (ROWs), and rights of use and easement (RUEs) granted by the Department of the Interior and other applicable laws and regulations, require lessees, operation right holders, and holders of ROWs and RUEs~~)~~ to perform decommissioning activities after termination or when BSEE determines they no longer have future use (43 U.S.C. 1334; 30 C.F.R. 250, subparts J and Q). Decommissioning trends and activities are summarized in **Chapter 3** with more detail in **Appendices B** and **C**. The potential impacts from decommissioning activities from the proposed action and cumulative OCS oil and gas activities were considered as part of the impact analysis for each resource in **Chapter 4**.

BOEM's subject-matter experts conducted a search and considered new information made available since publication of the Draft GOA Oil and Gas Programmatic EIS and GOM Oil and Gas SID. The subject-matter experts took into consideration the potential impacts of the expected impact-producing factors from routine activities and accidental events, the expected levels of activity detailed in the exploration and development scenarios, and any mitigations to arrive at impact conclusions (with and without applicable lease stipulations) for each resource category under each alternative. The subject-matter experts also determined the impacts of ongoing OCS oil- and gas-related activities and the incremental impact of an OCS oil and gas lease sale in the context of cumulative activities. The overall conclusions for certain environmental resources are not based on impacts to individuals, small groups of animals, or small areas of habitat, but rather on impacts to the resources/populations as a whole. All incomplete and unavailable information was disclosed and its relevance to a reasoned choice among alternatives was evaluated.

Air Quality

BOEM has analyzed the potential impacts to air quality with regards to the scenarios and impact-producing factors (IPFs) provided in **Chapter 3**. The potential impact levels under Alternative A (i.e., cancellation of a single proposed oil and gas lease sale) from the proposed action are **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil

and gas leases would likely range from **minor** to potentially **major** for certain areas. Impacts from routine activities and accidental events to air quality would generally be the same across all action alternatives, i.e., **negligible** to **moderate negative**, with the only potential exception being methane, which could lessen under Alternative C or D should leasing activity occur mostly in water depths greater than 200 m (656 ft) where less venting would be anticipated. Steps could be taken to require shallow-water facilities to flare rather than vent; however, this could cause increased emissions of other air pollutants like carbon dioxide (CO_2). If projected methane emissions are less, this has potential effects to the GHG emissions analysis discussed in **Chapter 4.0.2.1** and **Appendix K**. In the context of past, present, and reasonably foreseeable activities within the area of analysis, the *incremental contribution* of a proposed GOA oil and gas lease sale to cumulative impacts on air quality would likely be **minor** but potentially up to **major negative** across all action alternatives for certain areas. When considering that the existing baseline conditions of the Houston-Galveston-Brazoria area are in nonattainment for ozone (O_3), cumulative impacts could be **moderate** to **major** if notable and measurable levels of O_3 caused by an OCS oil and gas lease sale were to reach the Houston-Galveston-Brazoria area, slowing down the long-term ability of the area to recover from chronic nonattainment status for O_3 (Li et al. 2023).

Water Quality

BOEM has analyzed the potential impacts to water quality with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, any potential impacts to water quality from the proposed action would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely be **minor** with a slight risk for up to **moderate** impacts if notable changes to water quality conditions within 6,562 ft (2,000 m) of discharge points were to occur, or in the event of a large-volume, long-duration spill. Under Alternatives B, C, and D, an OCS oil and gas lease sale could result in **negligible** to **moderate adverse** impacts on water quality due mainly to discharges and wastes or unintended releases into the environment. Lessees are required to comply with regulations such as the Clean Water Act (CWA), which minimizes water quality impacts from routine OCS oil- and gas-related activities. As such, there are no additional water quality-specific mitigating measures being contemplated under any of the action alternatives. While Alternatives C and D would potentially change the spatial distribution of activities compared to Alternative B, they would not change the types of activities or their overall levels to a degree that would result in a meaningful difference in the overall impacts to water quality when compared to Alternative B. Therefore, the impact conclusions are the same as under Alternative B but with a lowered potential for impacts in those areas excluded from leasing. When considered in the context of all other past, present, and reasonably foreseeable activities in the lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on water quality would be **negligible** when applicable regulations are followed and enforced. This is because water quality monitoring data shows that changes in water parameters from oil and gas activities generally remain localized and adhere to regulatory requirements established by the CWA. While accidental events may also contribute to cumulative water quality impacts, adherence to National Pollutant Discharge and Elimination System (NPDES) permit requirements, BOEM oil spill

prevention and response protocols, and other regulatory safeguards helps limit these contributions (see **Table 4.2-2**).

Coastal Communities and Habitats

BOEM has analyzed the potential impacts to coastal communities and habitats with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single proposed OCS oil and gas lease sale were cancelled, potential impacts to coastal communities and habitats from an OCS oil and gas lease sale would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **negligible** to **moderate**. Under Alternatives B, C, and D, an OCS oil and gas lease sale could result in **negligible** to **moderate adverse** impacts on coastal communities and habitats with more notable impacts mainly attributable to unintended releases into the environment. Under Alternative C, removal of whole and partial SSRA blocks and whole and partial blocks proposed to be subject to the Blocks South of Baldwin County, Alabama, Stipulation from leasing consideration may result in decreased potential impacts from spills and spill response in coastal habitats. Under Alternative D, removal of whole and partial blocks of coastal OCS waters shoreward of the 20-m (66-ft) isobath from leasing consideration may further decrease potential impacts from spills and spill response. When considered in the context of all other past, present, and reasonably foreseeable activities in the OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on coastal communities and habitats would be **negligible** to **minor adverse** when properly regulated and mitigated. This is because unintended releases are likely to have localized impacts and coastal oil and gas support infrastructure sufficient to support new and existing leases is already largely in place.

Benthic Communities and Habitats

BOEM has analyzed the potential impacts to benthic communities and habitats, including protected corals (i.e., Endangered Species Act (ESA)-listed corals and designated coral critical habitat), with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, potential impacts to benthic communities and habitats, including protected corals, from the proposed action would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **negligible** to **minor**. Under Alternative B, an OCS oil and gas lease sale could result in **negligible** to **major adverse** impacts on benthic communities and habitats, including protected corals due to bottom disturbance, discharges and wastes, and response activities. With the application of BOEM protective measures (i.e., avoidance, distancing, and shunting requirements), the impacts would be reduced to **negligible** to **minor adverse**. Benthic communities and habitats and protected corals located within the areas excluded from leasing under Alternatives C and D are not expected to experience impacts from routine OCS oil- and gas-related activities because areas of impacts from routine OCS oil- and gas-related activities would occur within limited areas surrounding said activity, and not within the excluded areas. In addition, because ESA listed corals and designated coral critical habitat are located within the excluded areas under Alternatives C and D, impacts from routine OCS oil- and gas-related activities would be **none** under those

alternatives because these activities would not take place in the excluded areas. Routine impacts would be limited to the areas leased under each alternative. The impacts from accidental events to both benthic communities and habitats and protected corals would be the same for Alternatives C and D as described for Alternative B in **Chapter 4.4**. Under Alternatives C and D, an OCS oil and gas lease sale could result in **negligible** to **major adverse** impacts on benthic communities and habitats that are in areas not removed from leasing; however, with the application of BOEM protective measures (i.e., avoidance, distancing, and shunting requirements), the impacts would be reduced to **negligible** to **minor adverse**. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on benthic communities and habitats, including protected corals, would be **negligible** when properly regulated and mitigated.

Pelagic Communities and Habitats

BOEM has analyzed the potential impacts to pelagic communities and habitats with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single proposed OCS oil and gas lease sale were cancelled, potential impacts to pelagic communities and habitats from an OCS oil and gas lease sale would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **negligible** to **minor**. Under Alternatives B, C, and D, an OCS oil and gas lease sale could result in **negligible** to **minor adverse** impacts on pelagic communities and habitats, including *Sargassum*, when properly regulated due to discharges and wastes, noise, offshore habitat modification/space use, unintended releases, and response activities into the environment. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on pelagic communities and habitats would be **negligible** when properly regulated and enforced.

Fishes and Invertebrates

BOEM has analyzed the potential impacts to fishes and invertebrates with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single proposed OCS oil and gas lease sale were cancelled, the impacts are **none** since any potential impacts to fishes and invertebrates from an OCS oil and gas lease sale would be avoided. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **negligible** to **moderate adverse**. Under Alternatives B, C, and D, an OCS oil and gas lease sale could result in **moderate adverse** impacts to fishes and invertebrates without mitigation due to bottom disturbance, noise, and unintended releases into the environment. With the application of protective measures (i.e., BOEM hard bottom distancing mitigations), the **adverse** impacts would be reduced to **minor**. While impact conclusions are the same for Alternatives B, C, and D, Alternative C would provide greater protection than Alternative B for highly productive and diverse fish and invertebrate assemblages, including recreationally and commercially managed finfish species, known to inhabit hard bottom habitats in the region due to its exclusion of whole and partial blocks

containing topographic and pinnacle trend features from leasing. Alternative D may further reduce impacts specific to coastal and estuarine fishes and invertebrates. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS oil and gas lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on fishes and invertebrates would be **negligible** to **minor** when properly regulated and mitigated (i.e., BOEM's hard bottom distancing mitigations).

Birds

BOEM has analyzed the potential impacts to birds with regards to each of the alternatives, the scenarios, and IPFs. Under Alternative A, if a single proposed OCS oil and gas lease sale were cancelled, any potential impacts to birds from an OCS oil and gas lease sale would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **negligible** to **moderate adverse**. Under Alternatives B, C, and D, an OCS oil and gas lease sale would result in **negligible** to **moderate adverse** impacts on birds when properly regulated due to unintended releases into the environment. The potential spatial redistribution of activities under Alternatives C and D would not directly or indirectly influence the impact conclusions for birds, including ESA-listed species because bird species are spatially similar across the northern GOA and under all alternatives. Although impacts from routine OCS oil- and gas-related activities would not be expected to occur in areas removed from potential leasing in Alternatives C and D, the areas that are part of the geographical constraint (i.e., removed from potential leasing) do not contain unique bird habitats or communities that differ from the remaining areas, leaving cumulative impact determinations unchanged. Routine impacts would be limited to the areas leased under Alternatives C and D. The impacts from accidental events would be the same as described for Alternative B in **Chapter 4.7**, including vessel and aircraft strikes though unlikely, which could occur in excluded areas because vessels and aircraft could still transit the excluded areas. However, this potential spatial redistribution of activity does not affect impact levels to birds because of their wide distribution across the northern GOA. When considered in the context of all other past, present, and reasonably foreseeable activities in the OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on birds would be **negligible** when properly regulated and enforced.

Marine Mammals

BOEM has analyzed the potential impacts to marine mammals with regards to each of the alternatives, the scenarios, and IPFs. Under Alternative A, if a single proposed OCS oil and gas lease sale were cancelled, any potential impacts to marine mammals from an OCS oil and gas lease sale would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **negligible** to **moderate**, with no substantial effects to overall population levels. In the unlikely event of an accidental vessel strike on an ESA-listed whale, the impact could be **major**. Under Alternatives B, C, and D, an OCS oil and gas lease sale without protective measures could result in **negligible** to **major adverse** impacts on

marine mammals due to the potential for vessel strikes. With the application of protective measures (i.e., the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations; NTL No. 2009-G39; Protected Species Stipulation; and 2025 National Marine Fisheries Service Biological Opinion (NMFS BiOp) protocols including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA), A.8 Explosive-Severance Scenario Mitigation Protocol, and A.9 Pile Driving Monitoring and Reporting Requirements Protocol), the impacts would be reduced to **negligible** to **moderate adverse**. In the unlikely event of an accidental vessel strike on an ESA-listed whale (i.e., Sperm or Rice's whales), the impact could be **major**. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on marine mammals would be **negligible** when properly regulated and mitigated. Most impacts to marine mammals from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternatives C and D because, as discussed under Alternative B in **Chapter 4.8**, impacts from routine OCS oil- and gas-related activities occur within limited areas near the activities, and these activities would not occur in excluded areas. Impacts from most routine activities would be limited to the areas leased under each alternative. The impacts from accidental events would be the same as described for Alternative B in **Chapter 4.8**, including vessel strikes, which could occur in excluded areas because vessels could still transit the excluded areas. In addition, oil spills and response activities could occur in the excluded areas. However, the potential spatial redistribution of activity does not affect impact levels to marine mammals because marine mammals are widely distributed throughout the GOA.

Sea Turtles

BOEM has analyzed the potential impacts to sea turtles with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, any potential impacts to sea turtles from an OCS oil and gas lease sale would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **negligible** to **moderate**, with no substantial effects to overall population levels. Under Alternatives B, C, and D, an OCS oil and gas lease sale without protective measures could result in **negligible** to **moderate adverse** impacts on sea turtles due to noise, offshore habitat modification/space use, unintended releases into the environment, and strikes and collisions. With the application of protective measures, including the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations; NTL No. 2009-G39; Protected Species Stipulation; and the 2025 NMFS BiOp protocols including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.7 Sea Turtle Resuscitation Guidelines Protocol, A.8 Explosive-Severance Scenario Mitigation Protocol, A.9 Pile Driving Monitoring and Reporting Requirements Protocol, and

A.10 Site-clearance Trawling Protocol; the impacts would be reduced to **negligible** to **minor adverse** for those IPFs subject to the above mentioned protective measures. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on sea turtles would be **negligible** when properly regulated and mitigated. The exclusion of areas could provide benefits to sea turtles; however, due to the sea turtles' wide distribution and transitory use of these areas, the benefits of the exclusions would be limited. Most impacts to sea turtles from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternatives C and D because, as discussed under Alternative B in **Chapter 4.9**, areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding activity, and these activities would not occur in excluded areas. Impacts from most routine activities would be limited to the areas leased under each alternative. The impacts from accidental events would be the same as described for Alternative B in **Chapter 4.9**, including vessel strikes, which could occur in excluded areas because vessels could still transit the excluded areas. In addition, oil spills and response activities could occur in the excluded areas. The potential spatial redistribution of activity does not affect impact levels to sea turtles because sea turtles are widely distributed throughout the GOA. However, the exposure to IPFs associated with the installation, operation, maintenance, and decommissioning of offshore OCS oil- and gas-related infrastructure could be reduced near the exclusion areas for Alternatives C and D.

Commercial Fisheries

BOEM has analyzed the potential impacts to commercial fisheries with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, any direct impacts to commercial fisheries from an OCS oil and gas lease sale would be **none**, and any indirect impacts from energy substitution as a result of a canceled lease sale would be **negligible**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **negligible** to **minor**. Under Alternatives B-D, an OCS oil and gas lease sale could result in **minor beneficial** to **minor adverse** impacts on commercial fisheries due to any IPF except bottom disturbance and lighting and visual impacts. The actual impacts would depend on the locations of activities, species affected, intensity of commercial fishing activity in the affected area, and substitutability of any lost fishing access. From a regional perspective, routine and accidental impact conclusions under Alternatives C and D are unchanged from Alternative B. However, the removal of the Wind Leasing Call Area, waters shoreward of the 20-m (66-ft) isobath, SSRAs, and other areas in Alternative D would reduce the probability of impacts from routine activities in the majority of commercial fishing areas and could reduce the probability of some accidental events being experienced in adjacent coastal areas, especially in Texas and western Louisiana. When considered in the context of all other past, present, and reasonably foreseeable activities in the lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternatives B-D to cumulative impacts on commercial fisheries ranges from **negligible** to **minor adverse**.

Recreational Fishing

BOEM has analyzed the potential impacts to recreational fishing with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, direct impacts to recreational fishing from an OCS oil and gas lease sale would be **none,** and any indirect effects because of the precluded leasing and associated activities would be **negligible**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **moderate beneficial** to **moderate adverse**. This is primarily because the addition or removal of structures has a notable and measurable localized impact on the subsection of recreational fishers which might fish near them, as they tend to attract fish. Under Alternative B, an OCS oil and gas lease sale could lead to **minor beneficial** to **minor adverse** impacts due to any IPF except lighting and visual impacts which was **minor beneficial** to **negligible adverse**. Routine and accidental impacts under Alternatives C and D would remain unchanged from Alternative B, differing only in possible geographic distribution (especially with Alternative D) but not in overall activity levels. When considered in the context of all other past, present, and reasonably foreseeable activities in the lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on recreational fishing would be **minor beneficial** to **minor adverse**.

Recreational Resources

BOEM has analyzed the potential impacts to recreational resources with regards to each of the alternatives, the scenarios, and IPFs. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, direct impacts to recreational resources from an OCS oil and gas lease sale would be **none**, and any indirect impacts would be **negligible**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **minor beneficial** to **minor adverse** with no substantial effects to overall recreationist levels. Under Alternatives B and C, an OCS oil and gas lease sale would result in **minor beneficial** to **minor adverse** impacts on recreational resources due to any IPF except air emissions and pollution, coastal land use/modification, response activities, and strikes and collisions which were all **negligible**. Under Alternative D, an OCS oil and gas lease sale would result in **negligible** impacts on recreational resources due to the removal of much of the lease sale area near recreational resources along the coastline. When considered in the context of all other past, present, and reasonably foreseeable activities in the lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on recreational resources would be **negligible**.

Cultural, Historical, and Archaeological Resources

BOEM has analyzed the potential impacts to cultural, historical, and archaeological resources with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, any potential impacts to cultural, historical, and archaeological resources from an OCS oil and gas lease sale would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would

likely range from **negligible** to **major** driven mainly by bottom disturbance. Under Alternatives B, C, and D, an OCS oil and gas lease sale could result in **negligible** to **major** negative impacts to cultural, historical, and archaeological resources due to bottom disturbance, unintended releases into the environment and strikes and collisions. With compliance with BOEM's regulations and other protective measures as outlined in **Table 4.13-2**, the impacts would be reduced to **negligible** to **minor**. When considered in the context of all other past, present, and reasonably foreseeable activities in the lease sale area and existing regulatory requirements, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on cultural, historical, and archaeological resources would be **negligible**.

Land Use and Coastal Infrastructure

BOEM has analyzed the potential impacts to land use and coastal infrastructure with regards to each of the alternatives, scenarios, and IPFs. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, any potential impacts to land use and coastal infrastructure from an OCS oil and gas lease sale would be **none**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **moderate beneficial (**due to routine activities) to **moderate adverse (**driven mainly by accidental events). Alternatives B, C, and D, an OCS oil and gas lease sale could result in **minor adverse** impacts on land use and coastal infrastructure due to any of the routine IPFs except lighting and visual impacts. Accidental IPFs can potentially reach a **moderate adverse** level based on the size, location, and number of spills. When considered in the context of all other past, present, and reasonably foreseeable activities in the lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on coastal land use and infrastructure would be **negligible**.

Economic Factors

BOEM has analyzed the potential impacts on economic factors in relation to each of the alternatives, scenarios, and IPFs. The impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely be **negligible** in the short term, but **minor** in the long term. If Alternative A was implemented and a single OCS oil and gas lease sale were cancelled, any potential adverse impacts to economic factors would range from **negligible** in the short-term to potentially **minor adverse** in the long-term, depending on how industry views and responds to that decision moving forward. Impacts could be up to **moderate adverse** in the case that a multi-year gap in leasing were to occur; however P.L. 119-21 includes two GOA lease sales per year for 15 years (until 2040 and beyond the three sales included in the 2024-2029 National OCS Program) which makes it unlikely that multiyear gaps in leasing would occur. Under Alternatives B, C, and D, an OCS oil and gas lease sale could result in **minor adverse** to **moderate beneficial** impacts on economic factors depending on the actual levels of production and associated exploration and development activity (see **Chapter 3.3**). If actual activities resulting from the proposed action resemble the low-case scenario, then the beneficial impacts would likely be **minor**, mostly sustaining existing economic conditions or resulting in a small but measurable economic improvement. If actual activities resulting from an OCS oil and gas lease sale resemble the mid- to

high-case scenario, however, the beneficial impacts could be up to **moderate**, resulting in a notable and measurable economic improvement. Accidental events that result from an OCS oil and gas lease sale could range from **negligible** to **moderate adverse** under Alternatives B-D. Alternative C or D entails conducting the same level of the OCS oil- and gas-related activities as proposed under Alternative B. Therefore, the overall impact conclusions for Alternatives C and D are the same as for Alternative B. When considered in the context of all other past, present, and reasonably foreseeable activities in the lease sale area, the *incremental contribution* of an OCS oil and gas lease sale in the geographic areas defined by Alternative B, C, or D to cumulative impacts on economic factors would be **minor** to **moderate beneficial**. Conversely, the incremental impacts from the cancellation of a single OCS oil and gas lease sale could result in **negligible** to **moderate adverse** cumulative effects to the GOA's long-term economic prospects depending on how industry responds (**Chapter 2.2.1**).

Social Factors

BOEM has analyzed the potential impacts to social factors with regards to each of the alternatives, scenarios, and IPFs described in **Chapter 3**. Under Alternative A, if a single OCS oil and gas lease sale were cancelled, impacts would be **negligible**. However, the impacts that would be expected from all ongoing activities associated with existing oil and gas leases would likely range from **minor beneficial** to **moderate adverse**. Under Alternatives B-D, routine activities could lead to **minor beneficial** to **negligible adverse** impacts mainly due to the increased economic opportunity in upstream industries. Accidental events could have **negligible** to **moderate adverse** impacts if the affected activity or community would have to adjust somewhat to account for disruptions due to notable and measurable adverse impacts or if remedial or mitigating measures are necessary before the affected community can return to conditions prior to an accidental event. Though the removal of the wind leasing areas, SSRAs, and other areas under Alternatives C and D (**Figures 2.2-2** and **2.2-3**) could potentially reduce the probability of some accidental events being experienced in adjacent coastal areas, especially in Texas and western Louisiana, vessel traffic and pipelines would still be present. Therefore, overall routine and accidental impact conclusions under Alternatives C and D are unchanged from Alternative B. The *incremental impact* of an OCS oil and gas lease sale to cumulative impacts, across all action alternatives, would be **minor adverse** given the mature and expansive existing OCS Oil and Gas Program and infrastructure and its deeply intertwined nature to the regional communities and economies of the five Gulf Coast States.

Appendix A – References

This appendix includes all the citations referenced throughout this Programmatic EIS.

Appendix B – Description of Impact-Producing Factors

This appendix includes detailed descriptions of the impact-producing factors.

Appendix C – Description of Decommissioning Activities

This appendix provides a detailed description of decommissioning activities.

Appendix D – Glossary

This appendix is a glossary of terms used throughout this Programmatic EIS.

Appendix E – Keyword Index

This appendix is an index of key words used throughout this Draft Programmatic EIS.

Appendix F – List of Preparers

This appendix provides a list of all the preparers of this Programmatic EIS.

Appendix G – Consultation and Coordination

This appendix summarizes the ongoing consultation and coordination efforts used in preparing this Final Programmatic EIS. It includes descriptions of the Call for Information, Area ID memorandum, and development of the Draft and Final Programmatic EIS processes (including major differences between the draft and final Programmatic EIS). A summary of comments and responses received on the Draft Programmatic EIS is included. Also included are summaries of consultations with Federal and State agencies under the Coastal Zone Management Act, Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, National Historic Preservation Act, and government-to-government consultation and coordination.

Appendix H – Consultation Correspondence

This appendix collects the cover letters associated with the various consultations.

Appendix I – State Coastal Management Plans

This appendix includes descriptions of the Coastal Management Plans for each of the Gulf Coast States.

Appendix J – Proposed Lease Mitigating Measures

This appendix details proposed lease stipulations that may be available for the three lease sales included in the 2024-2029 National OCS Program.

Appendix K – Gulf of Mexico OCS Oil and Gas Leasing Greenhouse Gas Emissions

This appendix includes an updated life-cycle GHG emissions analysis.

Appendix L – Responses to Public Comments on the Draft GOA Programmatic EIS

This appendix contains BOEM responses to public comments on the Draft GOA Oil and Gas Programmatic EIS.

Appendix M – Assessment of Resources with Negligible to Minor Impacts

This appendix presents detailed analysis of GOA resources determined to have impacts for all IPFs under any alternative of minor or less.

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ABBREVIATIONS AND ACRONYMS

µg	microgram
µm	micrometer
2024-2029 National OCS Oil and Gas Program	*2024-2029 National Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program*
2024-2029 National OCS Oil and Gas Program Programmatic EIS	*2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program: Final Programmatic Environmental Impact Statement*
ac	acre
AQRV	air quality-related value
Area ID	Area Identification
bbl	barrel
Bbbl	billion barrels
BBO	billion barrels of oil
Bcf	billion cubic feet
Biological Environmental Background Report	Biological Environmental Background Report for the Gulf of Mexico OCS Region (BOEM 2021-015)
BiOp	Biological Opinion
BOE	billion barrels of oil equivalent
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CAP	criteria air pollutant
CD	Consistency Determination
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CMP	Coastal Management Program
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent
COA	Conditions of Approval
COST	continental offshore strategic test
CPA	Central Planning Area
CPAP	criteria precursor air pollutant
CSEM	controlled source electromagnetic
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DIP	decommission in place

DOCD	development operations coordination document
DOI	Department of the Interior (U.S.) (also USDOI)
DOT	Department of Transportation (U.S.)
DPP	development and production plan
E&D	exploration and development
E.O.	Executive Order
EA	environmental assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIA	Economic Impact Area
EIA	Energy Information Administration
EIS	environmental impact statement
EPA	Eastern Planning Area
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FGBNMS	Flower Garden Banks National Marine Sanctuary
FPSO	floating production, storage, and offloading system
FR	*Federal Register*
FWCA	Fish and Wildlife Coordination Act
FWS	U.S. Fish and Wildlife Service
G&G	geological and geophysical
GDP	gross domestic product
GHG	greenhouse gas
GOA	Gulf of America (waterbody)
GOAR	Gulf of America OCS Region
GOM	Gulf of Mexico
GOM Oil and Gas SID	*Programmatic Description of the Potential Effects from Gulf of Mexico OCS Oil- and Gas-Related Activities: A Supporting Information Document*
GOM Oil and Gas Programmatic EIS	*Gulf of Mexico Regional Oil and Gas Lease Sales: Draft Programmatic Environmental Impact Statement*
GOMESA	Gulf of Mexico Energy Security Act
GUIS	Gulf Islands National Seashore
Gulf of Mexico G&G Programmatic EIS	*Gulf of Mexico OCS Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas – Final Programmatic Environmental Impact Statement*
H_2S	hydrogen sulfide
ha	hectare

HAP	hazardous air pollutant
HAPC	Habitat of Particular Concern
HRG	high-resolution geophysical
Hz	Hertz
IMO	International Maritime Organization
IPF	impact-producing factor
IRA	Inflation Reduction Act of 2022
ITL	Information to Lessees
IWG	Interagency Working Group
kg/ha	kilogram per hectare
kHz	kilohertz
km	kilometer
LNG	liquefied natural gas
LOOP	Louisiana Offshore Oil Port
m	meter
MARAD	Maritime Administration (U.S. Department of Transportation)
MARPOL	International Convention for the Prevention of Pollution from Ships
mg/L	milligrams/liter
mi	mile
mm	millimeter
MMbbl	million barrels
MMBOE	million barrels of oil equivalent
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MODU	mobile offshore drilling unit
MSA	Magnuson-Stevens Fishery Conservation and Management Act of 1976
N	nitrogen
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEMS	National Energy Modeling System
NEPA	National Environmental Policy Act
NH_3	ammonia
NHPA	National Historic Preservation Act
nm	nautical mile
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuary Act

NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOS	Notice of Sale
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NTL	Notice to Lessees
O_3	ozone
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
ONRR	Office of Natural Resources Revenue
OSRA	Oil Spill Risk Analysis
OSRP	oil-spill response plan
OSV	offshore support vessel
PAHs	polycyclic aromatic hydrocarbons
Pb	lead
PLEMs	pipeline end manifold
PM	particulate matter
$PM_{2.5}$	particulate matter less than or equal to 2.5 µm
PM_{10}	particulate matter less than or equal to 10 µm
Pub. L.	Public Law
ROD	Record of Decision
ROW	right of way
RUE	rights-of-use and easement
S.O.	Secretary's Order
SAV	submerged aquatic vegetation
Secretary	Secretary of the Interior
SO_2	sulphur dioxide
SO_x	sulphur oxides
SSRA	Significant Sediment Resource Area
tpy	tons per year
Transboundary Stipulation	Stipulation on the Agreement Between the United States of America and the United Mexican States Concerning Transboundary Hydrocarbon Reservoirs in the Gulf of Mexico
U.S.	United States
USACE	U.S. Army Corps of Engineers

U.S.C.	United States Code
USCG	U.S. Coast Guard
USDHS	U.S. Department of Homeland Security
USDOE	U.S. Department of Energy
USDOI	U.S. Department of the Interior (also DOI)
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VGP	Vessel General Permit
VIDA	Vessel Incidental Discharge Act
VOC	volatile organic compound
VSP	vertical seismic profiling
WAZ	wide azimuth
WEA	Wind Energy Area
WPA	Western Planning Area
yr	year

CONVERSION CHART

To convert from	To	Multiply by
centimeter (cm)	inch (in)	0.3937
millimeter (mm)	inch (in)	0.03937
meter (m)	foot (ft)	3.281
meter^2 (m^2)	foot^2 (ft^2)	10.76
meter^2 (m^2)	yard^2 (yd^2)	1.196
meter^2 (m^2)	acre (ac)	0.0002471
meter^3 (m^3)	foot^3 (ft^3)	35.31
meter^3 (m^3)	yard^3 (yd^3)	1.308
kilometer (km)	mile (mi)	0.6214
kilometer^2 (km^2)	mile^2 (mi^2)	0.3861
hectare (ha)	acre (ac)	2.47
liter (L)	gallons (gal)	0.2642
degree Celsius (°C)	degree Fahrenheit (°F)	°F = (1.8 x °C) + 32
1 barrel (bbl) = 42 gal = 158.9 L = approximately 0.1428 metric tons 1 nautical mile (nm) = 1.15 mi (1.85 km) or 6,076 ft (1,852 m) tonnes = 1 long ton or 2,240 pounds (lb)		

CHAPTER 1

PURPOSE AND NEED

1 PURPOSE AND NEED

1.1 INTRODUCTION

The Secretary of the Interior (Secretary) designated the Bureau of Ocean Energy Management (BOEM) as the administrative agency responsible for leasing submerged Outer Continental Shelf (OCS) lands for oil and gas production and for supervision of certain offshore operations after lease issuance. BOEM is responsible for managing development of the Nation's offshore mineral and energy resources in an environmentally and economically responsible way. BOEM's responsibilities include leasing; plan administration; environmental studies, consultations, and analyses in compliance with the National Environmental Policy Act (NEPA) and other statutes; resource evaluation; economic analysis; and administration of the OCS Marine Minerals and Renewable Energy Programs.

The Secretary prepares the National OCS Oil and Gas Leasing Program pursuant to Section 18 of the Outer Continental Shelf Lands Act (OCSLA) (43 U.S.C. [United States Code] 1344). The National OCS Oil and Gas Program consists of a schedule of proposed lease sales during the Program's five-year period. When determining the schedule of lease sales, OCSLA requires the Secretary to consider four requirements and eight factors (Figure 1.1-1 and detailed in Chapters 2.2-2.6 in the 2024-2029 National OCS Oil and Gas Program [BOEM 2023a]) to balance national energy needs with economic, social, and environmental factors (including environmental safeguards). However, the Secretary has discretion under OCSLA to determine whether and when to hold individual proposed OCS oil and gas lease sales (lease sales) (43 U.S.C. 1344(e)). BOEM conducts region-specific environmental reviews by Program Areas (i.e., the portions of the OCS planning areas that are identified for leasing in a National OCS Oil and Gas Program) to support decisions on individual lease sales in those areas. The Secretary approved the *2024-2029 National Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program* (2024-2029 National OCS Oil and Gas Program) by signing a combined Decision Memorandum and Record of Decision for the Programmatic Environmental Impact Statement for the 2024-2029 National OCS Oil and Gas Program on December 14, 2023. The 2024-2029 National OCS Oil and Gas Program scheduled three proposed oil and gas lease sales for areas in the Gulf of America (GOA, the waterbody formerly named the Gulf of Mexico; Executive Order (E.O.) 14172, "Restoring Names that Honor American Greatness," (January 20, 2025) renamed the Gulf: https://www.presidency.ucsb.edu/documents/executive-order-14172-restoring-names-that-honor-american-greatness).

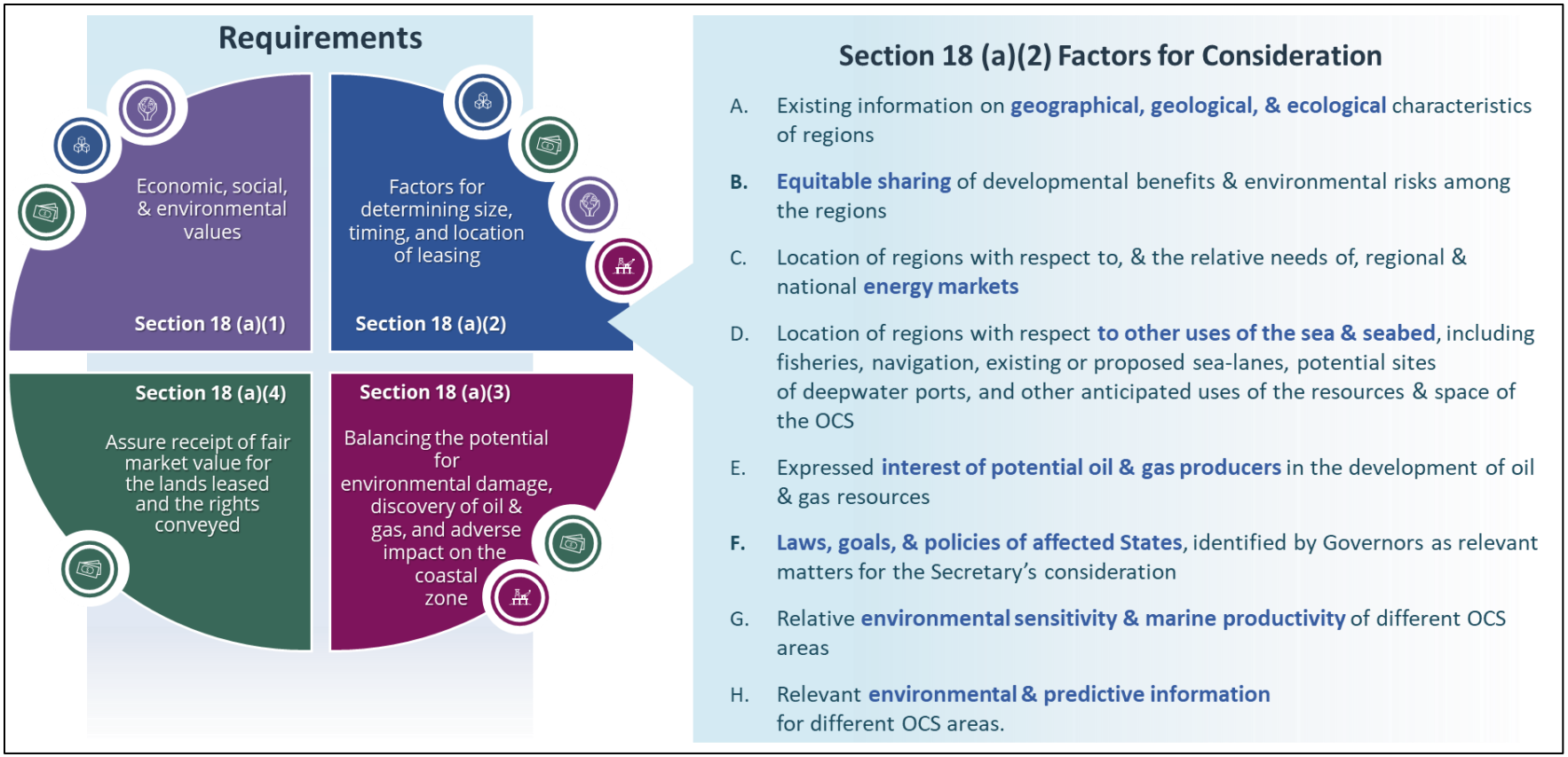

Figure 1.1-1. Requirements and Factors Considered in the National OCS Oil and Gas Program Schedule of Lease Sales.

The *Gulf of America Regional OCS Oil and Gas Lease Sales and Post-Lease Activities: Final Programmatic Environmental Impact Statement* (GOAR Oil and Gas Programmatic EIS) examines a proposed Federal action to hold an oil and gas lease sale offered in Federal OCS waters. The lease sale may be within BOEM's GOA Western, Central, and Eastern Planning Areas (i.e., WPA, CPA, and EPA, respectively). These planning areas encompass the areas offshore Texas, Louisiana, Mississippi, Alabama, and Florida (**Figure 1.1-2**). BOEM chose, at its discretion, to prepare an EIS at this stage. This Programmatic EIS analyzes the potential environmental impacts that could result if BOEM authorizes exploration, development, production, and decommissioning activities in the future. This Programmatic EIS analysis provides the context and setting of future proposed actions, including future oil and gas lease sales and site and activity specific actions, and describes the potential impacts associated with these activities, as well as the reasonably foreseeable impacts on GOA resources. Preparing an EIS allows more time to conduct public involvement and to evaluate potential impacts, thus providing more informed potential OCS oil and gas lease sale decisions. In addition, BOEM can tier from this Programmatic EIS for site- and activity-specific reviews for potential authorizations, which will streamline those future NEPA processes. This Programmatic EIS incorporates by reference and updates relevant materials as described below in **Chapter 1.6** (see **Table 1.6-1**).

On March 27, 2025, the U.S. District Court for the District of Columbia found that BOEM's NEPA analysis for Lease Sale 259 had improperly evaluated greenhouse gas (GHG) emissions and impacts to Rice's whale. The court found that BOEM had not adequately examined laws and policies postdating its modeling baseline in its GHG analysis. The court also found that BOEM did not address Rice's whale habitat in the western and central GOA. This Programmatic EIS serves to address the findings by the U.S. District Court for the District of Columbia. BOEM's GHG modeling baseline for this Programmatic EIS includes the laws and policies current as of 2022, which is the most current assessment as explained in **Appendix K.5.2**. BOEM also explains its consideration of updating the modeling baseline to account for changes in laws and policy since 2022 in **Appendix K.5.2**, as well as the "Implications of Changes to MarketSim Baseline" report at https://www.boem.gov/oil-gas-energy/energy-economics/oil-and-gas-economic-modeling. BOEM has also included Rice's whale habitat in the central and western GOA in its impacts analyses.

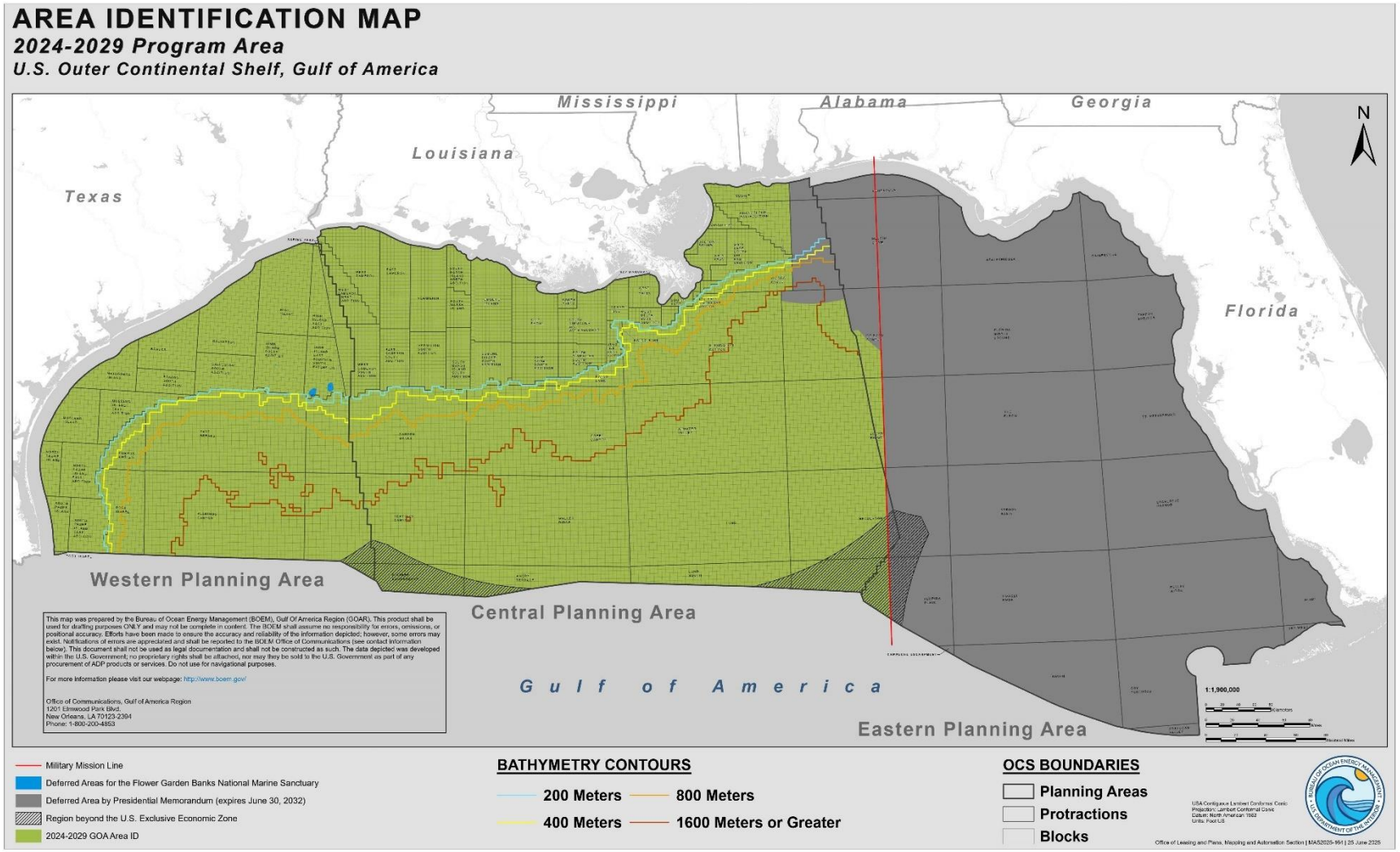

Figure 1.1-2. Area Identification Map for the 2024-2029 Proposed Gulf of America Oil and Gas Lease Sales. More information about the 2024-2029 GOA Area Identification and a full-sized version of this map can be found at https://www.boem.gov/oil-gas-energy/national-program/2024-2029-goa-area-identification.

1.2 PROPOSED ACTION

The Proposed Action evaluated in this Programmatic EIS is to hold an oil and gas lease sale on the Federal OCS in the GOA (**Chapter 2.2.2**). BOEM may rely on this Programmatic EIS or may supplement it as appropriate for decisions on future proposed GOAR oil and gas lease sales that will be made in the normal course. BOEM may also tier from this Programmatic EIS in future NEPA reviews for associated site- and activity-specific OCS oil- and gas-related activity approvals (typically environmental assessments [EAs] for plan approvals), and to help inform extraordinary circumstance reviews to ensure categorical exclusions are used appropriately. This GOA Oil and Gas Programmatic EIS focuses its analysis on the reasonably foreseeable environmental effects of OCS oil and natural gas leasing and associated OCS oil- and gas-related activities from a representative proposed single OCS oil and gas lease sale in the GOA.

Pursuant to OCSLA's staged leasing process, BOEM makes individual decisions on whether and how to proceed for each OCS oil and gas lease sale proposed in a National OCS Oil and Gas Program. BOEM has prepared this Programmatic EIS under 40 Code of Federal Regulations (CFR) 1502.4(a) and 1502.4(b)(1) (i)-(ii) to analyze the impacts of oil and natural gas leasing and associated OCS oil and gas-related activities. Therefore, this Programmatic EIS examines impacts from a representative, single proposed oil and gas lease sale of areas in the GOA. BOEM developed hypothetical scenarios on the foreseeable level of routine activities and their potential impacts, including accidental events (such as oil spills) that might result from an OCS oil and gas lease sale. A single proposed OCS oil and gas lease sale scenario includes all of the resulting activities that could occur over a 40-year analysis period. BOEM considers activities and impacts associated with an OCS oil and gas lease sale on biological, physical, and socioeconomic resources in the analysis. This Programmatic EIS assists decisionmakers in making informed, future decisions about GOAR oil and gas leasing and site- and activity-specific OCS oil- and gas-related activities. Decisions on future proposed OCS oil and gas lease sales and site- and activity-specific OCS oil- and gas-related activities will be made in the normal course and may be based on additional NEPA review that may update this Programmatic EIS as appropriate.

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action (Alternative B) is to facilitate the potential development of those areas that may contain economically recoverable oil and gas. Post-lease development would occur through plan and permit approvals (subject to additional environmental review and regulatory oversight). "Post-lease" describes the period after a lease has been issued. This purpose is consistent with BOEM's mandate to further the orderly development of OCS oil and gas resources under OCSLA (43 U.S.C.1331 et seq.). Each individual proposed OCS oil and gas lease sale would provide qualified bidders the opportunity to bid upon and lease available acreage in the GOA to explore, develop, and produce oil and natural gas.

The Proposed Action is needed to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as

amended (43 U.S.C. 1331 et seq.). The 2024-2029 National OCS Oil and Gas Program included analysis of national energy needs in its decision-making process (Chapter 1.2 of the 2024-2029 National OCS Oil and Gas Program (BOEM 2023a) and, through setting a schedule that includes lease sales, determined that continued leasing of areas in the GOA is in the national interest.

Although the United States consumes more than just oil and natural gas to fulfill its demand for energy, these fuels currently are fundamental to powering the U.S. economy. Oil serves as the feedstock for liquid hydrocarbon products, including gasoline, aviation and diesel fuel, and various petrochemicals. Gas is used to heat homes, generate electricity, and as a feedstock necessary for the production of numerous other goods. Oil and gas from the GOA contribute to meeting domestic demand and enhances national economic security by reducing the need for imports of these resources. The 2024-2029 National OCS Oil and Gas Program approved under Secretary Haaland included three GOS lease sales to meet the domestic demand for oil and gas. A recent study, Zeringue et al. (2022), forecasts steady oil production growth in the GOA, reaching consecutive peak production rates from 2023 through 2027 at more than two million barrels per day. Near-term production growth is driven by several large, announced discoveries that are expected to come online between 2022 and 2025. Additions to oil production for the last five years of the forecast (2027-2031) rely on an increasing contribution from undiscovered resources (Zeringue et al. 2022, Figure 14). Of the 2,106 active leases (approximately 11,438,638 acres) in the GOA, 399 leases are in producing status, with 382 producing leases in the CPA and 17 producing leases in the WPA as of June 2025. BOEM's short-term forecast shows strong continued production in the GOA. Although leasing decisions made in the National OCS Oil and Gas Program would not result in new production for several years, the developments and production would contribute to the national energy needs by contributing supply as well as benefits in terms of the balance of payments, energy security, technology, revenues, and employment. On January 20, 2025, President Donald J. Trump published two E.O.s: E.O. 14154 "Unleashing American Energy" and E.O. 14156 "Declaring a National Energy Emergency." E.O. 14154, among other things, updates the policy of the United States to encourage energy exploration and production on Federal lands and waters including the OCS. E.O.14156 covers several topics and authorizes the heads of executive departments and agencies to identify and exercise any lawful emergency authorities available to them, as well as all other lawful authorities they may possess, to facilitate the identification, leasing, siting, production, transportation, refining, and generation of domestic energy resources, including, but not limited to, on Federal lands. The Secretary implemented these E.O.s through Secretary's Orders (S.O.s) 3418 and 3417, respectively. Additionally, the One Big Beautiful Bill Act, Pub. L. No. 119-21, 139 Stat., signed into law on July 4, 2025, included a minimum of 30 sales over the next 15 years to meet domestic demand for oil and gas. See Chapter 1.2 of the 2024-2029 National OCS Oil and Gas Program for details on energy needs in the United States and to Chapter 6 for details on national and regional energy markets (BOEM 2023a).

1.4 GULF OF AMERICA POST-LEASE ACTIVITIES

BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) are responsible for managing, regulating, and monitoring oil and natural gas exploration, development, production, and

decommissioning operations on the OCS to promote the orderly development of mineral resources in a safe and environmentally sound manner. BOEM's regulations for oil, gas, and sulphur lease operations are specified in 30 CFR 550, 551, 556, and 560. BSEE's regulations for oil, gas, and sulphur operations are specified in 30 CFR 250 and 254. In 2018, BOEM and BSEE signed a Memorandum of Agreement (MOA) to outline each Bureau's NEPA responsibilities (BOEM and BSEE 2018). The MOA established that BOEM will manage the NEPA process for BSEE actions and that BSEE will serve as a Cooperating Agency on BOEM-initiated NEPA documents. The analysis presented in this Programmatic EIS will help inform decisions for site- and activity-specific OCS oil and gas- related activities. Site- and activity-specific NEPA documents (typically EAs for plan approvals) can tier from this Programmatic EIS. Extraordinary circumstance reviews can draw from this Programmatic EIS to ensure that categorical exclusions are used appropriately. All plans for OCS oil- and gas-related activities (e.g., exploration and development plans) go through rigorous BOEM review and approval to ensure compliance with established laws and regulations before any project-specific activities can begin on a lease. See **Chapter 3.2** for descriptions of these post-lease activities. BOEM and BSEE may assign mitigating measures as conditions of approval or permitting based on BOEM's and BSEE's technical and environmental evaluations of the proposed operations and may be applied to any OCS plan, permit, right-of-use and easement, or pipeline right-of-way grant. See Chapters 6 and 7 of the *Programmatic Description of the Potential Effects from Gulf of Mexico OCS Oil- and Gas-Related Activities: A Supporting Information Document* (GOM Oil and Gas SID) (BOEM 2023b) for more information on the mitigating measures that BOEM and BSEE often apply to permits and approvals. Operational compliance of the mitigating measures is enforced through BSEE's office and field compliance verification and inspection program.

BOEM and BSEE issue Notices to Lessees and Operators (NTLs) to provide clarification, description, or interpretation of a regulation; provide guidelines on the implementation of a special lease stipulation or regional requirement; or convey administrative information. A detailed listing of the current BOEM NTLs is available at https://www.boem.gov/about-boem/regulations-guidance/guidance-portal or through the Gulf of America OCS Region's Office of Communications at 504-736-2519 or 1-800-200-GULF. A detailed listing of BSEE's current NTLs is available BSEE at https://www.bsee.gov/guidance-and-regulations/guidance/notice-to-lessees.

1.5 Regulatory Framework

OCSLA mandates preparation of a national OCS oil and gas leasing program. Implementing regulations for OCSLA (30 CFR 550 and 551) and the U.S. Department of the Interior (DOI)'s NEPA implementing regulations (43 CFR 46) encourage orderly, safe, and environmentally responsible development of energy and other mineral resources on the OCS. BOEM consults with federally recognized tribal governments and Federal and State departments and agencies that have authority to govern and maintain ocean resources pursuant to other Federal laws. For more information on BOEM's consultation partners for specific Federal regulations and specific consultation and coordination processes with American Indian tribes, and Federal, State and local agencies, see **Appendix G**. In addition, a detailed description of major Federal laws and environmental regulations that are relevant to the OCS leasing process is provided in the *Gulf of America OCS Regulatory*

Framework technical report (BOEM 2025a), at https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic.

On February 25, 2025, the Council on Environmental Quality (CEQ) published an interim final rule in the *Federal Register* (90 FR 10610) to rescind the NEPA implementing regulations from the CFR in response to E.O. 14154. Since this Programmatic EIS was started under the 2022 Phase 1 rulemaking (87 FR 23453), BOEM has nonetheless elected to continue to follow those regulations (40 CFR 1500 – 1508) as guidance to the extent appropriate and consistent with the requirements of NEPA and E.O. 14154. In addition, BOEM continued to follow DOI's procedures and/or regulations implementing NEPA at 43 CFR 46 (as they existed before their revision on July 3, 2025), to meet the agency's obligations under NEPA, 42 U.S.C. 4321 et seq., given that this Programmatic EIS was substantially complete and close to final publication at the time the DOI regulations and procedures were updated.

1.6 Pertinent Environmental Reviews and Documentation

BOEM used multiple environmental reviews, studies, and additional sources of information to inform the NEPA analyses throughout this Programmatic EIS. **Table 1.6-1** provides a list and brief description of these documents. Where relevant to specific analyses provided herein, these documents have been incorporated by reference.

Table 1.6-1. Description of Reference Materials Used and Incorporated by Reference (where appropriate) in the Preparation of This Programmatic EIS.

Reference Document	Summary of Information Provided
2024-2029 National Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program (2024-2029 National OCS Oil and Gas Program) (BOEM 2023-058) (BOEM 2023a)	Under Section 18 of OCSLA, the Secretary is responsible for establishing a schedule of OCS oil and gas lease sales for a 5-year period in a National OCS Oil and Gas Leasing Program by evaluating specified attributes of OCS areas. The Proposed Final Program presents the analysis of the Proposed Program schedule of OCS oil and gas lease sales and incorporates input received during the public comment period.
2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program: Final Programmatic Environmental Impact Statement (BOEM 2023-054) (BOEM 2023d)	The Final Programmatic EIS for the 2024-2029 National OCS Oil and Gas Program focuses on high-level impacts at the national and regional scale, and describes and analyzes the potential environmental impacts that could result from leasing, exploration, production, and decommissioning associated with OCS oil and gas lease sales contemplated in the 2024-2029 National OCS Oil and Gas Program (BOEM 2023a).

Reference Document	Summary of Information Provided
Programmatic Description of the Potential Effects from Gulf of Mexico OCS Oil- and Gas-Related Activities: A Supporting Information Document (GOM Oil and Gas SID) (BOEM 2023-053) (BOEM 2023b)	The GOM Oil and Gas SID is part of BOEM's preliminary scoping process and was developed to provide subject-matter experts, decisionmakers, and the public with a broad characterization of the Gulf of America OCS; the potential activities associated with oil and gas leasing in the Gulf of America OCS; other activities and environmental factors not associated with OCS oil and gas leasing; and how these various activities and factors might interact with resources in the physical, biological, and human environments. The GOM Oil and Gas SID provides the baseline information that documents the primary resources and issues analyzed in this Programmatic EIS.
Gulf of Mexico Catastrophic Spill Event Analysis: High Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on the Gulf of Mexico Outer Continental Shelf; 2nd Revision (GOM Catastrophic Spill Event Analysis) (BOEM 2021-007) (BOEM 2021b)	This 2021 updated evaluation is a robust analysis of the impacts from low probability catastrophic spills and is made available to all applicable decisionmakers. The analysis presented in this report is intended to be a general overview of the potential effects of a low-probability catastrophic spill in the GOA, which is not reasonably foreseeable nor a part of the proposed action but has been evaluated nonetheless in response to the CEQ's report following the *Deepwater Horizon* explosion, oil spill, and response and is incorporated by reference herein (CEQ 2010).
Biological Environmental Background Report for the Gulf of Mexico OCS Region (Biological Environmental Background Report) (BOEM 2021-015) (BOEM 2021a)	The Biological Environmental Background Report compiles information that describes the biological resources of the GOA region and then explores these resources' vulnerability to BOEM regulated activities associated with the exploration and development of oil and gas, marine minerals, and renewable energy.
Gulf of America OCS Regulatory Framework (BOEM 2025-040) (BOEM 2025a)	This document describes the regulations that govern the environmental reviews for BOEM and BSEE's offshore activities involving oil, natural gas, renewable energy, and marine minerals in the GOA. It provides a framework of regulations and policies required for the OCS oil and gas leasing program.
Gulf of Mexico OCS Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas – Final Programmatic Environmental Impact Statement (Gulf of Mexico G&G Final Programmatic EIS) (BOEM 2017-051) (BOEM 2017a) and Record of Decision (ROD) (BOEM 2020b)	The Gulf of Mexico G&G Final Programmatic EIS analyzes the potential environmental impacts of performing G&G activities on the Gulf of America OCS. The ROD does not authorize any G&G activities but rather it establishes a framework for additional mandatory environmental reviews for site-specific actions and identifies applicable mitigating measures governing any future G&G activities in the region. BOEM will analyze the potential impacts of future site-specific actions in subsequent evaluations, which will tier from the Gulf of Mexico G&G Final Programmatic EIS.

Reference Document	Summary of Information Provided
Air Quality Modeling in the Gulf of Mexico Region Study (BOEM 2019-057) (Wilson et al. 2019b)	This Air Quality Modeling Study covers topics that support BOEM's air quality management, such as developing regulatory exemption thresholds and a long-term meteorological dataset for post-lease analysis, executing modeling simulations, and assessing the potential air quality impacts of a single OCS oil and gas lease sale and the National OCS Oil and Gas Program under the NEPA framework.
Air Quality Control, Reporting, and Compliance Rule (81 FR 19718)	The final rule ensures that BOEM applies up-to-date values for the Significance Levels in 30 CFR 550.303(e) consistent with those already established by the U.S. Environmental Protection Agency (USEPA) for analogous purposes (40 CFR 51.165(b)(2)). This rulemaking makes other improvements to the regulations to clarify and correct inconsistencies but it would not result in any different or additional environmental impacts.
Offshore Oil and Gas: Updated Regulations Needed to Improve Pipeline Oversight and Decommissioning (GAO-21-293) (GAO 2021)	The Government Accounting Office (GAO) reviewed BSEE's management of offshore oil and gas pipelines. This report examines BSEE's processes for ensuring active pipeline integrity and addressing safety and environmental risks posed by decommissioning. The GAO recommended that BSEE take actions to further develop, finalize, and implement updated pipeline regulations to address long-standing limitations regarding its ability to (1) ensure active pipeline integrity and (2) address safety and environmental risks associated with pipeline decommissioning.
Offshore Oil and Gas: Interior Needs to Improve Decommissioning Enforcement and Mitigate Related Risks (GAO-24-106229) (GAO 2024)	The GAO reviewed DOI's oversight of offshore decommissioning. This report examines Interior's effectiveness in enforcing decommissioning deadlines and assuring industry capacity to meet them. The GAO made four recommendations to DOI to strengthen BSEE and BOEM's decommissioning oversight and enforcement: (1) strengthen BSEE's approach to proactively overseeing and enforcing decommissioning deadlines, (2) complete planned actions to identify, propose, finalize, and fully implement changes to decommissioning regulations and guidance, (3) complete planned actions to further develop, finalize, and fully implement changes to financial assurance regulations and procedures that reduce financial risks, and (4) complete planned actions to assess and revise qualification procedures to address decommissioning capacity and compliance history.

Reference Document	Summary of Information Provided
Biological and conference opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's oil and gas program activities in the Gulf of America. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 701 p. Report No.: OPR-2022-03526. (NMFS 2025b)	On May 20, 2025, the National Marine Fisheries Service (NMFS) issued a biological and conference opinion on the oil and gas program in the GOA and it supersedes and replaces all other prior biological opinions on that action. The document is available at https://www.fisheries.noaa.gov/resource/document/biological-and-conference-opinion-bureau-ocean-energy-management-and-bureau
Attachments and appendices for the 2025 Gulf of America oil and gas Biological Opinion. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 87 p. (NMFS 2025a)	Attachments and Appendices for the 2025 Programmatic Biological and Conference Opinion on BOEM and BSEE's oil and gas activities in the GOA. The document is available at https://www.fisheries.noaa.gov/resource/document/attachments-and-appendices-2025-gulf-america-oil-and-gas-biological-opinion

1.7 Format and Organization of This Programmatic EIS

The remaining chapters in this Programmatic EIS are described below.

- **Chapter 2** describes the proposed action, including the potential proposed OCS oil and gas lease sale alternatives analyzed in this Programmatic EIS; summarizes the potential mitigating measures (pre- and post-lease), including the proposed stipulations; and provides a broad comparison of impacts by alternative.
- **Chapter 3** describes all of the potentially occurring actions associated with a proposed OCS oil and gas lease sale and the cumulative activities that provide a framework for detailed analyses of the potential impacts analyzed in this Programmatic EIS.
- **Chapter 4** summarizes the affected environment and the potential impacts of a proposed OCS oil and gas lease sale and each alternative by resource, focusing on any new information that may affect previous conclusions for each resource since publication of the GOM Oil and Gas SID.
- **Appendix A** includes all of the citations referred to throughout this Programmatic EIS.
- **Appendix B** includes detailed descriptions of the impact producing factors (IPFs).
- **Appendix C** describes a detailed description of decommissioning activities.
- **Appendix D** is a glossary of terms.
- **Appendix E** is a keyword index of terms used throughout this Programmatic EIS.

- **Appendix F** is a list of the preparers of this Programmatic EIS.
- **Appendix G** describes the consultation and coordination efforts used in preparing this Programmatic EIS.
- **Appendix H** includes the consultation coordination cover letters.
- **Appendix I** includes descriptions of the Gulf Coast States' Coastal Management Plans.
- **Appendix J** includes detailed descriptions of the proposed lease stipulations.
- **Appendix K** includes BOEM's updated GHG emissions analysis.
- **Appendix L** presents the BOEM responses to public comments on the Draft GOA Oil and Gas Programmatic EIS.
- **Appendix M** presents detailed analysis of GOA resources determined to have impacts for all IPFs under any alternative of minor or less.

CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

The proposed action and alternatives to the proposed action evaluate holding an oil and gas lease sale for areas on the Federal OCS in the GOA (**Chapter 1.2**). The NEPA alternatives analyzed, with the exception of the No Action Alternative, should meet the purpose and need (Section 102(C)(iii) of 42 U.S.C. 4332; **Chapter 1.3**). This chapter presents a reasonable range of alternatives to the proposed action, including a No Action Alternative (Alternative A) and three action alternatives (Alternatives B-D). BOEM also presents the potential mitigating measures that could be used to reduce the environmental impact of the proposed action or alternatives at the lease sale and post-lease stages. Finally, this chapter presents the issues and resources to be analyzed and summarizes the potential impacts by alternative. This comparison defines the issues and provides the decisionmaker and the public a clear analysis of the options.

2.2 ALTERNATIVES CONSIDERED

The discussions below describe the alternatives that are considered for this environmental analysis. All available unleased blocks within the WPA, CPA, and EPA portions of the proposed OCS oil and gas lease sale area, with the exceptions as outlined for each alternative below, are being considered for a proposed OCS oil and gas lease sale. The mitigating measures (pre- and post-lease), including the proposed stipulations, are described in **Chapter 2.2.2** of this Programmatic EIS. For a more detailed description of mitigating measures and lease stipulations, see **Appendix J** of this Programmatic EIS and Chapters 6 and 7 of the GOM Oil and Gas SID.

2.2.1 Alternative A – No Action

Alternative A is the cancellation of a single proposed GOA oil and gas lease sale. Under Alternative A, a proposed OCS oil and gas lease sale would not occur so there would be no new routine activities or accidental events resulting from the proposed action. Conversely, the opportunity for development of the estimated oil and gas from the proposed action would be precluded or postponed to a future proposed OCS oil and gas lease sale. Cancelling a proposed OCS oil and gas lease sale, as scheduled in the 2024-2029 National Program, could result in a multi-year period (up to 4 years) of no new oil and gas leasing. Under Alternative A, baseline conditions and ongoing activities related to previously issued leases and permits would continue. Activities that may occur in the future under existing leases or a separate proposed OCS oil and gas lease sale decision related to the Gulf of America OCS Oil and Gas Program, are also included in this analysis. On July 4, 2025, President Donald J. Trump signed the One Big Beautiful Bill Act (OBBBA), which sets a mandate of 30 OCS oil and gas lease sales in the next 15 years. Therefore, if a single proposed OCS oil and gas lease sale were to be cancelled, the overall level of OCS oil- and gas-related activity in the long term would be reduced by only a small percentage, if any. That is because the activity would likely be postponed to a future sale, and there would likely only be a noticeable drop in exploration and development activities if older leases reach the end of their production and new leases are not issued to replace those activities.

A cancelled proposed OCS oil and gas lease sale discourages operators from developing sub-economic discoveries based on the time value of money, which is the concept that a sum of money has greater value now than it will in the future due to its earning potential invested in something else. Many deepwater discoveries are too small to warrant a dedicated development structure. Multiple smaller fields, however, can be produced by tie backs to a central hub. Decisions to place a central hub rest heavily on the expectation of continued opportunities to access OCS leases. A cancelled OCS oil and gas lease sale inhibits this flexibility, delays development decisions, and, in an era of elevated interest rates, may make the cost of developing marginal fields too high such that development is deferred, sold, or cancelled altogether. When OCS oil and gas lease sales occur on a regular basis, as they generally have for many decades, operators maintain maximum flexibility in how they choose to invest in their discoveries. When an OCS oil and gas lease sale is cancelled and the uncertainty of future lease sales increases, particularly in an inflationary environment where the time value of money is a more acute factor, an operator's development decisions become more difficult to predict. If access to OCS leases is more restricted or less certain, it may present economic circumstances that increase the risk of smaller operators going bankrupt and major operators focusing their activities elsewhere in the world. In either case, the result may be lessened or fewer routine or accidental impacts from OCS oil- and gas-related activities in the GOA region, but these activities and associated impacts could shift to other regions of the world. Analysis of the economic and social impacts in the GOA region of Alternative A are found in **Chapters 4.15.2.3** and **4.16.2.3**, respectively. BOEM generally would expect to see similar types of activities and impacts to those analyzed in this document for the GOA (**Chapter 4**) in other oil producing areas. In the absence of an OCS oil and gas lease sale, future contributions to oil and gas production would come from discovered and undiscovered resources on existing OCS leases, some of which may already be producing oil and gas. As discussed in the 2024-2029 National Program PEIS, if no new leasing occurred under the 2024-2029 National Program, it is anticipated that OCS oil and gas production would be replaced by foreign oil production, increased domestic oil and gas production, and other energy substitutes. Most substitutes would not be produced within BOEM OCS planning areas, though they may travel through them as in the case of additional imports.

In summary, cancelling a proposed OCS oil and gas lease sale, as scheduled in the 2024-2029 National Program, could result in a multi-year period (up to 4 years) of no new oil and gas leasing, and creates two areas of uncertainty for oil and gas developers. First, operator decisions and economic outcomes become harder to predict. Second, if operators defer or cancel investments in their discoveries because of greater economic uncertainty, then the foreseeable OCS oil- and gas-related activities become more uncertain and impacts (beneficial and/or adverse) may not be realized. The current resource conditions and impacts from ongoing activities under the No Action Alternative serve as the baseline against which the direct and indirect impacts of all action alternatives are evaluated. The continuation of all other existing and reasonably foreseeable activities described in **Chapter 3.6 and Appendix B** with the cancellation of a single proposed GOA oil and gas lease sale serves as the baseline for the evaluation of cumulative impacts in **Chapter 4**. However, with the passage of the OBBBA, it is reasonable to assume if one sale were cancelled, impacts would be postponed.

2.2.2 Alternative B (The Proposed Action and The Preferred Alternative) – Regionwide OCS Lease Sale

Alternative B (**Figure 2.2-1**) allows for a proposed GOAR oil and gas lease sale including all available unleased blocks in the WPA, CPA, and EPA OCS lease sale areas for oil and gas operations, with the following exceptions:

- whole and portions of blocks currently under Presidential withdrawal (The White House 2020);
- blocks that are adjacent to or beyond the United States' Exclusive Economic Zone (EEZ) in the area known as the northern portion of the Eastern Gap; and
- whole and partial blocks within the boundaries of the Flower Garden Banks National Marine Sanctuary (FGBNMS) as of the July 2008 Memorandum on Withdrawal of Certain Areas of U.S. OCS from Leasing Disposition (The White House 2008).

The proposed action would provide the most flexible leasing approach. It provides more frequent opportunity to bid on rejected, relinquished, or expired OCS lease blocks in all three GOA planning areas. A proposed OCS oil and gas lease sale under this alternative may include proposed lease stipulations designed to mitigate environmental risks to vulnerable environmental resources. The decisionmaker will make a determination to apply stipulations discussed below in **Chapter 2.3.1** and **Appendix J** in the Record of Decision for each proposed OCS oil and gas lease sale.

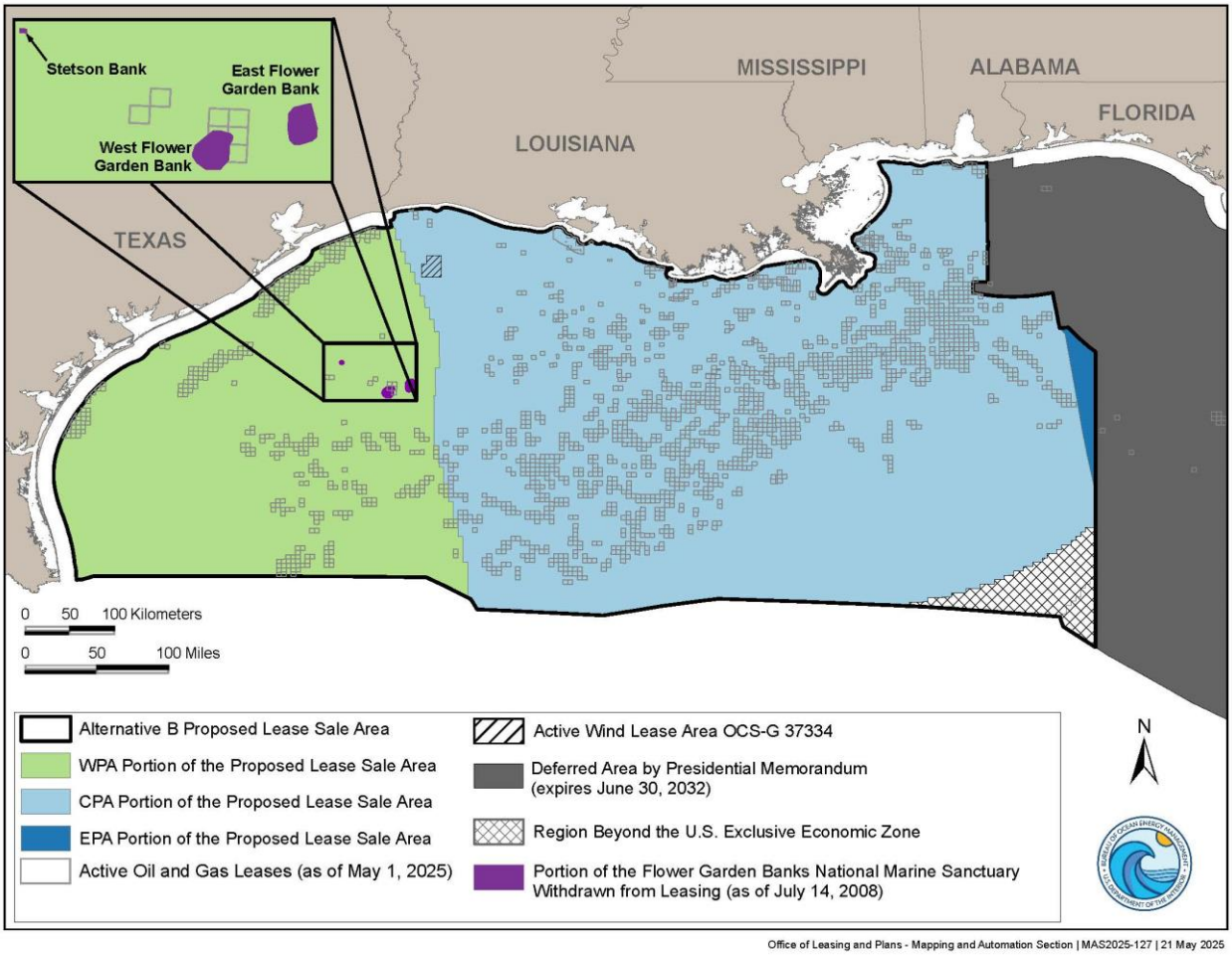

Figure 2.2-1. Proposed OCS Oil and Gas Lease Sale Area for Alternative B (a total of approximately 94.1 million acres with approximately 80 million acres available for lease as of May 2025).

2.2.3 Alternative C – Targeted OCS Lease Sale Area

Alternative C (**Figure 2.2-2**) allows for a proposed OCS oil and gas lease sale area within a reduced geographic area by excluding targeted areas from Alternative B. These exclusions focus future OCS leasing in areas of interest, for environmental considerations, and to reduce marine spatial planning conflicts. Alternative C would allow for a proposed GOAR oil and gas lease sale of approximately 65 million acres as of May 2025. This alternative includes all available unleased blocks in the WPA, CPA, and EPA OCS lease sale areas for OCS oil- and gas-related activities, with the following exceptions:

- blocks that were excluded from consideration under Alternative B;
- whole and partial blocks subject to the proposed Topographic Features Stipulation;
- whole and partial blocks subject to the proposed Live Bottom (Pinnacle Trend) Stipulation;

- whole and partial blocks subject to the proposed Blocks South of Baldwin County, Alabama, Stipulation;
- whole and partial blocks that contain Significant Sediment Resource Areas (SSRAs);
- Wind Energy Area Options (WEAs) (Areas A, B, C, D, E, F, G, and H) as of April 2024 and final WEAs (Areas I, J, K, L, and N);
- whole and partial blocks within the Rice's whale proposed core distribution area as of March 2025; and
- whole and partial blocks within the Rice's whale proposed critical habitat area as of March 2025.

The proposed lease stipulations are discussed below in **Chapter 2.3.1** and **Appendix J**. On July 30, 2025 Secretary Burgum signed S.O. 3437, *Ending Preferential Treatment for Unreliable, Foreign Controlled Energy Sources in Department Decision-Making,* which rescinded all designated GOA Wind Energy Areas. However, these areas are still included in the NEPA analysis of Alternative C to examine the potential for space use conflicts.

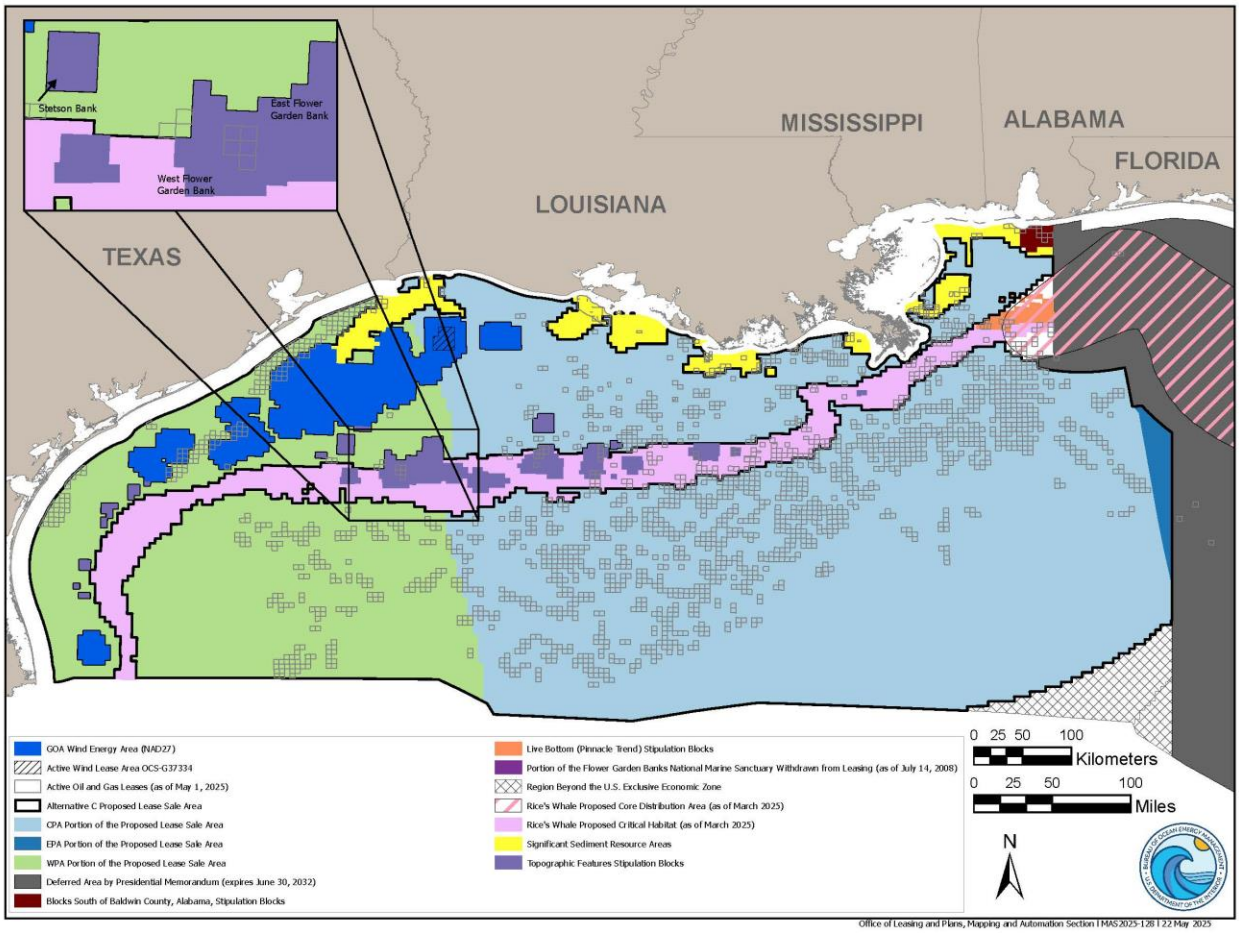

Figure 2.2-2. Proposed OCS Oil and Gas Lease Sale Area for Alternative C (a total of approximately 75.2 million acres with approximately 65 million acres available for lease as of May 2025).

Unlike Alternative B, which largely relies on lease stipulations and mitigating measures to reduce potential environmental effects, Alternative C removes whole or partial blocks subject to the Topographic Features, Live Bottom (Pinnacle Trend), and South of Baldwin County, Alabama, lease stipulations, and other sensitive areas as identified above. These areas, emphasized by public commenters in scoping for previous NEPA analyses, can be geographically defined, and have adequate existing information about their importance and/or ecological sensitivity to OCS oil- and gas-related activities.

2.2.4 Alternative D –Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D (**Figure 2.2-3**) allows for a proposed OCS oil and gas lease sale area within a smaller geographic area than Alternative C by excluding additional areas for environmental considerations and marine spatial planning. It offers a proposed GOAR oil and gas lease sale of approximately 46.1 million acres as of May 2024. This alternative includes all available unleased blocks in the WPA and CPA lease sale areas for OCS oil and gas operations, with the following exceptions:

- blocks that were excluded from consideration under Alternative C;
- whole and partial blocks in the EPA of the GOA;
- additional whole and partial blocks of the GOA Wind Leasing Call Area;
- whole and partial blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath to avoid additional impacts to coastal stocks of bottlenose dolphin (*Tursiops truncatus)*;
- whole and partial blocks around the expanded FGBNMS as of March 22, 2021; and
- whole and partial blocks identified by the Department of Defense as mission incompatibility areas.

This alternative removes whole or partial blocks from additional sensitive areas as described above. These areas have been emphasized by public commenters in scoping for previous NEPA analyses, can be geographically defined, and have adequate existing information regarding their importance and/or ecological sensitivity to OCS oil- and gas-related activities. Leasing activities are concentrated into a smaller footprint to potentially further reduce the impact to the environment and to preserve additional flexibility for marine spatial planning between potential different ocean uses (i.e., OCS oil and gas development, offshore renewable energy development, marine mineral use, carbon sequestration, etc.).

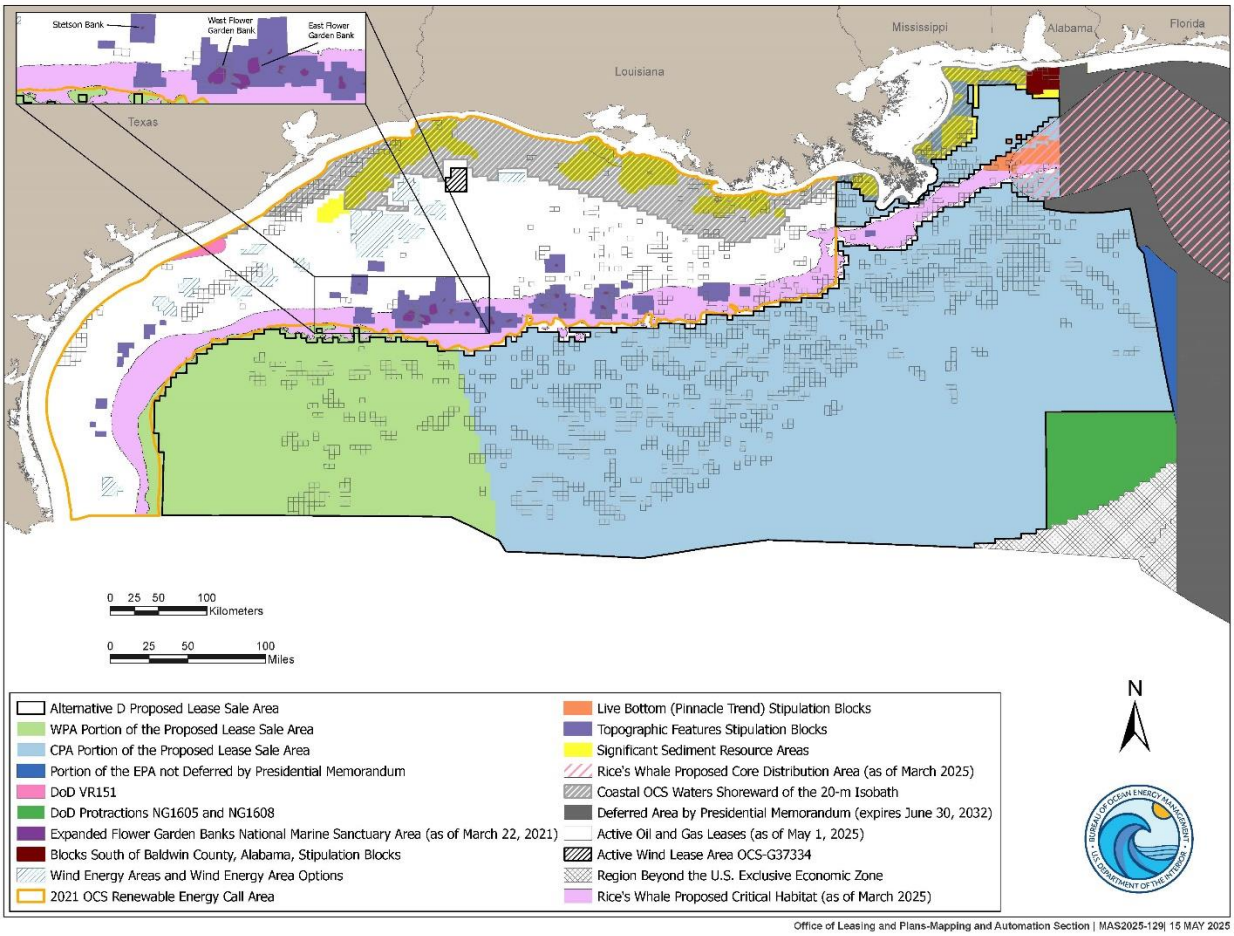

Figure 2.2-3. Proposed OCS Oil and Gas Lease Sale Area for Alternative D (a total of approximately 54.6 million acres with approximately 46.1 million acres available for lease as of May 2025).

2.2.5 Other Alternatives Considered but Eliminated

Comments received on the Draft PEIS called for consideration of additional alternatives. BOEM considered each of these alternatives and eliminated them from detailed consideration. Please see **Appendix L**, Topic 3 – Alternatives for detailed reasoning as to why each alternative listed in **Table 2.2-1** was not carried forward.

Table 2.2-1. Other Alternatives Considered but Eliminated.

Suggested Alternative	Comment ID
BOEM should consider an alternative that excludes not only Rice's whale proposed critical habitat, but also includes a 10-kilometer or greater buffer for this critically endangered species.	BOEM-2023-0046-5236
BOEM should include "alternatives that will reduce climate change-related effects or address adverse health and environmental effects that disproportionately affect communities with environmental justice concerns.	BOEM-2023-0046-5236

Suggested Alternative	Comment ID
Other than the no-action alternative, BOEM should consider an alternative that would limit the government's exposure to liability by prohibiting the issuance of leases to any company with extant overdue decommissioning obligations.	BOEM-2023-0046-3142
BOEM should further examine alternatives that would limit the number of wells that could be drilled or the amount of oil and gas that could be developed to address the project's significant greenhouse gas emissions and resulting impacts.	BOEM-2023-0046-5236
It should consider an alternative that ties the acreage of new leasing to the amount of relinquished undeveloped leases.	BOEM-2023-0046-5236
BOEM should also consider an alternative that would prohibit the use of particularly dangerous drilling activities like fracking and acidizing.	BOEM-2023-0046-5236

2.3 MITIGATING MEASURES

Mitigating measures are an integral part of BOEM's OCS Oil and Gas Program. They ensure that operations are conducted in an environmentally sound manner (with an emphasis on avoiding or minimizing any adverse impact of routine operations on the environment). BOEM considers the use of mitigation at all phases of energy development and planning. Mitigations can be applied at the prelease stage, typically through applying lease stipulations or specific G&G permit mitigations. Site-specific mitigating measures to plans, permits, and/or authorizations are called Conditions of Approval and are applied at the post-lease stage. Through this approach, BOEM is able to analyze impacts and mitigations that are appropriate for consideration at the appropriate time. BOEM and BSEE's post-lease permitting and approval processes are described in Chapter 5 of the GOM Oil and Gas SID; Chapters 6 and 7 of the GOM Oil and Gas SID provide a comprehensive list of commonly applied mitigating measures and potential lease stipulations, respectively.

2.3.1 Proposed Lease Stipulations

The potential lease stipulations are mitigating measures that are included as part of an OCS oil and gas lease. They are included for analysis in this Programmatic EIS and were developed after numerous scoping efforts for the continuing OCS Oil and Gas Program in the GOA. **Appendix J** provides a detailed description of these proposed lease stipulations. The lease stipulations being considered are shown in **Table 2.3-1.** Since the publication of the draft Programmatic EIS, the One Big Beautiful Bill Act (Pub. L. 119-21) was enacted. Among other things, the Act requires that DOI hold on average two mandated sales in the Gulf of America, with specific limitations on acreage size and it also requires the application of the financial terms, economic conditions, and lease stipulations previously applied in Gulf of Mexico Lease Sale 254. For those congressionally-mandated sales, therefore, the required stipulations will be applied; the discussion of the stipulations included in this Programmatic EIS would be applicable only to GOA sales not mandated by Pub. L. 119-21.

Lease stipulations will be considered for adoption by the decisionmaker, as applicable, under authority delegated by the Secretary. Because the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations were applied as programmatic mitigation under the 2024-2029 National OCS Oil

and Gas Program Record of Decision (BOEM 2023e), they would apply to all leases issued under the 2024-2029 National OCS Oil and Gas Program. However, because Alternatives C and D would not allow leasing in the blocks identified in the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations, the adoption of these two stipulations would not result in any change to the leasing area analyzed in Alternatives C or D. The analysis of the other stipulations for any particular alternative does not ensure application of the stipulations to leases that may result from any proposed GOA oil and gas lease sale. It also does not preclude minor modifications during subsequent steps in the prelease process if comments or consultations indicate changes are necessary or if conditions change. Any stipulations or mitigation requirements to be included in a GOA oil and gas lease sale will be described in the ROD and Final Notice of Sale for that lease sale. BSEE has the authority to monitor and enforce these conditions under 30 CFR 250.N and may seek remedies and penalties from any operator that fails to comply with those conditions, stipulations, and mitigating measures.

Table 2.3-1 indicates what stipulations could be applied for each alternative. Alternatives C and D consider the same stipulations as Alternative B, as applicable, with the exception of removing the Topographic Features, Live Bottoms (Pinnacle Trend), and Blocks South of Baldwin County, Alabama, Stipulations because those areas are removed from leasing under Alternatives C and D.

Table 2.3-1. Applicable Stipulations by Alternative.

Stipulation[1,2]	Alternative A[3]	Alternative B	Alternative C	Alternative D
Military Areas Stipulation	–	X	X	X
Evacuation Stipulation	–	X	X	X
Coordination Stipulation	–	X	X	X
Protected Species Stipulation	–	X	X	X
Topographic Features Stipulation	–	X	–	–
United Nations Convention on the Law of the Sea Royalty Payment Stipulation	–	X	X	X
Stipulation on the Agreement Between the United States of America and the United Mexican States Concerning Transboundary Hydrocarbon Reservoirs in the Gulf of America (Transboundary Stipulation)	–	X	X	X
Live Bottom (Pinnacle Trend)	–	X	–	–
Blocks South of Baldwin County, Alabama, Stipulation	–	X	–	–
Restrictions due to Rights-of-Use and Easements for Floating Production Facilities Stipulation	–	X	X	X

[1] Stipulations that would apply to specific lease blocks under any given alternative are marked with an X.

[2] Stipulations that would not apply, because the stipulation blocks or areas are not within the proposed OCS oil and gas lease sale area for that alternative, are marked "–".

[3] Alternative A would cancel a proposed OCS oil and gas lease sale and any associated activities; therefore, no stipulations would apply. However, applicable stipulations would apply to leases issued prior to this proposed OCS oil and gas lease sale and are considered under ongoing activities.

2.3.2 Post-lease Conditions of Approval

Post-lease mitigating measures have been implemented for over 40 years in the GOAR as conditions of approval (COAs). Following a GOAR oil and gas lease sale, an applicant seeks approvals to develop their lease by preparing and submitting OCS plans. The OCS plans and permit applications are reviewed by BOEM. Depending on what the applicant proposes to take place on a specific lease, right-of-way, or right-of-use, may be denied, approved, or approved with COAs. The COAs become part of the approved post-lease authorization or permit approval. They include environmental protection requirements that maintain conformance with law, the requirements of other agencies having jurisdiction, or safety precautions. Over time, BOEM realized that many of these site-specific mitigations were recurring and developed a list of commonly applied "standard" mitigations. Some BOEM-identified mitigating measures are incorporated into OCS oil- and gas-related operations through cooperative agreements or efforts with industry and State and Federal agencies. Operational compliance of the mitigating measures is enforced through BSEE's office and field compliance verification and inspection program. BOEM and BSEE, working together, are continually revising applicable mitigations to more easily and routinely track their effectiveness and compliance with them. Chapter 5 of the GOM Oil and Gas SID discusses BOEM and BSEE's rigorous post-lease processes and Chapter 6 of the GOM Oil and Gas SID describes over 120 standard mitigations that may be required by BOEM or BSEE as a result of plan and permit review processes for the GOAR. Compliance with all regulatory requirements, including post-lease COAs and their mitigating effects, is considered part of the proposed action.

2.4 PRIMARY TOPICS AND RESOURCES EVALUATED

For the purposes of this Programmatic EIS, issues are defined as those principal "effects" that an EIS should evaluate in-depth. As part of the scoping process, BOEM determined the scope and the significant issues to be analyzed in depth as outlined in NEPA, as amended (42 U.S.C. 4321 et seq.) and the DOI regulations implementing NEPA (43 CFR 46). The analysis in this Programmatic EIS can then show the degree of change from the present conditions to the conditions from the actions arising from the proposed action for each issue.

2.4.1 Issues to be Analyzed

The GOM Oil and Gas SID, which is incorporated by reference, provides an introduction to the issues related to potential impact-producing factors and the environmental and socioeconomic resources and activities that could be affected by OCS oil- and gas-related activities. Chapter 4 of the GOM Oil and Gas SID describes the resources and activities that could be affected by the impact-producing factors described in Chapter 2 of the GOM Oil and Gas SID. **Chapter 3** and **Appendix B** of this Programmatic EIS identifies several issues or impact-producing factors related to routine activities, accidental events, or cumulative activities to be evaluated (**Table 2.4-1**).

Table 2.4-1. Impact-Producing Factors Related to Routine Activities, Accidental Events, or Cumulative Activities.

Routine Activities	Accidental Events	Cumulative Activities
Air Emissions and Pollution	Unintended Releases into the Environment	Air Emissions and Pollution[1]
Discharges and Wastes	Response Activities	Discharges and Wastes[1]
Bottom Disturbance	Strikes and Collisions	Bottom Disturbance[1]
Noise	-	Noise[1]
Coastal Land Use/Modification	-	Coastal Land Use/Modification[1]
Lighting and Visual Impacts	-	Lighting and Visual Impacts[1]
Offshore Habitat Modification/Space Use	-	Offshore Habitat Modification/ Space Use[1]
Socioeconomic Changes and Drivers	-	Socioeconomic Changes and Drivers[1]
-	-	Other Environmental Factors

[1] These IPFs can occur from cumulative OCS oil- and gas-related activities and non-OCS oil- and gas-related activities

In addition to the above-mentioned IPFs, BOEM identified greenhouse gas emissions and space-use issues as issues of programmatic concern, which are described in more detail in **Chapter 4.0.2**. **Chapter 4** of this Programmatic EIS describes the environmental and socioeconomic resources and activities that could be affected by the IPFs and issues of programmatic concern identified above and described in **Chapters 3** and **4.0.2** and **Appendix B** and includes the resource categories shown in **Table 2.4-2**.

Table 2.4-2. GOA Oil and Gas Programmatic EIS Resource Categories.

Air Quality	Sea Turtles
Water Quality	Commercial Fisheries
Coastal Communities and Habitats	Recreational Fishing
Benthic Communities and Habitats	Recreational Resources
Pelagic Communities and Habitats	Cultural, Historical, and Archaeological Resources
Fishes and Invertebrates	Land Use and Coastal Infrastructure
Birds	Economic Factors
Marine Mammals	Social Factors

Comments received during scoping raised additional issues for consideration in this Programmatic EIS. Several comments related to the NEPA process, this NEPA analysis generally, alternatives, exclusion areas, and mitigating measures were incorporated or considered in the preparation of applicable parts of this Programmatic EIS. Other issues analyzed in detail in the environmental analysis are shown in **Table 2.4-3**.

Table 2.4-3. Scoping Issues Identified for Detailed Environmental Analysis.

Climate-Related Factors	Commercial Fisheries
Greenhouse Gases	Recreational Resources
Alternative Use	Economic Factors
Air Quality	Social Factors
Water Quality	Other Resources
Benthic Communities and Habitats	Consultations
Fishes and Invertebrates	Cumulative Analysis
Marine Mammals	Oil Spills
Sea Turtles	-

Scoping comments are summarized in **Appendix G** of this Programmatic EIS and detailed in the GOA Oil and Gas Scoping Report, which can be found at https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic. Issues raised during scoping are analyzed in detail in their respective resource analyses in **Chapter 4**. Analysis for life-cycle greenhouse gas emissions is published in **Appendix K** and summarized in **Chapter 4.0.2.1**.

2.4.2 Issues Considered but Not Analyzed

As part of the scoping process, agencies shall identify and eliminate from detailed study the issues that are not significant to the proposed action or have been covered by prior environmental review as outlined in the NEPA statute (42 U.S.C. 4321 et seq.) and the DOI regulations implementing NEPA (43 CFR 46). Several comments received during scoping were outside the scope of this analysis and therefore not analyzed in detail. Topics not analyzed in detail include the 2024-2029 National OCS Oil and Gas Program, bid requirements, oil rights, and changes to regulations. The temporally static or transient aspects of the physical setting, such as the GOA's geology, oceanography, and meteorology, are not analyzed, except when they interact with IPFs having relevance to environmental or socioeconomic resources.

2.5 Comparison of Impacts by Alternative

The full analyses of the potential impacts of routine activities (including decommissioning) and accidental events associated with an OCS oil and gas lease sale and its incremental contribution to the cumulative impacts are described in detail in the individual resource discussions in **Chapter 4**. **Table 2.5-1** presents the environmental impacts of the Proposed Action and the Alternatives in comparative form based on the information and analysis presented in **Chapter 4**. Each resource includes a range of impact levels to account for certain variables such as uncertainty in the level and magnitude of potential accidental events. They also include the minimization of the OCS oil- or gas-related impacts through lease stipulations, post-lease mitigations, and/or other regulatory requirements, where applicable. It must also be emphasized that, in arriving at the overall conclusions for certain environmental resources, the conclusions are not based on impacts to individuals, small groups of animals, or small areas of habitat, but on impacts to the resources/populations as a whole. This Programmatic EIS uses a four-level classification scheme to

characterize the potential beneficial impacts and adverse impacts of alternatives as either negligible, minor, moderate, or major. The impact-level ratings are defined generally for each resource in **Tables 4.0-2** and **4.0-3** and, where required, resource-specific, expanded definitions are provided in the resource analysis. Impact conclusions – whether a proposed OCS oil and gas lease sale were to occur or not – are in the individual resource analyses in **Chapter 4**.

Table 2.5-1. Comparison of Overall Impacts by Alternative for Each Resource Category.

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Air Quality[1]	Direct and indirect impacts would be **none**.	**Negligible** to **moderate negative** from routine air emissions and pollutants and accidental events, though air quality should recover quickly with or without remediation.	Impacts to regional air quality would likely be similar as Alternative B (ranging from **negligible** to **moderate negative**) because Alternative C would still make substantial areas in shallow waters available for leasing and overall activity and production levels are the same. However, reduced leasing in water depths <200 m (656 ft) could potentially decrease venting activities and associated methane emissions.	Impacts to regional air quality would likely be similar as Alternative B (ranging from **negligible** to **moderate negative**) because Alternative D would still make substantial areas in shallow waters available for leasing and overall activity and production levels are the same. However, reduced leasing in water depths <200 m (656 ft) could potentially decrease venting activities and associated methane emissions.
Water Quality	Direct and indirect impacts would be **none**.	Routine activities would have **negligible** effects due to existing regulatory requirements. Accidental events, depending on magnitude and severity, could have **minor** to **moderate adverse** impacts. Trends and Oil Spill Risk Analysis (OSRA) analyses show that most spills (>95%) are 1 bbl or less, and small spills (<1,000 bbl) would weather and disperse quickly.	**Negligible** to **moderate adverse** impacts to regional water quality, similar to Alternative B. In the areas excluded from leasing, impacts to water quality would be reduced to **negligible** for all IPFs.	**Negligible** to **moderate adverse** impacts to regional water quality, similar to Alternative B. In the areas excluded from leasing, impacts to water quality would be reduced to **negligible** for all IPFs.

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Coastal Communities and Habitats	Direct and indirect impacts would be **none**.	**Negligible** to **moderate adverse** impacts, primarily associated with the slight risk of large spills and associated response activities affecting coastal communities and habitats. However, trends and OSRA analyses show that most spills (>95%) are 1 bbl or less, and small spills (<1,000 bbl) would likely weather and disperse before reaching coastal communities and habitats.	**Negligible** to **moderate adverse** impacts, similar to Alternative B, with decreased potential for oil spills and response activities to affect coastal habitats adjacent to the exclusion areas, including substantial areas along Texas and Louisiana, and all areas along the Mississippi and Alabama coast.	**Negligible** to **moderate adverse** impacts, similar to Alternatives B and C, with further decreased potential for oil spills and response activities to affect coastal habitats adjacent to the exclusion areas, including all areas along the Texas, Mississippi, and Alabama coast, and most areas along the Louisiana coast.
Benthic Communities and Habitats	Direct and indirect impacts would be **none**.	Implementation of the proposed action could result in **negligible** to **major adverse** impacts on benthic communities and habitats, including protected corals. With the application of BOEM's protective measures (i.e., avoidance, distancing, and shunting requirements), the impacts would be **negligible** to **minor adverse**.	With the application of BOEM protective measures (i.e., avoidance, distancing, and shunting requirements), the impacts would be **negligible** to **minor adverse**, similar to Alternative B. Routine impacts to benthic habitats, including protected corals, in the excluded areas would be **none**.	With the application of BOEM's protective measures (i.e., avoidance, distancing, and shunting requirements), the impacts would be **negligible** to **minor adverse**, similar to Alternative B. Routine impacts to benthic habitats, including protected corals, in the excluded areas would be **none**.

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Pelagic Communities and Habitats	Direct and indirect impacts would be **none**.	Overall impacts would be **negligible** to **minor adverse** because of the localized nature of the effects compared to the basin-wide distribution of plankton and *Sargassum* in the northern GOA.	**Negligible** to **minor adverse** similar to Alternative B. Routine impacts to pelagic communities and habitats in the excluded areas would be **none**, but impacts from some IPFs (e.g., vessel strikes and oil spills) could still occur in the excluded areas. Alternative C would not change the overall impact conclusions for pelagic communities and habitats given their wide distribution across the GOA.	**Negligible** to **minor adverse** similar to Alternative B. Routine impacts to pelagic communities and habitats in the excluded areas would be **none**, but impacts from some IPFs (e.g., vessel strikes and oil spills) could still occur in the excluded areas. Alternative D would not change the overall impact conclusions for pelagic communities and habitats given their wide distribution across the GOA.
Fish and Invertebrates	Direct and indirect impacts would be **none**.	Implementation of the proposed action could result in **negligible** to **moderate adverse** impacts on fish and invertebrate resources; however, with the application of BOEM's protective measures (i.e., avoidance, and distancing requirements), the impacts would be reduced to **minor adverse**.	**Negligible** to **minor adverse** similar to Alternative B. However, Alternative C would provide greater protection than Alternative B for highly productive and diverse fish and invertebrate assemblages, including recreationally and commercially managed finfish species, known to inhabit hard bottom habitats like topographic and pinnacle trend features found in the areas excluded from leasing.	**Negligible** to **minor adverse** similar to Alternatives C but may further reduce impacts specific to coastal and estuarine fishes and invertebrates due to additional exclusion areas in nearshore waters.
Birds	Direct and indirect impacts would be **none**.	Impacts from routine activities and most accidental events would likely be **negligible** to **minor adverse**; however, larger oil spill(s) could have up to **moderate adverse** impacts depending on their frequency, duration, geographic extent, and mitigation effectiveness.	**Negligible** to **moderate adverse** similar to Alternative B. Alternative C would not directly or indirectly influence the impact conclusions for birds, including Endangered Species Act (ESA)-listed species, because of their abundance and basin-wide distribution across the northern GOA.	**Negligible** to **moderate adverse** similar to Alternatives B and C. Alternative D would not directly or indirectly influence the impact conclusions for birds, including ESA-listed species, because of their abundance and basin-wide distribution across the northern GOA.

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Marine Mammals	Direct and indirect impacts would be **none**.	Without protective measures, impacts from harmful levels of noise; entanglement, entrapment, or ingestion; accidental vessel strikes; accidental oil-spill contact; and spill-response activities could increase to **major adverse**. Impacts would be **negligible** to **moderate adverse**[2] with the implementation of protective measures.	Similar to Alternative B, **negligible** to **major adverse** without protective measures, reduced to **moderate adverse**[2] with proposed mitigating measures and applicable regulatory requirements. Alternative C would not change the overall impact conclusions for marine mammals given their wide distribution across the GOA, transitory use of the excluded areas, and because impacts from some IPFs (e.g., vessel strikes and oil spills) could still occur in the excluded areas.	Similar to Alternative B, **negligible** to **major adverse** without protective measures, reduced to **moderate adverse**[2] with proposed mitigating measures and applicable regulatory requirements. Alternative D would not change the overall impact conclusions for marine mammals given their wide distribution across the GOA, transitory use of the excluded areas, and because impacts from some IPFs (e.g., vessel strikes and oil spills) could still occur in the excluded areas.
Sea Turtles	Direct and indirect impacts would be **none**.	Without protective measures, impacts from harmful levels of noise; entanglement, entrapment, or ingestion; accidental vessel strikes; accidental oil-spill contact; and spill-response activities could increase to **moderate adverse**. Impacts would be **negligible** to **minor adverse** with the implementation of protective measures for those impact-producing factors (IPFs) subject to the protective measures.	Similar to Alternative B, **negligible** to **moderate adverse** without protective measures, reduced to **minor adverse** with proposed mitigating measures for those IPFs subject to the above-mentioned protective measures and applicable regulatory requirements. Alternative C would not change the overall impact conclusions for sea turtles given their wide distribution across the GOA, transitory use of the excluded areas, and because impacts from some IPFs (e.g., vessel strikes and oil spills) could still occur in the excluded areas.	Similar to Alternative B, **negligible** to **moderate adverse** without protective measures, reduced to **minor adverse** with proposed mitigating measures for those IPFs subject to the above-mentioned protective measures and applicable regulatory requirements. Alternative D would not change the overall impact conclusions for sea turtles given their wide distribution across the GOA, transitory use of the excluded areas, and because impacts from some IPFs (e.g., vessel strikes and oil spills) could still occur in the excluded areas.

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Commercial Fisheries	Direct impacts from the proposed action would be avoided, including any potential beneficial effects from structure emplacement. Indirect effects, if any, from energy substitution due to canceling a single proposed OCS oil and gas lease sale would likely be **negligible**.	**Negligible** to **minor adverse** impacts on commercial fisheries depending on the locations of activities, species affected, intensity of commercial fishing activity in the affected area, and substitutability of any lost fishing access. **Negligible** to **minor beneficial** impacts from artificial reef effects of new OCS infrastructure.	**Negligible** to **minor adverse** and **minor beneficial** impacts similar to Alternative B because overall scenario ranges would remain the same and because there would still be a substantive overlap of available acreage and highly used commercial fishing areas from a regional perspective. However, Alternative C could reduce localized space-use conflicts and potential impacts to commercial fisheries from noise, bottom disturbance, habitat loss, and oil spills in the areas excluded from leasing.	Adverse and beneficial impacts from routine activities would more than likely be reduced to **negligible** considering the vast overlap of most commercial fishing areas and the areas excluded from leasing. However, because large oil spills could still potentially travel into the excluded areas under certain conditions, the potential impacts from accidental events would still range from **negligible** to **minor adverse**.
Recreational Fishing	Direct impacts from the proposed action would be avoided, including any beneficial artificial reef effects from structure emplacement. Any indirect effects because of the precluded leasing and associated activities from a single proposed OCS oil and gas lease sale would be **negligible**.	**Negligible** to **minor adverse** impacts on recreational fishing depending on the locations of activities, species affected, and intensity of commercial fishing activity in the affected area, and substitutability of any lost fishing access. **Negligible** to **minor beneficial** impacts from artificial reef effects of new OCS infrastructure.	**Negligible** to **minor adverse** and **negligible** to **minor beneficial** impacts similar to Alternative B because overall scenario ranges would remain the same and because there would still be a substantive overlap of available leasing acreage and common recreational fishing areas from a regional perspective. However, Alternative C could reduce the probability of some accidental events being experienced in common recreational fishing areas off the Texas and western Louisiana coast.	**Negligible** to **minor adverse** and **negligible** to **minor beneficial** impacts overall, similar to Alternative C, but further reduced off Texas and western Louisiana because of the vast overlap of most recreational fishing areas and the areas excluded from leasing.

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Recreational Resources	Direct impacts from the proposed action would be avoided, including any potential beneficial effects from structure emplacement. Indirect effects, if any, from energy substitution due to canceling a single proposed OCS oil and gas lease sale would likely be **negligible**.	Ranging from **minor beneficial** to **minor adverse** impacts depending on the proximity of activities to recreational resources and the type of recreational use. For example, new infrastructure could improve recreational diving opportunities (i.e., beneficial impact), whereas a large oil spill could reduce beach access and/or visitation.	Ranging from **minor beneficial** to **minor adverse** similar to Alternative B, although the spatial constraints could reduce the probability of some accidental events being experienced in adjacent recreational areas, especially in Texas and western Louisiana.	Potential impacts would be reduced to **negligible** because the majority of recreational use areas near the coastline would be excluded and notably distanced from the available lease areas.
Cultural, Historical, and Archaeological Resources[3]	Direct and indirect impacts would be **none**. However, cancellation of a single proposed OCS oil and gas lease sale would be an incremental reduction in the discovery and knowledge of potential archaeological resources in unleased blocks.	**Negligible** to **minor negative** with the application of survey and mitigation requirements at the post-lease stage. However, where protective measures cannot be applied or adhered to and an accidental event comes into direct physical contact with an archaeological resource, negative impacts to that resource could be **negligible** to **major**.	Ranging from **negligible** to **minor negative** similar to Alternative B.	Ranging from **negligible** to **minor negative** similar to Alternative B.

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Land Use and Coastal Infrastructure	Direct and indirect impacts would be **none**. Cancellation of a single proposed OCS oil and gas lease sale would not be expected to cause any noticeable changes in coastal land use patterns given the expansive existing OCS oil- and gas-related infrastructure and the reasonably foreseeable lease sales.	Overall impacts would be **minor adverse**. New or expanded coastal infrastructure as a result of the proposed action is not likely given the expansive existing OCS oil- and gas-related infrastructure.	Impacts to land use and coastal infrastructure are tied directly to the level of offshore activities, and a lease sale under Alternative C is not expected to alter the forecasted development activity. Therefore, overall impacts would be **minor adverse**, similar to Alternative B.	Impacts to land use and coastal infrastructure are tied directly to the level of offshore activities, and a lease sale under Alternative D is not expected to alter the forecasted development activity. Therefore, overall impacts would be **minor adverse**, similar to Alternative B.
Economic Factors	Short-term impacts would be **negligible** because production from existing leases would continue to largely sustain current economic conditions. Long-term impacts could likely be **minor adverse** given the number of existing active oil and gas leases either currently producing or in their primary term and the sales included in the One Big Beautiful Bill Act.	Ranging from **minor** to **moderate beneficial** impacts from routine activities by sustaining or improving economics and employment in most sectors. Accidental events could have **minor** to **moderate adverse** impacts to fisheries, tourism, or other sectors depending on their magnitude and extent and effectiveness of associated mitigation and response activities. When considering all IPFs together, however, the generally short-term and localized nature or effects of accidental events are somewhat outweighed by the economic benefits from routine activities, resulting in **minor adverse** to **moderate beneficial** overall impacts under Alternative B.	From a regional perspective, Alternative C still leaves substantial areas available for leasing across all water depths, and overall production and activity levels are not expected to significantly differ from Alternative B. Therefore, overall impacts would be similar to Alternative B, ranging from **minor adverse** to **moderate beneficial**.	From a regional perspective, overall impacts would be similar to Alternative B, ranging from **minor adverse** to **moderate beneficial** because overall production and activity levels are not expected to significantly differ from Alternative B. However, a shift to deeper waters could have a disproportionate adverse impact on some operators that rely heavily on shallow-water operations, as most acreage in water depths <200 m (656 ft) would not be offered under Alternative D.

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Social Factors	Direct and indirect impacts would be **negligible**. Cancellation of a single proposed OCS oil and gas lease sale would not be expected to result in a notable adverse impact to regional employment or other social factors.	Routine activities could lead to **minor beneficial** to **negligible adverse** impacts because of the existing extensive and widespread support system for the petroleum industry and its associated labor force. Accidental events could have **negligible** to **moderate adverse** impacts if remedial or mitigating measures are necessary before the affected community can return to prior conditions.	**Minor beneficial** to **negligible adverse** for routine activities and **negligible** to **moderate adverse** for accidental events, similar to Alternative B. However, removal of the wind energy areas, SSRAs, and other blocks could reduce the probability of some accidental events being experienced in adjacent coastal areas, especially in Texas and western Louisiana.	**Minor beneficial** to **negligible adverse** for routine activities and **negligible** to **moderate adverse** for accidental events, similar to Alternative B. However, removal of the wind energy areas, SSRAs, and other blocks could reduce the probability of some accidental events being experienced in adjacent coastal areas, especially in Texas and western Louisiana.

[1] The term “adverse” has a specific meaning under the Clean Air Act (CAA). Therefore, to avoid confusion in the air quality analysis, the term “negative” is used in the identification of impacts under NEPA and should not be interpreted as synonymous with “adverse” impacts as defined under the CAA.

[2] In the unlikely event of a strike on an ESA-listed whale, the determination could be up to major.

[3] The term “adverse” has a specific meaning under the National Historic Preservation Act (NHPA). Therefore, to avoid confusion in the cultural, historical, and archaeological resources analysis, the term “negative” is used in the identification of impacts under NEPA and should not be interpretated as synonymous with “adverse” impacts as defined under the NHPA.

CHAPTER 3

ACTIVITIES, SCENARIOS, AND IMPACT-PRODUCING FACTORS

3 ACTIVITIES, SCENARIOS, AND IMPACT-PRODUCING FACTORS

3.1 INTRODUCTION

This chapter describes offshore oil- and gas-related activities and the scenarios developed to analyze and project the range of future routine, accidental, and cumulative activities. The impact-producing factors (IPFs) associated with a representative proposed oil and gas lease sale in the GOAR under any of the action alternatives are also introduced. **Chapter 3.2** describes activities that occur during oil and gas development resulting from a single representative proposed GOAR oil and gas lease sale. Three distinct scenarios (ongoing, single OCS oil and gas lease sale, and cumulative) are presented in **Chapter 3.3** to forecast the range of activities that could occur within a proposed OCS oil and gas lease sale area, and to group these activities within the context of their associated IPFs. **Chapters 3.4**, **3.5**, and **3.6** introduce the IPFs that may result from routine OCS oil and gas development activities, accidental events, and cumulative activities, respectively that could potentially affect biological, physical, and socioeconomic resources. See **Appendix B**, and Chapters 1.3.3 and 2 of the GOM Oil and Gas SID for additional detailed descriptions of these activities and IPFs. As described below, this information is incorporated by reference.

What is a Scenario?

A scenario provides an estimate of the level of offshore activity that could result from a proposed action. **Figure 3.1-1** depicts the location on the Gulf of America OCS of the offshore subareas or water-depth ranges. The water-depth ranges were developed to reflect the technological requirements, related physical and economic impacts as a consequence of the oil and gas potential, exploration and development activities, and lease terms unique to each water-depth range. **Chapter 3.3.2** explains the relationship between the ongoing, single OCS oil and gas lease sale, and cumulative scenarios and the range of alternatives considered in this Programmatic EIS. The proposed action scenarios and activity levels were developed based on the following factors:

- recent trends in the amount and location of OCS seismic survey vessel activity, leasing, exploration, development, and decommissioning activity;
- historical oil and gas prices, price trends, oil and gas supply and demand, and related factors that influence oil and gas product-price and price volatility;
- estimates of undiscovered, unleased, conventionally recoverable OCS oil and gas resources;
- existing offshore and onshore oil and/or gas infrastructure and resource availability (e.g., drilling rig availability);
- industry information; and
- oil- and gas-related technologies, and the economic considerations and environmental constraints of these technologies.

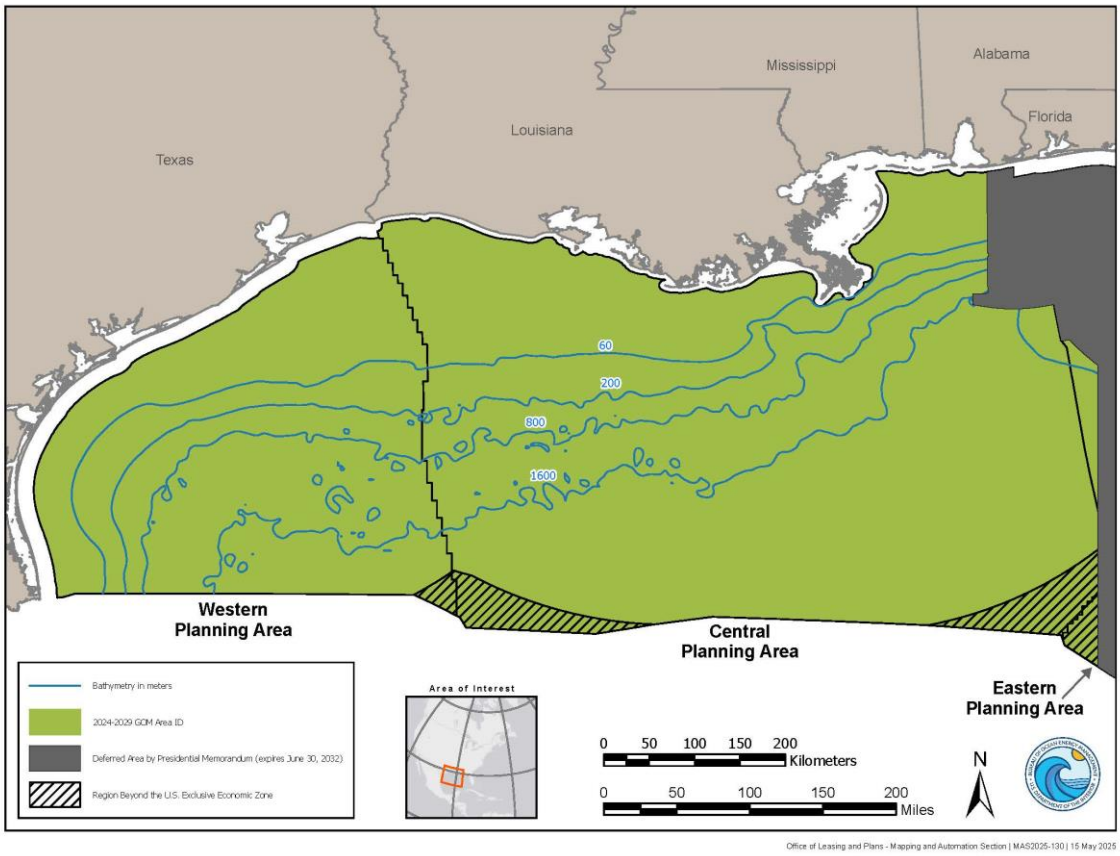

Figure 3.1-1.Offshore Subareas in the Gulf of America.

The analyses are compared with actual historical activity and infrastructure data to ensure that historical precedent, as well as recent trends, are reflected in each activity forecast. Due to the inherent uncertainties associated with an assessment of undiscovered resources, the scenarios are reported as a range of values corresponding to probabilities of occurrence. The low and high OCS oil and gas production scenarios, and the factors that influence them, are used to create the range in anticipated oil and gas activity. Scenario ranges provide flexibility to characterize the full range of potential impacts that could occur under each of the proposed action alternatives.

What is an Impact-Producing Factor?

An IPF is the outcome or result of any proposed or ongoing OCS oil- and gas-related activities with the potential to affect (positively or negatively) physical, biological, cultural, and/or socioeconomic resources. These IPFs are grouped into “issue” categories based on BOEM’s internal and external scoping on this Programmatic EIS and consideration of the extensive history of public input received through previous and ongoing assessments and outreach efforts. Both OCS and non-OCS oil- and gas-related activities can contribute to one or multiple IPF categories.

How are the Impact-Producing Factors Categorized?

Routine OCS Oil- and Gas-Related Activities. These are routine operations that generally occur during the lifetime of a lease. The activities are broken down by phase and include exploration, development, oil or gas production and transport, and decommissioning as discussed in **Chapter 3.4** and **Appendix B** of this Programmatic EIS and Chapter 1.3.3 of the GOM Oil and Gas SID. These descriptions are applicable to activities resulting from the proposed action (i.e., a single representative proposed OCS oil and gas lease sale), as well as activities resulting from existing and future GOA oil and gas leases.

Accidental OCS Oil- and Gas-Related Events. Types of accidental events include releases into the environment (e.g., oil spills, loss of well control, accidental air emissions, pipeline failures, chemical and drilling fluid spills, and trash and debris), response activities, and collisions or vessel strikes (e.g., vessel to vessel and vessel striking a marine resource). Reasonably foreseeable accidental events associated with OCS oil and gas development are discussed in **Chapter 3.5** and **Appendix B** of this Programmatic EIS and in Chapter 2.9 of the GOM Oil and Gas SID.

Cumulative Activities. Past, present, and reasonably foreseeable activities occurring within the same time or place and could result in cumulative impacts. The Cumulative OCS Oil and Gas Program scenario includes all activities (i.e., routine OCS oil- and gas-related activities and accidental events, as described above) from past, proposed, and future GOAR oil and gas lease sales (**Chapter 3.6.1** and **Appendix B.4.1**). The ongoing OCS oil and gas scenario in **Table 3.3-2** includes present and future activities only resulting from past GOAR oil and gas lease sales as ongoing activities. Non-OCS oil- and gas-related past, present, and reasonably foreseeable cumulative activities are those considered independent of OCS oil and gas leasing. These activities are reasonably expected regardless of whether OCS oil and gas leasing and associated activities occur. These other related impact-producing factors or activities are described below in **Chapter 3.6.2** and **Appendix B.4.2** and within each IPF category under the subheading “Non-OCS Oil- and Gas-Related Activities” in Chapter 2 of the GOM Oil and Gas SID.

3.2 Phases of OCS Oil and Gas Development Resulting from a GOA Oil and Gas Lease Sale

The OCS oil- and gas-related operations resulting from a single GOAR oil and gas lease sale generally occur in five phases: (1) remote sensing of subsurface formations and structures with seismic surveying; (2) exploration to locate viable oil or natural gas deposits; (3) development well drilling, structure construction, and pipeline installation; (4) operation (oil or gas production and transport); and (5) decommissioning of facilities and pipelines once a reservoir is no longer productive or profitable (**Figure 3.2-1**). These activities are briefly described below with additional information provided in Chapter 1.3.3 of the GOM Oil and Gas SID and a description of the post-lease permitting and approval process in Chapter 5 of the GOM Oil and Gas SID. As described in **Chapter 3.2.1**, G&G surveys may occur before leasing takes place and are included in **Table 3.3-3**.

The estimated level of activity associated with each phase of development is also provided in **Chapter 3.3.**

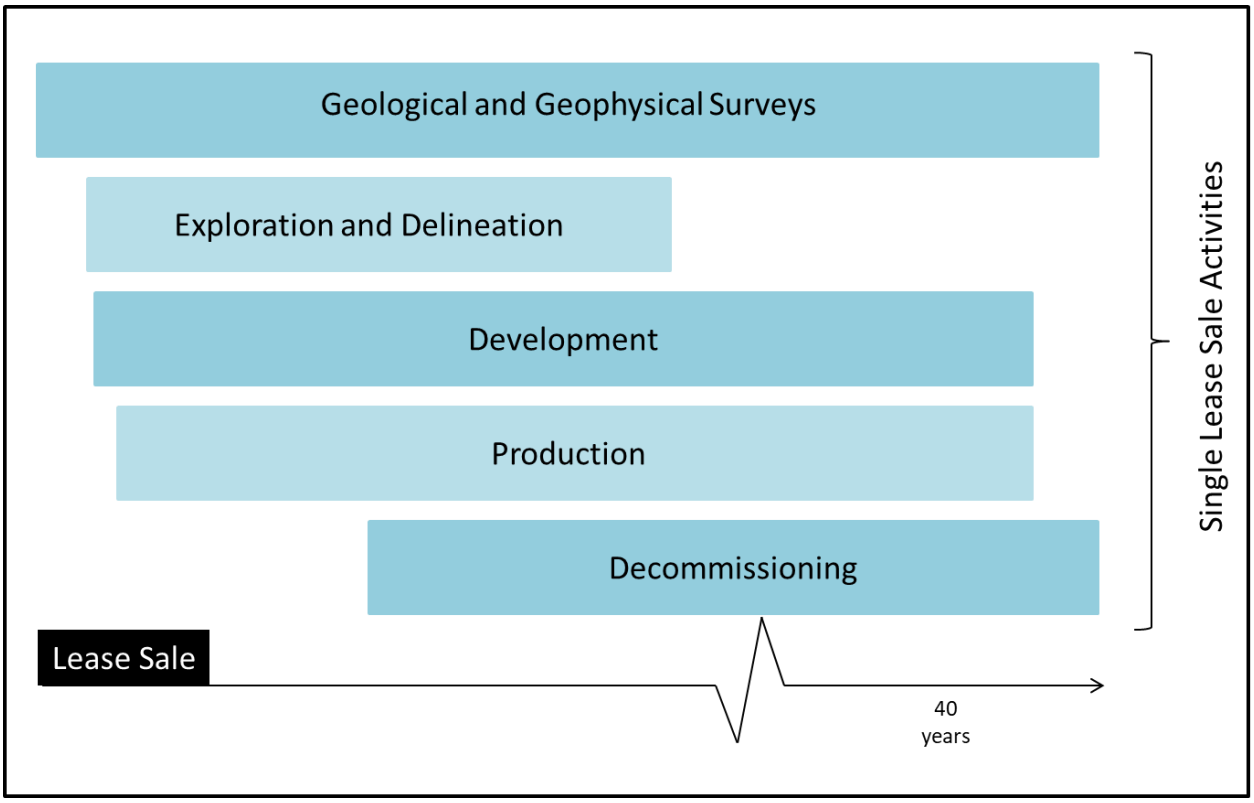

Figure 3.2-1. Phases of OCS Oil and Gas Activity Resulting from a Single Proposed GOAR Oil and Gas Lease Sale over 40 Years.

Activities would occur on OCS leases only after a proposed OCS oil and gas lease sale is held. Forecasts indicate that the significant activities associated with exploration, development, production, and abandonment of leases in the GOA occur within the 40-year analysis period of a single proposed OCS oil and gas lease sale. Unusual cases exist where activity on a lease may continue beyond 50 years. For example, subsea activity could potentially increase the lifespan of platforms from older OCS oil and gas lease sales. In these instances, a subsea well may be drilled on a lease acquired during the proposed OCS oil and gas lease sale but tied back to an existing platform from a previous OCS oil and gas lease sale.

Across all phases of development, offshore service vessels are one of the primary modes of transporting personnel and supplies between service bases and offshore structures, drilling rigs, derrick barges, and pipeline construction barges. In addition to personnel, service vessels carry cargo offshore (i.e., freshwater, fuel, cement, barite, liquid and recycled drilling fluids, tubulars, equipment, and food). Service vessels were evaluated for the following categories: wells (exploration and development drilling); well workovers; plug and abandonment of wells; structure installation; structure operation; structure decommissioning; subsea installation; subsea removal; and pipeline installation and decommissioning. Other offshore vessel operations, including geological sampling

and seismic surveying activity associated with a leasing event, is assumed to be covered in the estimates provided in **Table 3.3-2**.

Helicopters are the only aircraft used for transporting personnel between service bases and offshore platforms, drilling rigs, derrick barges, and pipeline construction barges. Helicopters are routinely used for normal crew changes and at other times (such as emergencies) to transport management and special service personnel to offshore exploration and production sites. In addition, equipment and supplies are sometimes transported. An operation is considered a roundtrip and includes takeoff and landing.

3.2.1 Geological and Geophysical (G&G) Surveys

A variety of G&G surveys are conducted in support of OCS oil- and gas-related activities to (1) determine if there is industry interest for oil and gas leasing in the area, (2) obtain data for exploration and production, (3) aid in siting offshore infrastructure (e.g., production platform or pipeline routes), (4) identify possible seafloor or shallow depth geologic hazards, and (5) locate potential archaeological resources and potential hard bottom habitats for avoidance. The G&G activities for oil and gas exploration may occur either before leasing takes place (prelease; assessing interest) or after authorization of an existing lease (post-lease; project-related ancillary activities such as vertical seismic profiling, a method used to calibrate seismic data with well log data). The types of G&G surveys conducted for oil and gas exploration and development are summarized in **Table 3.2-1**. More detail on each survey type can be found in Chapter 1.3.3 of the GOM Oil and Gas SID and Appendix F of the *Gulf of Mexico OCS Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas; Final Programmatic Environmental Impact Statement* (BOEM 2017a).

The scenario evaluated in this Programmatic EIS includes ancillary activities. As defined in 30 CFR 550.105, ancillary activities are those activities on a lease that are: (1) conducted to obtain data and information to ensure proper exploration or development of a lease; and (2) can be conducted without BOEM approval of an application or permit. Other non-ancillary, post-lease G&G activities resulting from a single proposed GOA oil and gas lease sale are subject to additional BOEM review and approval. Post-lease activities (ancillary or other) conducted by operators can include additional seismic surveys, non-airgun high-resolution geophysical (HRG) seismic surveys, and seafloor sampling, including via stratigraphic wells, shallow test wells, and geotechnical sampling. BOEM oversees G&G data acquisition and permitting activities pursuant to regulations at 30 CFR 550 and 551. Post-lease activities can occur on an existing lease authorized by OCS plan approvals, plan revisions, or by a required notification to BOEM before certain ancillary activities are undertaken. Guidance for each type of ancillary activity, the type and level of BOEM review, follow-up actions, and post-survey report requirements are provided in NTL No. 2009-G34. If BOEM determines that the type of proposed ancillary activity necessitates revising an existing OCS plan (which would have been subject to an initial NEPA review), another NEPA review is triggered on the revision to the plan.

Table 3.2-1. Geological and Geophysical Survey Types.

Category and Purpose(s)	Survey Type
Deep-Penetration Seismic Surveys – Most, if not all, deep-penetration seismic surveys use airguns. Seismic surveys evaluate subsurface geological formations to assess potential hydrocarbon reservoirs and optimally site exploration and development wells. The 2D surveys provide a cross-sectional image of the Earth's structure while 3D provides a volumetric image of underlying geological structures. Repeated 3D surveys result in time lapse, or 4D, surveys that assess the depletion of a reservoir. Borehole seismic surveys provide information about geologic structure, lithology, and fluids.	2D Seismic Surveys 3D Seismic Surveys Ocean-Bottom 2D Seismic Surveys (cable or nodes) Ocean-Bottom 3D Seismic Surveys (cable or nodes) Wide-Azimuth and Related Multi-Vessel Surveys 3D Coil Surveys (source vessel uses circular sailing pattern instead of a rectilinear pattern) Borehole Seismic Surveys (2D and 3D VSP surveys and SWD) Vertical Cable Surveys 4D Time-Lapse Surveys
Airgun High-Resolution Geophysical (HRG) Surveys – A single, small airgun used to assess shallow hazards, benthic habitats, bottom-founded structure emplacement.	High-Resolution Seismic Surveys[A]
Non-Airgun Acoustic High-Resolution Geophysical (HRG) Surveys – Assess shallow hazards, potential sand and gravel resources and dredging borrow pit design for coastal restoration, archaeological resources, and benthic habitats. The HRG surveys are run with a suite of tools, indicated at right, during the same deployment.	Subbottom Profiling Surveys[AB] Side-Scan Sonars[AB] Single-Beam and Multibeam Echosounders[AB] Magnetometers
Non-Acoustic Marine Geophysical Surveys – Electromagnetic signals are used to develop a conductivity/ resistivity profile of the seafloor, helping to identify economic hydrocarbon accumulations and aid with archaeological surveys.	Marine Gravity Surveys Marine Magnetic Surveys Marine Magnetotelluric Surveys Marine Controlled Source Electromagnetic (CSEM) Surveys
Airborne Remote Surveys – Gravity and magnetic surveys are used to assess structure and sedimentary properties of subsurface horizons. Airborne magnetic surveys evaluate deep crustal structure, salt-related structure, and intra-sedimentary anomalies.	Airborne Gravity Surveys Airborne Magnetic Surveys

Category and Purpose(s)	Survey Type
Geological and Geotechnical Surveys – Collect bottom water samples, surface and near-surface sediment samples to assess seafloor properties for siting structures such as platforms, pipelines, or cables. Geologic coring is also used to assess sediment characteristics for use in coastal restoration projects. Shallow test drilling is conducted to place test equipment into a borehole to evaluate gas hydrates or other properties. The deeper COST wells evaluate stratigraphy and hydrocarbon potential without drilling directly into oil- and gas bearing strata.	Grab and Box Sampling[AB] Geologic Coring[AB] Shallow Test Drilling[A] COST Wells[A] Cone Penetrometer Tests[A]
Other Surveys and Equipment – The devices in this category assist in the execution of surveys, either by providing location or facilitating underwater service tasks. Additionally, water guns are no longer used as a seismic source except in extremely rare instances.	Acoustic Pingers (including Pressure Inverted Echo Sounders [PIES])[A] Wave Gliders Transponders, Transceivers, Responders[A] ROVs and AUVs[A]

2D = two-dimensional; 3D = three-dimensional; 4D = four-dimensional; AUV = autonomous underwater vehicle; COST = continental offshore stratigraphic test; HRG = high-resolution geophysical; ROV = remotely operated vehicle; SWD = seismic while drilling; VSP = vertical seismic profile.

[A] Survey type also applicable to BOEM Renewable Energy Program Activities.

[B] Survey type also applicable to BOEM Marine Minerals Program Activities.

3.2.2 Exploration and Delineation

Exploration for OCS oil and gas is the process of searching for and characterizing hydrocarbon resources. The exploration stage involves G&G surveys (including seismic surveys, high-resolution geophysical (HRG) surveys, controlled source electromagnetic surveys, and gravity and magnetic surveys), sediment sampling, and exploratory drilling. The most reliable way to determine whether the identified formations or structures contain hydrocarbons is to drill into them; however, the decision to drill is not made solely on geological grounds. Government requirements, economic factors (drilling costs, transport costs, market conditions, relative merit/financial risk), and technical feasibility (including safety and environmental considerations) are all factored into the decision. Following an OCS oil and gas lease sale, exploratory drilling activity would likely occur early during a lease term (determined by water depth) but could begin within one year.

If a resource is discovered during the drilling of an exploration well in quantities appearing to be economically viable, one or more follow-up “delineation” or “appraisal” wells are drilled to determine the size and the extent of the field. In the GOA, exploration and delineation wells are typically drilled from mobile offshore drilling units (MODUs). The MODUs are self-contained with their own power generation, static (anchored) or dynamic positioning system, utilities, and living quarters. Supplies are brought to the rig and wastes are returned to shore by supply boat; crews are transferred on and off the rig by helicopters and/or service vessels. These types of service vessels (including supply boats) are included in the scenario estimates for service vessel trips. Once the rig

is fixed in position, drilling of the well begins. Drilling operations are typically conducted around-the-clock, generally over 1-3 months, depending on the depth of the hydrocarbon formation and the geological conditions as described in Chapter 1.3.3.2 of the GOM Oil and Gas SID.

3.2.3 Development

Development drilling differs from exploratory drilling in that the hydrocarbon resource has been identified and delineated. The objective is to target formations or structures as efficiently as possible so as to not drill more wells than is necessary to produce the reservoir. Should an operator decide to move forward with producing a well, completion operations must be undertaken. The type of well completion used to prepare a well for production is based on the rock properties of the reservoir as well as the properties of the reservoir fluid. However, for the vast majority of well completions, the typical process includes installing or “running” the production casing; cementing the casing; perforating the casing and surrounding cement; injecting water, brine, or gelled brine as carrier fluid for a “frac pack” (sand, ceramic beads, or other proppant); treating/acidizing the reservoir formation near the wellbore; installing production screens; running production tubing; and installing a production tree. Most development well drilling would likely occur in the first 25 years of each OCS lease.

3.2.4 Production

Production of OCS oil and gas on a lease could begin as early as 3 years after an OCS oil and gas lease sale. There is a range of offshore infrastructure installed for hydrocarbon production, including bottom-fixed and floating platforms, caissons, well protectors, casing, wellheads, flowlines and risers, manifolds, jumpers, flowline support sleds, subsea systems, pipelines (including supply lines), and conductors. **Figure 3.2-2** illustrates the types of fixed and floating production facilities used at various water depths. More information on each structure is presented in Chapter 1.3.3.4 of the GOM Oil and Gas SID. Platform installations occurring in earlier years of a lease would most likely be caissons and small fixed platforms in shallow water. Floating structures installed in deeper water would take several years to construct and install and tend to take first production later in the life cycle of a lease.

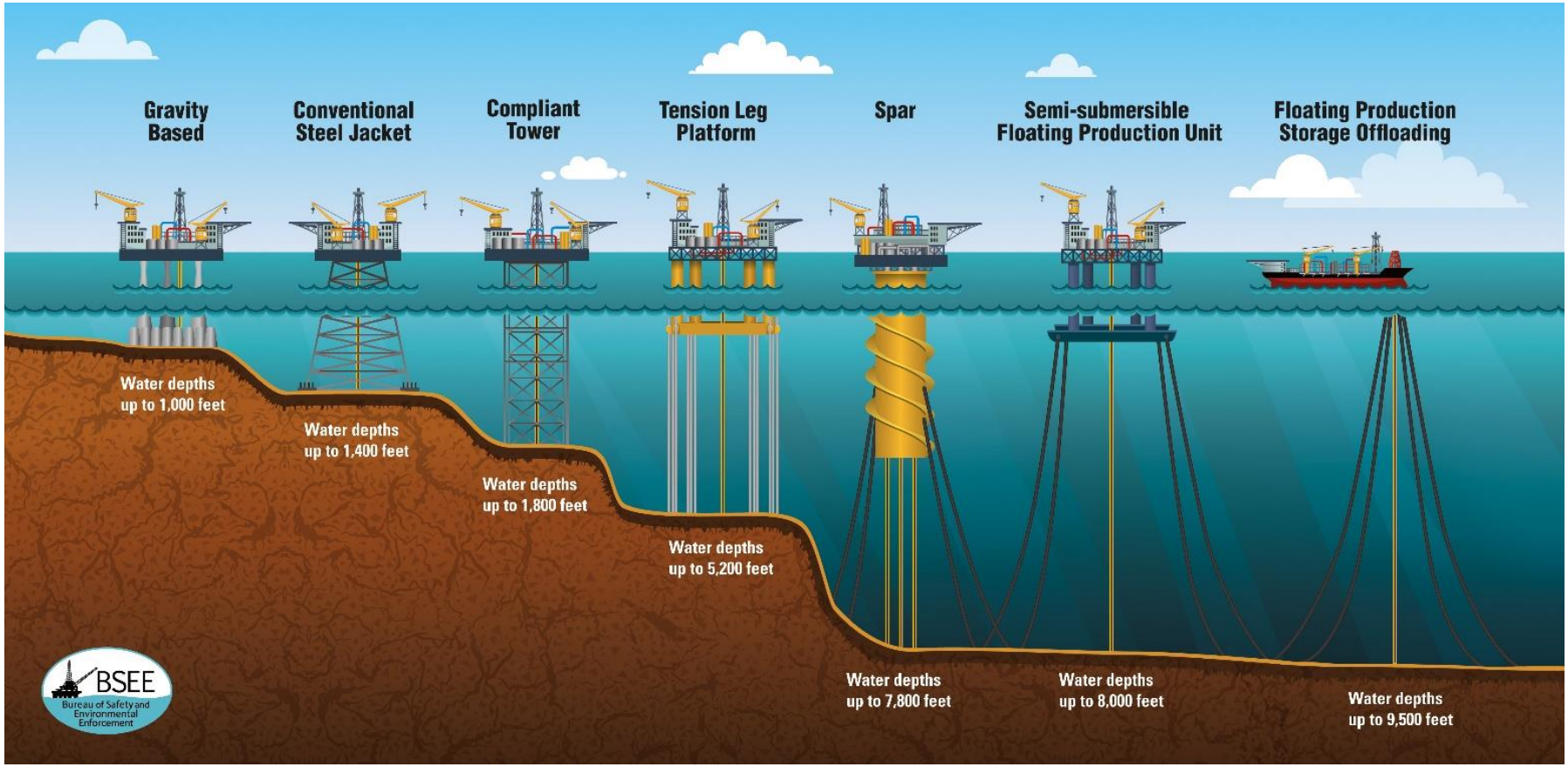

Figure 3.2-2. Examples of Offshore Production. Source: Bureau of Safety and Environmental Enforcement Examples of Production Platforms 2020.

An expansive pipeline network is the primary method used to transport a variety of liquid and gaseous products between OCS production sites and onshore facilities around the GOA (see Chapter 1.3.3.4 of the GOM Oil and Gas SID). This network includes supply lines that can transport gas from onshore to offshore facilities. BOEM projects that the majority of new pipelines constructed as a result of a proposed action would connect to the existing pipeline infrastructure offshore or in State waters. BOEM projects that 0-1 new pipeline landfalls could result from a proposed GOA oil and gas lease sale; however, only two new pipeline landfalls, which occurred in 2024, have been permitted since 2014. Historically, barging in the GOA has accounted for less than 1 percent of the oil transported for the entire OCS Oil and Gas Program, and it is assumed that this trend would continue overall and for any single proposed GOA oil and gas lease sale. Shuttle tankers are used to transport crude oil from floating production, storage, and offloading (FPSO) systems to Gulf Coast refinery ports or to offshore deepwater ports such as the Louisiana Offshore Oil Port. The FPSOs are projected to occur only in water depths greater than 1,600 m (5,250 ft). Oil from an FPSO is expected to be 100 percent tankered, while oil from another type of floating platform is expected to be 100 percent piped. See Chapter 2.9.3.3 of the GOM Oil and Gas SID for more information on vessel traffic.

Completed and producing offshore wells may require periodic reentry that is designed to maintain or restore a desired flow rate. These procedures are referred to as a well “workover.” Workover operations are also carried out to evaluate or reevaluate a geologic formation or reservoir (including recompletion to another stratum) or to permanently abandon a part or all of a well. Workovers on subsea completions require that a rig be moved on location to provide surface support. Workovers can take from 1 day to several months to complete depending on the complexity of the operations, with a median of 7 days. Based on historical data, BOEM projects that a producing well may have seven workovers or other well activities during its active lifetime (typically every 3-5 years).

3.2.5 Decommissioning

Decommissioning activities apply to wells, structures, pipelines, and other appurtenances (e.g., manifolds, jumpers, subsea systems), as summarized below, with expanded descriptions in **Appendix C**, and Chapters 1.3 and 2.3.1 of the GOM Oil and Gas SID. Structures are generally grouped into two main categories based on their relationship to the platform/facilities (e.g., piles, jackets, caissons, templates, mooring devices) or the well (e.g., wellheads, casings, casing stubs).

In compliance with Section 22 of BOEM’s Oil and Gas Lease Form (BOEM-2005) and BSEE regulations (30 CFR 250.1710 and 30 CFR 250.1725), operators must remove seafloor obstructions from their leases within one year of lease termination or after a structure has been deemed obsolete or unusable. Further, Federal regulations require that offshore leases be cleared of all structures within one year after production on the lease ceases, while infrastructure no longer useful for operations must be removed pursuant to BSEE-specified time frames (30 CFR 250.1703). Approvals for all structures, pipelines, appurtenances, and other types of equipment, whether removed or decommissioned in place (DIP), typically include additional site-specific NEPA review by BOEM. The

appropriate level of NEPA analysis is completed for all structure removals that propose explosive severance methods and/or site clearance trawling (see Chapter 5 of the GOM Oil and Gas SID).

Infrastructure that is no longer useful for operations must be decommissioned pursuant to 30 CFR 250.1703. “Idle iron,” as it is termed, can include wells, structures, and pipelines. To provide additional guidance to lessees and Rights-of-Way and Right-of-Use-and Easement (ROW/RUE) holders on their decommissioning obligations for idle infrastructure, BSEE developed NTL No. 2018-G03 to clarify when they may deem infrastructure “no longer useful for operations” and “not capable of oil, gas, and sulfur production in paying quantities” and the associated timeframes for decommissioning. Once the Decommissioning Plan is approved, the obligated entity is required to perform the decommissioning work in compliance with the specified schedules and procedures. Safety and environmental-compliance inspections are maintained on idle infrastructure, prior to and after issuance of the BSEE orders noted above, in accordance with field compliance priorities outlined in the Gulf of America Region’s Annual Inspection Plan.

Two types of well abandonment operations — temporary and permanent — can occur at any of the phases of a well. An operator may temporarily abandon or “suspend” a well to (1) allow detailed analyses or additional delineation wells while deciding if a discovery is economically viable, (2) save the wellbore for a future sidetrack to a new geologic bottom-hole location, or (3) wait on design or construction of special production equipment or facilities. Permanent abandonment operations are undertaken when a wellbore is of no further use to the operator (i.e., the well is a dry hole or the well’s producible hydrocarbon resources have been depleted). Wells are considered decommissioned once permanent abandonment procedures have been completed. Production structures are generally removed from the seafloor at the end of their useful life. Some structures may qualify for BSEE’s Rigs-to-Reefs program and can be repurposed as artificial reefs in the GOA (Chapter 5.3 of the GOM Oil and Gas SID). As of 2024, over 600 decommissioned oil and gas structures have been reefed in the GOA (BSEE 2025a). As of March 2025, about 35 percent of platform removal applications proposed relocating through the rigs-to-reefs program (BSEE 2025c). BSEE generally does not approve decommissioning in place for pipelines installed in areas of the GOA determined to have near-surface sand or mixed sediments that could be valuable for flood control or coastal restoration or that cross navigational fairways. To make the sediment available for these purposes or navigational fairways clear, BSEE typically requires the pipeline operator to excavate and remove a pipeline to avoid space-use conflicts with dredging operations or safe navigation.

Various severing devices and methodologies are designed to cut structural targets during decommissioning activities. These devices are generally grouped and classified as either nonexplosive or explosive, and they can be deployed and operated by divers, remotely operated vehicles, or from the surface. Processes for infrastructure removal are discussed in greater detail in **Appendix C**, as well as Chapters 2.3.1.3 and 5 of the GOM Oil and Gas SID.

Decommissioned structures not suitable for reefing or decommissioning in place are brought back to shore for end-of-life processing. Many materials are returned to their manufacturing or

assembly companies for refurbishment and reuse after decontamination. Metallic materials not able to be reused are taken to specialized fabrication or scrap yards for decontamination and to begin the scrapping process. Virtually no steel (with the exception of some pilings and conductors cased in cement) is typically landfilled (Dismukes et al. 2007). Non-metallic materials not able to be recycled are transferred to landfills according to necessary state and local permitting.

BSEE regulations currently do not require companies to report the actual weight of material removed during decommissioning. However, in 2003, an MMS (BOEM's predecessor) funded study estimated that approximately 62,270 tons (137,281,851 lbs) of deck and jacket steel from Gulf of America OCS oil and gas structures were decommissioned (Kaiser and Pulsipher 2007). It is important to note that these estimates were based on algorithms and assumptions (e.g. production capacity and water depth) generated by the study authors, and not on actual reported data (Kaiser and Pulsipher 2007). Though not a forecast, these data provide a credible and useful approximation of the annual tonnage that could be expected from cumulative OCS decommissioning in the GOA based on past and foreseeable trends. While structures, rigs, and marine vessels do contribute to scrap supply in coastal communities and regional economies, Kaiser and Pulsipher also observed that they are "considered marginal contributors to total supply" when compared to other scrap sources (Kaiser and Pulsipher 2010). See **Appendix C.4** for additional information on reuse and scrapping of OCS infrastructure.

Decommissioning Trends

Since the 1940s, the offshore oil and gas industry has installed more than 55,000 wells and 8,000 platforms in the GOA. As the GOA region has matured and fields deplete, decommissioning activity has increased and active structure inventory has steadily declined. From 2015 to 2024, an average of 411 wells per year were permanently plugged-and-abandoned, totaling 4,109 wells decommissioned within that timeframe (**Table C.2-1**) (ONRR 2020). As of March 31, 2025, 1,360 structures (i.e., caissons, well-protector structures, and jacketed and floating facilities) remain on the Gulf of America OCS. New discoveries may still be made in the region but the contribution of new structures relative to decommissioning activity would be negligible overall, with more structures being removed than installed on average annually (**Figure 3.2-3**). From 2015-2024, the offshore energy industry has averaged 104 platform removals per year, 99 percent of which being in water depths less than 656 ft (200 m) (**Table C.2-2**). This is due in part to the small number of deepwater structures installed annually, as well as the substantial capital expenditures and planning required in development and execution. Similar decommissioning rates in water depths greater than 656 ft (200 m) are expected in the years ahead.

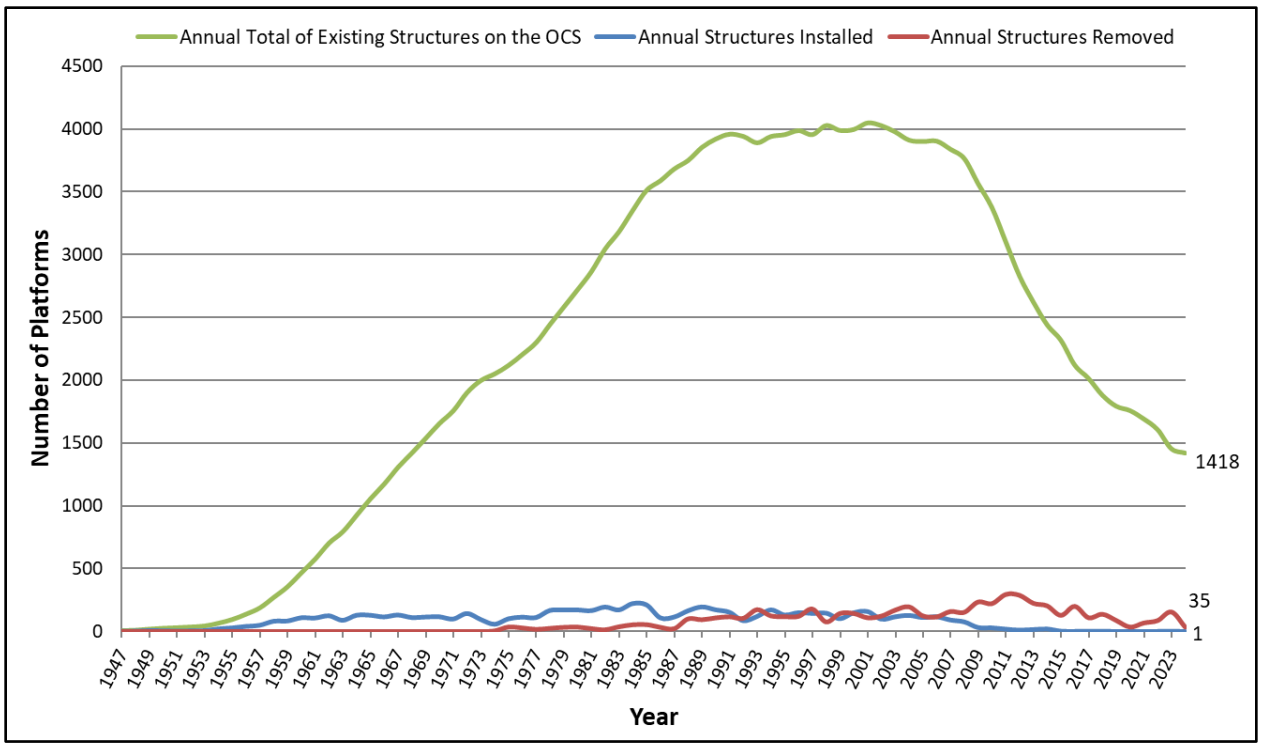

Figure 3.2-3. Structures Installed, Structures Removed, and Total Existing Structures on the OCS Annually from 1947-2024.

Based on trends from 2013 to 2022, about 65 percent of future platform removal permit applications are anticipated to request authorization for the use of explosive severing methods, often as a back-up cutter when non-explosive methodologies prove unsuccessful (Welsch, official communication, 2023). Forecasted platform decommissionings by water-depth range for ongoing, single OCS oil and gas lease sale, and cumulative OCS Oil and Gas Program scenarios are shown in **Table 3.3-2**. Of the 3,317-8,895 production structures estimated to be decommissioned from the GOA in the Cumulative OCS Oil and Gas Program scenario, 1,374-4,725 production structures (installed landward of the 200 m [656 ft] isobath) could seek approval to be removed using explosives. This would equate to an average of 20-68 structures removed annually using explosives over the next 70 years. It is important to note, however, that this represents a conservatively high activity range and the actual use of explosives are statistically likely to be far less based on historic trends. From 2015 to 2024, for example, while about 65 percent of applications requested approval for the use of explosives, the actual use of explosive severances occurred on only approximately 18 percent of removals (**Table C.2-3**). Applying an assumption of 18 percent would equate to a much lower average of 8-23 actual structures removed annually using explosives.

From 2015 to 2024, roughly 5,657 mi (9,104 km) of pipeline were decommissioned; approximately 94 percent of which was abandoned in place in accordance with the requirements at 30 CFR 250.1750-51 (**Table C.2-4**), while the other 6 percent was removed (**Table C.2-5**). It is anticipated that most offshore pipelines and appurtenances (e.g., subsea systems, pipeline end modules, subsea tie-in, manifolds, jumpers, pipeline end terminals, umbilical lines, etc.) would continue being decommissioned in place if they do not constitute a hazard (obstruction) to navigation

and commercial fishing operations, unduly interfere with other uses of the OCS, or have adverse environmental effects, as allowed under certain conditions in 30 CFR 250.1750. See **Appendix C** for more information.

As of May 2025, estimated current decommissioning liabilities for existing OCS facilities were between $33 and $48 billion (BSEE 2025b; GAO 2024). Shallow water liabilities, i.e., those in water depths less than 200 m, make up about 26 percent of the total and are expected to decrease by about 55 percent over the next 20 years, as the number of facilities decommissioned is projected to be greater than the number installed. Deepwater liability levels make up about 74 percent of the total, and are expected to remain constant over the next 20 years as facilities are decommissioned at roughly the same rate they are installed in water depths greater than 200 m (BOEM 2024d).

3.2.6 New and Unusual Technology

Technologies continue to evolve to meet the technical, environmental, and economic challenges of offshore oil and gas development, especially in deepwater. Because such advances in technology cannot be predicted with certainty, BOEM reviews all submitted OCS plans and applications to identify any proposal to use new or unusual technologies (NUTs) to develop a lease. If it is determined in a NUT review that the proposed technology creates an effect on safety and environment that is greater than conventional (proven) technology, an EA will be required for the submitted plan or application. Some of the technologies proposed for use may actually be extended applications of existing technologies and interface with the environment in essentially the same way as well-known or conventional technologies. These technologies are also reviewed by BOEM for alternative compliance or departures that may trigger additional environmental review. More information can be found in Chapter 5.2.3.4 of the SID.

3.3 Overview of Activities, Scenario, and Impact-Producing Factors

3.3.1 Timetables and Production Estimates

Offshore oil and gas leases range in duration depending on hydrocarbon production on the lease. BOEM projects that the overwhelming majority of the oil and natural gas fields discovered in the GOA as a result of a single representative OCS oil and gas lease sale would reach the end of its economic life within a time span of 40 years based on historic activity trends analyzed in the scenario. Exploration and development activity forecasts become increasingly uncertain as the length of time of the forecast increases. It is possible that due to a number of influencing factors and unusual cases that may exist, activity on a lease might continue beyond 40 years. However, the activities associated with exploration, development, production, and decommissioning of leases in the GOA (**Chapter 3.2**) have been assumed to occur within a 40-year analysis period due to BOEM's analysis of historic activity trends.

The Cumulative OCS Oil and Gas Program scenario was developed with an analysis period of 70 years or 2024-2093. This scenario encompasses ongoing oil and gas production anticipated from existing GOA leases, the 40-year analysis period for a single proposed OCS oil and gas lease

sale, as well as the analysis period for activities associated with reasonably foreseeable future proposed OCS oil and gas lease sales. Recent development trends show that almost all activities from a single proposed OCS oil and gas lease sale occur within a 40-year period, with some extending up to 50 years. Therefore, BOEM used a 40-year analysis period for the single lease sale scenario but, since some could extend up to 50 years, BOEM conservatively used a 70-year time period for the cumulative scenario. It is important to note that a single proposed OCS oil and gas lease sale, no matter which alternative is selected, would represent only a small incremental contribution (0.1 to 4.2 percent) to the overall Cumulative OCS Oil and Gas Program activity forecasted to occur in the GOA between 2024 and 2093. Further information about the Cumulative OCS Oil and Gas Program scenario can be found in **Chapter 3.6.1** and **Appendix B.4**.

Table 3.3-1 presents the ranges of projected offshore oil and gas production for ongoing oil and gas production anticipated from existing GOA leases, a single representative proposed OCS oil and gas lease sale, and for the Cumulative OCS Oil and Gas Program (2024-2093).

Table 3.3-1. Range of Projected Oil and Gas Production Resulting from Leasing Activity in the Gulf of America OCS.

Reserve/Resource Production	Ongoing	Single OCS Oil and Gas Lease Sale	OCS Cumulative (2024-2093)
Oil (BBO)	5.819-12.308	0.055-0.756	18.336-39.746
Gas (Tcf)	6.71-15.559	0.077-0.997	18.98-66.741

BBO = billion barrels of oil; Tcf = trillion cubic feet.

Note: The OCS cumulative includes projected production from ongoing, single OCS oil and gas lease sale and future OCS oil and gas lease sales. The production data is representative of the estimated production over the entire 40-year life of a single lease sale or 70-year life of the cumulative scenario.

The majority of oil and gas resources in the GOA are located within the geographical boundaries of all the action alternatives (B-D). Current industry trends indicate that more exploration and development drilling occurs in deepwater (depths >200 m [660 ft]) than shallow (depths <200 m [660 ft]), regardless of the activity level scenario. Over the entire 40-year analysis period for a single proposed OCS oil and gas lease sale, production would not be equally distributed across water-depth categories due to geographic specificity of resources based on geology.

3.3.2 Expected Activity Scenario

Three distinct scenarios are presented in this Programmatic EIS to forecast the range of potential activities that could occur within a proposed OCS oil and gas lease sale area. Ongoing activities include all current and future activities related to previously issued leases and permits through GOA oil and gas Lease Sale 261. This ongoing scenario is applicable to all alternatives considered, including Alternative A (no action). The ongoing activities would occur regardless of the alternative selected and are considered part of the existing baseline. Single Sale includes activities that would result from a representative proposed OCS oil and gas lease sale under a National OCS Oil and Gas Program, regardless of which action alternative (i.e., Alternative B, C, or D) is selected. The ranges within this Single Sale scenario are broad, representing the low and high levels of

forecasted activity that are reflective of historical data of the lowest and highest recorded discovered resource volumes. While the selection of one representative proposed OCS oil and gas lease sale alternative over another could shift the location of the forecasted activities, the overall range of activity levels would not change under Alternative B, C, or D because they are expected to fall within the range of low and high levels of forecasted activity. Finally, activities in the cumulative scenario include the activities described under the ongoing and single OCS oil and gas lease sale activities, as well as activities anticipated to result from actions carried out on OCS acreage leased in future National OCS Oil and Gas Programs (see **Chapter 3.6.1** and **Appendix B.4**). For the purpose of this analysis, BOEM incorporates activities from the 2024-2029 National OCS Program and two future National OCS Oil and Gas Programs.

The assumptions for the forecasted activities in the ongoing scenario have been updated for this Final Programmatic EIS. When the GOA Oil and Gas Draft Programmatic EIS was published, BOEM assumed for the ongoing scenario (analyzed under Alternative A) no new leasing in the GOA for the foreseeable future as a conservative estimate since a zero lease sale National Program was still under consideration by the Secretary of the Interior. This approach necessitated reductions to production of various elements such as contingent resources and undiscovered resources on existing leased acreage for the levels of estimated activity. However, as a result of E.O.s 14156 and 14154, S.O.s 3417 and 3418, and the Secretary's announcement of the preparation of a new National OCS Leasing Program, BOEM now anticipates new leasing in the GOAR similar to historical levels along with historical levels of associated OCS leasing activities. BOEM also assumes that along with a higher likelihood of leasing, the development of both contingent resources and undiscovered resources on leased acreage is also more likely. Because it is likely that new leases could occur in the GOAR, the "high level" of estimated activity from the ongoing scenario in the Draft Programmatic EIS provides a reasonable estimate of activity due to the assumptions that contingent resources and some undiscovered resources would be developed on existing leased acreage. Therefore, the estimated activity for the ongoing scenario in **Table 3.3-2** uses the high level of the activity range from the Draft Programmatic EIS for impacts analysis in this EIS. The lower end of the range sets a bound for activity in the event no new leases would be issued for areas in the GOA. Because new leasing is now likely to occur, it can be assumed that the "high level" of the range could be more.

The estimated activities in the cumulative scenario have been updated for this Final Programmatic EIS. When the Draft Programmatic EIS was published, it was reasonably foreseeable that the number of proposed OCS oil and gas leases that could be scheduled in future National OCS Oil and Gas Programs would be similar to the 2024-2029 National OCS Oil and Gas Program (i.e., three proposed OCS oil and gas lease sales in the GOA). However, for the reasons stated above, it is now likely that a future National OCS Oil and Gas Program could schedule up to 10 proposed OCS oil and gas lease sales over a five-year interval (two sales per year) as in years past. Therefore, the cumulative scenario in **Table 3.3-2** still includes the activities described under the ongoing and single OCS oil and gas lease sale activities (which remain unchanged), but now assumes future National OCS Oil and Gas Programs could schedule up to 10 proposed OCS oil and gas lease sales over a five-year interval (two sales per year) in the GOA.

The routine OCS oil- and gas-related activities associated with exploration, development, production, and decommissioning from ongoing and future proposed OCS oil and gas lease sales are shown in **Table 3.3-2**. Projected activity levels are shown as a range and distributed into subareas based on water depth as shown in **Figure 3.1-1**. These water-depth ranges were developed to reflect the technological requirements, related physical and economic impacts from the oil and gas potential, exploration and development activities, and lease terms unique to each water-depth range. The activities included in **Table 3.3-2** are estimated to occur within the 40-year analysis period for the ongoing scenario as well as the single proposed OCS oil and gas lease sale. The cumulative scenario assumes continued GOAR leasing; therefore, it analyzes activity over a 70-year (2024-2093) period.

Table 3.3-2. Offshore Scenario Activities by Water Depth.

Activity	Action	0-60 m	60-200 m	200-800 m	800-1,600 m	>1,600 m	Total Lease Sale Area[1]
Exploration and Delineation Wells	Ongoing	0-78	0-76	0-57	0-161	0-163	0-535
Exploration and Delineation Wells	Single OCS Oil and Gas Lease Sale	0-32	0-35	3-9	3-23	3-27	9-126
Exploration and Delineation Wells	Cumulative	124-1,430	79-388	163-382	490-906	375-650	1,231-3,756
Development and Production Wells[2,3]	Ongoing Oil and Gas Combined[3]	0-359	0-116	0-151	0-232	0-248	0-1,106
Development and Production Wells[2,3]	Single OCS Oil and Gas Lease Sale Combined	0-26	0-29	2-10	3-28	2-31	7-124
Development and Production Wells[2,3]	Cumulative Oil & Gas Combined	447-5,403	284-1,484	292-1,572	681-1,244	767-1,393	2,471-11,096
Development and Production Wells[2]	Ongoing Oil	0-185	0-81	0-115	0-192	0-215	0-788
Development and Production Wells[2]	Single Oil	0-4	0-4	1-8	2-24	1-26	4-66
Development and Production Wells[2]	Cumulative Oil	220-1,896	137-1,041	202-965	596-1,071	677-1,250	1,832-6,223
Development and Production Wells[2]	Ongoing Gas	0-173	0-34	0-35	0-39	0-32	0-313
Development and Production Wells[2]	Single Gas	0-21	0-24	0-1	0-3	0-4	0-53

Activity	Action	0-60 m	60-200 m	200-800 m	800-1,600 m	>1,600 m	Total Lease Sale Area[1]
Development and Production Wells[2]	Cumulative Gas	226-3,506	146-442	89-606	84-172	89-142	634-4,868
Installed Production Structures	Ongoing	0-44	0-7	0-3	0-4	0-4	0-62
Installed Production Structures	Single OCS Oil and Gas Lease Sale	0-26	0-29	0-1	0-2	0-2	0-60
Installed Production Structures	Cumulative	447-4,931	285-1,356	14-31	13-25	11-18	770-6,361
Subsea Structures Installed[4]	Ongoing	0	0	0-38	0-55	0-58	0-151
Subsea Structures Installed[4]	Single OCS Oil and Gas Lease Sale	0	0	1-3	1-7	1-8	3-18
Subsea Structures Installed[4]	Cumulative	0	0	169-394	172-313	137-234	478-941
Production Structures Decommissioned Using Explosives	Ongoing	729-757	182-187	0	0	0	911-944
Production Structures Decommissioned Using Explosives	Single OCS Oil and Gas Lease Sale	0-17	0-19	0	0	0	0-36
Production Structures Decommissioned Using Explosives	Cumulative	1,066-3,763	308-962	0	0	0	1,374-4,725
Total Production Structures Decommissioned[5]	Ongoing	1,121-1,165	280-287	119-160	319-378	294-356	2,133-2,346
Total Production Structures Decommissioned[5]	Single OCS Oil and Gas Lease Sale	0-26	0-29	1-4	1-9	1-11	3-79
Total Production Structures Decommissioned[5]	Cumulative	1,640-5,789	474-1,480	316-528	494-624	393-473	3,317-8,895

Activity	Action	0-60 m	60-200 m	200-800 m	800-1,600 m	>1,600 m	Total Lease Sale Area[1]
Length of Installed Pipelines (km)[6]	Ongoing	0-89	0-35	0-94	0-431	0-551	0-1,200
Length of Installed Pipelines (km)[6]	Single OCS Oil and Gas Lease Sale	0-36	0-39	9-45	41-392	34-520	84-1,032
Length of Installed Pipelines (km)[6]	Cumulative	237-2,390	137-800	292-1,867	2,161-4,999	2,781-6,955	5,608-17,011
Service-Vessel Trips (1000's of trips)	Ongoing	0-72	0-40	1-48	4-77	4-79	9-315
Service-Vessel Trips (1000's of trips)	Single OCS Oil and Gas Lease Sale	0-35	0-39	0-12	1-28	1-39	2-153[1]
Service-Vessel Trips (1000's of trips)	Cumulative	490-6,608	312-1,820	121-511	177-469	167-408	1,268-9,815
Helicopter Operations (1000's of operations)[7]	Ongoing	0-13	0-16	0-9	0-52	0-137	0-227
Helicopter Operations (1000's of operations)[7]	Single OCS Oil and Gas Lease Sale	0-8	0-7	0-2	0-9	1-24	1-50
Helicopter Operations (1000's of operations)[7]	Cumulative	5-327	3-89	13-97	44-258	217-713	282-1,484

Note: Ongoing and single sale-related activity assumes the lifespan of a lease for 40 years. Cumulative-related activities assume continued proposed OCS oil and gas lease sale activity and assumes 70 years of activities.

1 Subtotals may not add up to the proposed OCS oil and gas lease sale area total because of rounding.

2 Development and Production Wells includes some exploration wells that were re-entered and completed. These wells were removed from the Exploration and Delineation well count.

3 Total oil and gas development and production well forecast combined.

4 Subsea Structures include subsea systems, pipeline end modules, manifolds, and pipeline end terminals.

5 Total Production Structures Decommissioned includes both Installed Production Structures and Subsea Structures Installed

6 Projected length of pipelines include umbilical lines, jumpers, and subsea tie-ins; it does not include length in State waters.

7 Helicopter trips may include circuits. This means that each take-off and landing is counted as a trip and is not necessarily one trip offshore or one trip onshore. Trips may occur between platforms or across a water depth.

The G&G survey activities associated with a single representative proposed OCS oil and gas lease sale are provided in **Table 3.3-3**. A summary of each survey type is provided above in **Table 3.2-1** with greater detail found in Chapter 1.3.3 of the GOM Oil and Gas SID and Appendix F of the *Gulf of Mexico OCS Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas; Final Programmatic Environmental Impact Statement* (BOEM 2017a).

Table 3.3-3. Geological and Geophysical Survey Activities Associated with a Single Representative Proposed OCS Oil and Gas Lease Sale.

Activity Type – Activity Level	G&G Permit (line miles)	G&G Blocks (number of surveys)
HRG – Low	270-450	N/A
HRG – High	2,300-3,840	N/A
CSEM – Low	N/A	0
CSEM – High	N/A	0-1
VSP – Low	2-3	N/A
VSP – High	20-34	N/A
Deep Seismic (3D WAZ) – Low	N/A	0
Deep Seismic (3D WAZ) – High	N/A	1-2
Deep Seismic (4D WAZ) – Low	N/A	0
Deep Seismic (4D WAZ) – High	N/A	1-2

3D = three dimensional; 4D = four dimensional; CSEM = controlled source electromagnetic; G&G = geological and geophysical; HRG = high-resolution geophysical; VSP = vertical seismic profile; WAZ = wide azimuth.

Note: The activity level for the low case G&G survey scenario assumes 54-90 lease blocks. The activity level for the high case scenario assumes 460-768 lease blocks.

3.3.2.1 Potential Modifiers to the Expected Activity Scenario

There is the potential for different laws, regulations, or policies to alter the expected activity scenario in various ways. BOEM investigates each of these potential modifiers as they arise to understand their potential effect to the expected activity scenario. For the GOA Oil and Gas Programmatic EIS, policy decisions on applicable royalty rates included in lease sales could have effects on expected production. However, the data used in the development of the expected activity scenario come from data with historical royalty rates ranging from 12.5 percent - 18.75 percent. In the past, BOEM has seen various changes in lease terms and conditions and have built this variability into the forecast. Additionally, BSEE implemented new parameters for Downhole Commingling in the Paleogene (Wilcox) reservoirs, expanding the allowable pressure differential from 200 psi to 1500 psi. This change, the result of extensive technical consultation with offshore industry leaders, could increase production output by roughly 10 percent, which would translate into over 100,000 barrels per day production increase over the next ten years. Additional gains are possible as operators provide further data. Results from a University of Texas study on commingling show that commingled production maximizes per-well oil production compared to sequential schemes. Over 30 years, it provides 61 percent more oil recovery, and over 50 years, it yields 21 percent more. BOEM has determined that this change in policy from BSEE would have no effect on the expected activity scenario (Wilson 2025, official communication).

3.3.3 Impact-Producing Factor Relationship to Expected Activity Scenario

This Programmatic EIS groups IPFs into eight overarching issue categories (e.g., noise and bottom disturbance) for routine OCS oil- and gas-related activities, and for the non-OCS oil- and gas-related activities. Three IPF categories were considered for accidental OCS oil- and gas-related

events. Both OCS oil- and gas-related activities and non-OCS oil- and gas-related activities can contribute to one or multiple IPF categories. **Table 3.3-4** identifies the relationship between IPF categories and each of the activities associated with a proposed OCS oil and gas lease sale, as identified in **Table 3.3-2**.

Table 3.3-4. Relationship between Oil and Gas Scenario Activities and Impact-Producing Factors Categories.

Activity	Air Emissions and Pollution	Discharges and Wastes	Bottom Disturbance	Noise	Coastal Land Use/Modification	Lighting and Visual Impacts	Offshore Habitat Modification/Space Use	Socioeconomic Changes and Drivers	Unintended Releases into the Environment	Response Activities	Strikes and Collisions
G&G Survey Activity (including G&G Vessels)	X	X	X	X	-	X	X	X	X	-	X
Exploration and Delineation Wells	X	X	X	X	-	X	X	X	X	X	-
Development and Production Wells	X	X	X	X	-	X	X	X	X	X	-
Offshore Production Structures Installation	X	X	X	X	-	X	X	X	X	X	-
Subsea Structures Installation and Decommissioning	X	X	X	X	-	X	X	X	X	X	-
Production Structures Decommissioned Using Explosives	X	X	X	X	-	X	X	X	X	X	X
Other Structure Decommissioning	X	X	X	X	-	X	X	X	X	X	X
Pipeline Installation and Decommissioning	X	X	X	X	X	X	X	X	X	X	-
Service Vessel Trips	X	X	X	X	X	X	-	X	X	X	X
Helicopter Operations	X	-	-	X	X	X	-	X	X	-	X

3.4 ROUTINE ACTIVITIES

BOEM identified the following IPF categories (**Table 3.4-1**) that commonly occur as a result of oil and gas exploration, development, production, and decommissioning on the Gulf of America OCS as discussed in **Chapter 3.2**. For detailed descriptions of the IPFs see **Appendix B**.

Table 3.4-1. IPF categories and descriptions for Routine OCS Oil- and Gas-Related Activities.

IPF Category	Description
Air Emissions and Pollution	Emissions from vessels, helicopters, structures, and other OCS oil- and gas-related activities.
Discharges and Wastes	Drilling and production fluids, drill cuttings, various waters, deck drainage, sanitary wastes, and domestic wastes generated during OCS oil-and gas-related activities.
Bottom Disturbance	Drilling, infrastructure and anchor emplacement, and infrastructure removals (including site-clearance verification trawling) associated with offshore oil and gas exploration, development, production, and decommissioning.
Noise	G&G surveys, vessels, helicopters and aircraft traffic, drilling and production operations, pipeline trenching, construction, and decommissioning from offshore oil- and gas-related activities.
Coastal Land Use/Modification	Onshore oil- and gas-related infrastructure that provides support for offshore OCS oil- and gas-related activities.
Lighting and Visual Impacts	Infrastructure presence and light emissions that could alter the existing landscapes and seascapes.
Offshore Habitat Modification/Space Use	Modification and/or use of habitats and other specific areas through the placement or removal of infrastructure.
Socioeconomic Changes and Drivers	The extent to which OCS oil- and gas-related activities produce socioeconomic changes in the offshore oil and gas industry and elsewhere in society.

3.5 ACCIDENTAL EVENTS

While industry practices and government regulations minimize the risks, the potential for oil spills and other accidental events still exists. Accidental events are unauthorized events. They are examined separately due to their potential to occur and cause noteworthy human and environmental impacts. Types of reasonably foreseeable accidental events include releases into the environment, response activities, and strikes and collisions (**Table 3.5-1**). These IPFs and Federal regulatory requirements from prevention to accident response are described in greater detail in **Appendix B** and Chapter 2.9 of the GOM Oil and Gas SID.

Table 3.5-1. IPF Categories and Descriptions for Accidental Events.

IPF Category	Description
Unintended Releases into the Environment	Oil, chemical, and drilling fluid spills, loss of well control, pipeline failures, accidental air emissions, and trash and debris related to OCS oil and gas exploration, development, production, and decommissioning activities.
Response Activities	Spill response techniques or tools used to contain and remove oil in the event of a spill.
Strikes and Collisions	A vessel or aircraft unintentionally hitting a resource (strike) or another vessel, aircraft, or structure (collision).

3.6 CUMULATIVE ACTIVITIES

Cumulative effects result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. **Table 3.6-1** provides brief descriptions of the Cumulative activity IPFs, and **Appendix B** describes the reasonably foreseeable activities and stressors that contribute to the IPF categories below in more detail.

3.6.1 Cumulative OCS Oil and Gas Program

Includes all activities (i.e., routine activities projected to occur and accidental events that could occur) from past, proposed, and future proposed GOA oil and gas lease sales. The Cumulative OCS Oil and Gas Program scenario forecasts 70 years of activities. However, the scenarios developed as part of this chapter vary in the length of time projected depending on what would be considered reasonably foreseeable based on the data available and the ability to predict future actions without being speculative.

3.6.2 Non-OCS Oil- and Gas-Related Activities

The non-OCS oil- and gas-related activities introduced in this chapter are defined as other past, present, and reasonably foreseeable future activities occurring within the same geographic range and within the same timeframes as the projected routine activities and potential accidental events discussed above, but they are not related to the Cumulative OCS Oil and Gas Program. Chapter 2 of the GOM Oil and Gas SID also summarizes non-OCS oil- and gas-related activities that could potentially affect an environmental or socioeconomic resource in addition to OCS oil- and gas-related activity. For detailed descriptions of cumulative activity IPFs, see **Appendix B.4**.

Table 3.6-1. IPF Categories and Descriptions for Cumulative Activities.

IPF Category Association	IPF Category	Description
Cumulative OCS Oil and Gas Program	Routine Activities	See Table 3.4-1.
Cumulative OCS Oil and Gas Program	Accidental Events	See Table 3.5-1.
Non-OCS Oil- and Gas-Related Activities	Air Emissions and Pollution	Offshore natural and anthropogenic sources of air pollution not related to OCS oil- and gas-related activities that cause degradation to air quality.
Non-OCS Oil- and Gas-Related Activities	Discharges and Wastes	Discharges and wastes from non-OCS oil- and gas-related events may derive from discharge from shipwrecks, military activities, dredged material disposal, land-based nonpoint pollution, and natural seeps.
Non-OCS Oil- and Gas-Related Activities	Bottom Disturbance	Seafloor disturbance caused by activities that are not part of BOEM's OCS Oil and Gas Program (e.g. anchoring, military operations, State oil and gas activities, dredging, trawling, and renewable energy installations).

IPF Category Association	IPF Category	Description
Non-OCS Oil- and Gas-Related Activities	Noise	Noise includes natural sources (e.g. sounds produced by animals, wind-driven waves, rainfall, and storms) and anthropogenic sources like shipping and military activities.
Non-OCS Oil- and Gas-Related Activities	Coastal Land Use/Modification	Coastal land use/modification (Coastal Protection and Restoration Authority 2023) includes erosion, saltwater intrusion, dredging and navigation canals, coastal restoration programs, and tourism infrastructure.
Non-OCS Oil- and Gas-Related Activities	Lighting and Visual Impacts	Activities from stakeholders that use the ocean that have the potential to alter or disrupt the existing visual and aesthetic environment.
Non-OCS Oil- and Gas-Related Activities	Offshore Habitat Modification/Space Use	Activities other than the OCS Oil and Gas Program occurring in the Gulf of America.
Non-OCS Oil- and Gas-Related Activities	Socioeconomic Changes and Drivers	The extent to which non-OCS oil- and gas-related activities produce socioeconomic changes.
Non-OCS Oil- and Gas-Related Activities	Other Environmental Factors	This category encompasses various environmental factors and stressors that shape the existing and future environmental baseline, including sea-level rise, shifting ocean and atmospheric temperatures, coastal erosion, higher intensity storms, ocean acidification, major storms (including increased intensity), eutrophication and hypoxia, natural seeps, and other processes occurring in the GOA as discussed in **Appendix B**. These environmental factors can have cascading effects on marine ecosystems because they may act additively or synergistically with the other stressors above.

CHAPTER 4

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.0 OVERVIEW

This GOA Oil and Gas Programmatic EIS contains analyses of the potential environmental impacts that could result under Alternatives A through D from a single representative proposed OCS oil and gas lease sale in the GOAR. These analyses may be applied, supplemented, or both, as appropriate to inform the decisions for potential future OCS oil and gas lease sales in the GOAR, as scheduled in a National OCS Oil and Gas Program. The impact analyses from the GOA Oil and Gas Programmatic EIS will also be used for tiering purposes for associated site and activity-specific OCS oil- and gas-related activity approvals, and to inform extraordinary circumstance reviews to ensure categorical exclusions are used appropriately. These analyses also include updated GHG estimates (at BOEM's discretion despite CEQ rescinding their guidance on May 28, 2025) and information on Rice's whale to address deficiencies found by the U.S. District Court for the District of Columbia in BOEM's NEPA analysis for GOM Lease Sale 259.

This Programmatic EIS incorporates by reference the GOM Oil and Gas SID. This document provides a robust characterization of the affected environment and environmental setting; description of the activities associated with oil and gas operations in the GOA and other activities and environmental factors not associated with OCS oil and gas activities; and a description of the cause and effect relationships leading to the potential range of effects to the physical, biological, and human environments. This preliminary identification and disclosure of the potential range of effects and their influencing variables was used to scope out unimportant issues and focus the analyses in this Programmatic EIS on the potentially important issues. BOEM's subject-matter experts incorporated the GOM Oil and Gas SID and other information acquired during internal and external scoping, then applied the scenarios presented in **Chapter 3** to evaluate the context and intensity of potential impacts. They were then able to determine what the overall level of direct, indirect, and cumulative impacts would be for Alternatives A through D.

4.0.1 Environmental Setting

This chapter provides a regional overview of the geological, meteorological, physical, pelagic, benthic, coastal, and human environmental characteristics of the GOA. It also describes various regional-scale natural events and processes. The summaries of the environmental setting below are incorporated by reference from Chapter 3 of the GOM Oil and Gas SID and Chapter 2.8 of the 2024-2029 National OCS Oil and Gas Program Programmatic EIS. These descriptions form the baseline environmental conditions in which the Proposed Action is evaluated. Past and ongoing OCS oil- and gas-related activities (evaluated in previous BOEM environmental analyses) contributed to the existing baseline environmental conditions, as well as non-OCS oil- and gas-related activities.

4.0.1.1 Geologic Environment

The present-day GOA is a small ocean basin with a water-surface area of more than 1.5 million square kilometers (km^2; 371 million acres). The greatest water depth is approximately 3,700 m (roughly 12,000 ft). It is almost completely surrounded by land, opening to the Atlantic Ocean through the Straits of Florida and to the Caribbean Sea through the Yucatan Channel. Although the smallest by area, the GOA is currently the most important region for U.S. offshore energy production. There are two major sedimentary provinces in the Gulf Coast region: Cenozoic (the western and central part of the GOA) and Mesozoic (the eastern GOA). The geologic plays of the Cenozoic Province extend from offshore Texas eastward across the north-central GOA to the edge of the Cretaceous Shelf Edge (commonly known as the Florida Escarpment) offshore Mississippi, Alabama, and Florida. It incorporates the entire WPA, a large portion of the CPA, and the southwestern portion of the EPA. To date, all of the hydrocarbon production on the OCS in the Cenozoic Province is from sands ranging in age from Paleocene to Pleistocene (approximately 62-0.1 million years ago). The Mesozoic Province in the OCS extends eastward from the Cretaceous Shelf Edge off the coast of Mississippi, Alabama, and Florida towards the coastline of Florida. Most of this area has experienced limited drilling, mainly on the shelf, with some production from the Mesozoic Norphlet in the CPA. The seafloor of the northern GOA has hundreds of salt domes, which are areas where salt has risen upward into overlying sediments to create dome-like structures. These salt domes are important features that are linked to oil and gas reservoirs, as well as to the formation of brine pools and other hydrocarbon seeps, found throughout the region. More detail on the assessment units, geologic plays, and geologic setting of the GOA can be found in the *2021 Assessment of Technically and Economically Recoverable Oil and Natural Gas Resources of the Gulf of Mexico Outer Continental Shelf* (BOEM 2021d).

Natural petroleum seeps, in which crude oil and gas naturally migrate up through the seafloor and into the water column, are very common in the GOA and have likely been active throughout history. GOA seeps are highly variable in composition and volume and include gases, volatiles, liquids, pitch, asphalt, tars, water, brines, and fluidized sediments. Seeps are most abundant and most prolific in the central and western regions of the northern GOA (Garcia-Pineda et al. 2010). Natural hydrocarbon seeps may contribute 95 percent to the total oil inputs (i.e., the combination of natural and anthropogenic sources) to the GOA (Kvenvolden and Cooper 2003; MacDonald et al. 2015; National Research Council 2003b).

4.0.1.2 Meteorological Environment

The GOA is influenced by a maritime subtropical climate controlled mainly by the clockwise circulation around the semi-permanent area of high barometric pressure commonly known as the Bermuda High. This proximity to the high-pressure system results in a predominantly southeasterly wind flow in the GOA region. The relative humidity over the GOA is high throughout the year. Precipitation is frequent and abundant throughout the year but does show distinct seasonal variation. The average monthly pressure shows a west to east gradient along the northern GOA during the summer. In the winter, the monthly pressure is more uniform along the northern GOA. Air temperature ranges from highs in the summer of 24.7-28.0°C (76.5-82.4°F) to lows in the winter of

2.1-21.7°C (35.8-71.1°F). Air temperatures over the open GOA exhibit narrower limits of variations on a daily and seasonal basis due to the moderating effect of the large bodies of water. Ambient air quality monitoring shows that onshore criteria air pollutant (CAP) levels along the Gulf Coast are below the National Ambient Air Quality Standards (NAAQS), except for the Houston-Galveston-Brazoria nonattainment area for ozone ($O_{3)}$ and the St. Bernard nonattainment area for sulphur dioxide (SO_2) (see Figure 4.1.1-1 of the GOM Oil and Gas SID).

Hurricanes may develop in or migrate into the GOA during the warmer months. Tropical cyclones (especially hurricanes) affecting the GOA originate over the equatorial portions of the Atlantic Ocean, Caribbean Sea, and GOA. Tropical cyclones occur most frequently between June and November. Based on 50 years of data, there are about 10.2 storms per year and about 5.9 of those become hurricanes in the Atlantic Ocean. Data from 1950 to 2000 show that 81 percent of these storms could affect the GOA (Klotzbach et al. 2020). There is a high probability that tropical storms would cause damage to physical, economic, biological, and social systems (including OCS oil- and gas-related activities) in the GOA. Most of the damage is caused by storm surge, waves, and high winds. Storm surge depends on local factors, such as bottom topography and coastline configuration, and storm intensity. Water depth and storm intensity control wave height during hurricane conditions. Sustained winds for major hurricanes (Saffir-Simpson Category 3 and above) are higher than 95.2 kn (109.6 mph). Twenty-four major hurricanes (Category 3 or higher at landfall) impacted the Gulf Coast from 2000 through 2023. These types of storms may affect any area of the GOA and substantially alter the local wind circulation around them.

4.0.1.3 Physical Environment

The Loop Current is the dominant circulation feature in the GOA. Warm water originating in the Atlantic Ocean flows through the Caribbean and northward past the Yucatan peninsula into the GOA. This flow “loops” around the GOA and exits near the Florida Straits to join the Gulf Stream. Loop Current rings (which are seasonal warm-water eddies) separate from the Loop Current and flow in an anticyclonic (or clockwise) pattern in the western GOA. At times, the boundary of the Loop Current sheds smaller, cold-core, cyclonic eddies (Sturges and Leben 2000). Dynamics of the Loop Current and eddies have an important influence on levels of primary productivity in the GOA region. Circulation on the continental shelf in the northeastern GOA has been observed to follow a cyclonic pattern, with westward alongshore currents prevailing on the inner and middle shelf and opposing alongshore flow over the outer shelf and slope (Brooks and Giammona 1991). The outer shelf is an area of transition between deepwater currents over the continental slope and the shelf regime. Cold water from deeper off-shelf regions moves onto and off of the continental shelf by cross-shelf flow associated with upwelling and downwelling processes. Mean deep (~2,000 m [~6,562 ft]) flow around the edges of the GOA circulates in a cyclonic (counterclockwise) direction (Sturges et al. 2004). A net counterclockwise circulation pattern was also observed at about 900-m (2,953-ft) depth around the borders of the GOA (Weatherly 2004). In deep water, several oil and gas operators have observed short-term (up to a day), very high-speed currents (150 cm/s [59 in/s]) in the upper portions of the water column. Such currents may have vertical extents of less than 100 m (328 ft),

and they generally occur within the depth range of 100-300 m (328-984 ft) in total water depths of 700 m (2,297 ft) or less over the upper continental slope.

Cold fronts, as well as diurnal and seasonal cycles of heat flux at the air/sea interface, affect near-surface water temperatures. However, water at depths greater than about 100 m (328 ft) remains unaffected by surface boundary heat flux. Watermass property extremes are closely associated with specific density surfaces. Summer heating and stratification affect continental shelf waters in the GOA. Salinity is generally lower nearshore, although fresh water from the Mississippi River and other rivers occasionally moves into outer shelf waters. Freshwater intrusions further lower the salinity after local storms. Subsurface waters derive from outside the GOA and enter from the Caribbean Sea through the Yucatan Channel. Below about 1,800 m (5,906 ft), temperature and salinity across the GOA is relatively uniform (Nowlin Jr. 1972). As average water temperatures rise, tropical corals have been observed shifting from the Caribbean to the GOA (Precht and Aronson 2004). In the northern GOA, fishes and invertebrates have displayed an overall trend of moving into deeper water between 1968 and 2011 (Pinsky et al. 2013). Invasive lionfish, first observed in the northern GOA in 2010, have grown exponentially in number and are commonly found on reefs competing with or preying upon native GOA fish species like vermilion snapper (Dahl and Patterson III 2014).

4.0.1.4 Pelagic Environment

Water quality in the GOA region is generally rated as fair (USEPA 2012). River water flowing into marine waters is a primary influence on water quality within the GOA region and includes input from 33 major rivers (including the Mississippi River) that drain 31 states (Ellis and Dean 2012). These discharges produce a cross-shelf pattern in biological productivity, with the highest productivity occurring along the coasts and gradually declining with distance from shore (Karnauskas et al. 2013). Additional influences on water quality include point-source discharges, marine traffic, oil and gas production and development, natural events, and atmospheric deposition. Agricultural runoff from fertilizer and pesticide use introduces additional nutrient-rich water into the GOA. While nutrients are an essential component to healthy ecosystems, excess amounts of nutrients added to waterbodies (eutrophication) can create unintended side effects. The combined naturally nutrient rich waters of the GOA with anthropogenic inputs can support large seasonal algal blooms (including harmful algal blooms). The decomposition of these large algal blooms may lead to hypoxia (low or depleted areas of oxygen) on the continental shelf of the northern GOA (Obenour et al. 2013; Rabalais et al. 2002; Turner et al. 2012).

Pelagic communities include larvae from a wide variety of fishes and invertebrate species, which provide important food resources for larger animals (Biggs and Ressler 2001; Cardona et al. 2016; Muller-Karger et al. 2015). The composition of pelagic fishes varies from the inner shelf (e.g., seatrout and cobia), to middle shelf (e.g., snappers and jacks), and to deep waters (e.g., tunas and mesopelagic fishes like lanternfish and bristlemouths) (Biggs and Ressler 2001; Ditty et al. 1988; Muhling et al. 2012) and supports many large-scale commercial and recreational fisheries. The Flower Garden Banks National Marine Sanctuary (FGBNMS) in the northern GOA is an important

habitat for many species of fishes and invertebrates. Brown algae *Sargassum* is an important feature of GOA pelagic waters; it can cover widespread areas and form floating mats large enough to be detectable by satellite (Hardy et al. 2018; Hu et al. 2016). *Sargassum* mats also provide food and protection from predation for a wide spectrum of fauna, including larval and juvenile fishes and sea turtles (Casazza and Ross 2008; Dooley 1972). Common pelagic birds include shearwaters, storm-petrels, boobies, northern gannets, jaegers, phalaropes, petrels, gulls, and terns (Duncan and Havard 1980). Five species of ESA-listed sea turtles occur in the GOA planning areas: loggerhead, green, hawksbill, Kemp's ridley, and leatherback (NOAA 2015). All these species rely on coastal and pelagic waters for foraging needs (Bjorndal 1997; Collard 1990; Davis and Fargion 1996; Fritts et al. 1983a; Fritts et al. 1983b; Godley et al. 2008; NMFS and FWS 2015). Twenty-one species of marine mammals regularly occur in the GOA pelagic environment, including a unique evolutionary lineage of baleen whale (Rice's whale, previously known as the GOA subpopulation of Bryde's whale) and 20 species of toothed whales and dolphins. Both the Rice's and sperm whales are ESA-listed and have presumed year-round resident populations in the GOA (NMFS 2020; Van Parijs 2015). The *Deepwater Horizon* oil spill had lasting effects on the pelagic food web and throughout the water column in the GOA (Fisher et al. 2016; Pulster et al. 2020), with chronic exposure to hydrocarbons affecting populations years after the spill. In addition, large numbers of fish eggs and larvae were killed or potentially impaired, which may have lasting effects on species' demographics and pelagic food webs (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016).

4.0.1.5 Benthic Environment

The seafloor of the GOA is composed primarily of muddy and sandy sediments. The sediments are deposited mostly in deltaic environments of sands and shales, usually deposited as channel or delta front sands on the shelf. The nearly ubiquitous soft bottom environments in the GOA are home to demersal fishes and marine benthic communities, which include invertebrates like sea stars, crabs, and worms (Rowe and Kennicutt II 2009). The shelf area holds the potential for deepwater delta systems with channels, distributary bars, levees, overbank deposits, and large fan lobes in the older and deeper section. Nearshore and shelf habitat may serve as essential fish habitat (EFH) for managed species like shrimp, stone crab, and spiny lobster (Gulf of Mexico Fishery Management Council 2005). Hard bottom habitats, though far less common than soft bottom environments, are scattered across the GOA. These habitats include shallow and deepwater coral reefs, pinnacles, banks, and artificial reefs. The coral reefs of the GOA provide important habitat for many species of invertebrates and fishes, including commercially and recreationally important species of snapper and grouper, for which these areas have been designated essential fish habitat. Many Habitats of Particular Concern (HAPCs) in the GOA are based on the presence of living coral reefs or hard bottoms, including ESA-listed species such as elkhorn and staghorn coral. Coral EFH includes hard bottom areas on the scattered pinnacles in the CPA and EPA, and banks in the CPA (16 features) and WPA (21 features) (Gulf of Mexico Fishery Management Council 2016). Submerged banks in the WPA and CPA are isolated areas of higher relief that provide hard bottom habitat for communities of high biomass and diversity. The WPA and CPA contain the FGBNMS, a system of banks atop salt dome formations. These banks, including those added in the recent expansion, are biodiversity hotspots that provide important habitat and represent key examples of

coral and algal reefs and mesophotic and deepwater coral communities in the GOA (NOAA 2020). The topography of the continental slope is irregular and characterized by canyons, troughs, and salt structures. Several major submarine canyons, such as Mississippi and DeSoto Canyons, serve as important feeding areas for predators. The abyssal plains (ocean floor) are basically horizontal physiographic subprovinces and are surrounded by features with higher topography. The GOA also contains deepwater coral communities that have been found as deep as 9,842 ft (3,000 m) (BOEM 2012; Brooks et al. 2012).

At least 330 chemosynthetic communities exist in the GOA (BOEM 2016). Deep-sea sponges, corals, and tubeworms are attracted to these chemosynthetic communities and associated substrates and these, in turn, attract relatively large numbers and species of invertebrates and fishes to these microhabitats for shelter, feeding, and nursery grounds (BOEM 2017b; Fraser and Sedberry 2008). Gas hydrates are a naturally occurring “ice-like” combination of natural gas and water (gas trapped in ice crystals) that have the potential to be a significant new source of energy from the world’s oceans and polar regions. Hydrates have been observed and sampled from the Gulf of America OCS in association with naturally occurring oil and gas seeps in localized deepwater areas of very cold temperature and high pressure at or near the seafloor.

4.0.1.6 Coastal Environment

The U.S. coastline of the GOA comprises more than 750 bays, estuaries, and sub-estuary systems (USEPA 2012). These coastal and estuarine habitats provide important nursery grounds and adult habitat for numerous species of fishes and invertebrates, while seagrass beds provide foraging habitat for sea turtles and manatees (Byrnes et al. 2017). GOA coastal waters support stocks of several commercially and recreationally valuable fishes and invertebrate species that are managed by the National Oceanic and Atmospheric Administration (NOAA) and the Gulf of Mexico Fishery Management Council. The most common coastal habitats in the GOA include saltwater marshes, saltwater mangrove swamps, and non-vegetated areas such as sandbars, mudflats, and shoals (Dahl and Stedman 2013; Gulf Restoration Network 2004). Barrier islands are present on more than half of the U.S. GOA coastline (BOEM 2015; Dolan and Lins 1987) and protect the mainland from shoreline erosion by reducing wave action (Rosati 2009; Zinnert et al. 2019). Barrier islands also provide habitat for many species of birds, sea turtles, and sand-dwelling crustaceans. Submerged aquatic vegetation (SAV) is a vital component of coastal aquatic ecosystems, with at least 26 species of seagrasses and attached macroalgae growing in the northern GOA (Carter et al. 2011; Cosentino-Manning et al. 2015; Heck et al. 2011). Seagrasses serve important ecological functions, including foraging material for grazers, habitat for marine life, and important nursery grounds for numerous commercially important fish and invertebrate species.

4.0.1.7 Human Environment

Communities in the GOA region depend on the ocean economy for employment and income. In 2019, over 616,000 people were employed in coastal industries (2.8% of total employment in the region), bringing in $115 billion dollars in gross domestic product (GDP) (4.3% of total GDP in the region). The GOA’s ocean economy is heavily influenced by the recreation and tourism industry,

which provides for over half of the jobs in this sector, and offshore oil and gas activities, which generate 70 percent of the GDP (NOAA 2021; 2022b). The GOA contributes the highest percentage of GDP in the entire U.S. ocean economy, with Texas contributing a majority of that percentage due to the offshore oil and gas industry (NOAA 2019). The GDP in the GOA ocean economy increased by 41 percent from 2009 to 2019, driven by changes in resource pricing (NOAA 2021). The oil and gas industry sector as a whole has been operating for decades and has a central role in the employment base for the WPA and CPA (Louisiana State University 2017). In contrast, the EPA has few active leases off Florida's Gulf Coast.

The GOA is home to some of the world's most productive commercial and recreational fisheries. The region accounts for approximately 20 percent of the total domestic commercial and recreational harvest (landings) each year, sustaining the livelihoods of thousands of fishermen and their families, and providing a way of life for coastal communities. Shrimp, menhaden, oysters, and blue crab are some of the GOA's most important commercial species.

The GOA coastal zone provides significant ecological and economic value to the region and holds important archaeological and cultural resources. Shipwrecks are scattered throughout the GOA at all water depths. During oil and gas exploration (E&D), many shipwrecks have been discovered and are potenentailly eligible for listing on the National Register of Historic Places (NRHP). The GOA coastline contains archaeological, cultural, and historic sites, many of which are eligible for listing on the NRHP.

Land use in coastal areas of the GOA is a mix of urban, industrial, and rural activities, including manufacturing, shipping, agriculture, and recreation. The Gulf Coast, particularly in the WPA and CPA, is known for an established offshore oil and gas industry with a network of related onshore support industries. Other important Gulf Coast industries include commercial shipping, fisheries, tourism, and hospitality (i.e., hotels and restaurants). More than half of the 20 largest U.S. ports are along the Gulf Coast, mostly along the WPA and CPA (Industrial Economics Inc. 2014). The Gulf Coast has numerous State parks, beaches, and important environmental features that support multiple uses, including commercial and recreational fisheries and recreation and tourism. Parts of the GOA's sandy seafloor support marine mineral dredging on the OCS to address erosion along beaches and to strengthen the resilience of coastal communities and infrastructure.

The culture of the GOA region varies greatly, from Houston, Texas, the fourth most populous city in the U.S., to smaller metropolitan areas (e.g., Corpus Christi and Galveston, Texas; New Orleans, Louisiana; Mobile, Alabama; and Tampa, Florida), and to Louisiana's largely undeveloped bayous, inhabited by Indigenous and Cajun (Acadian) communities. Culture is also strongly tied to commercial and recreational fisheries, the oil and gas industry, recreation and tourism (fueled by beaches, especially on the Alabama and Florida Gulf Coasts, and vibrant tourist destinations, such as Key West, Florida, and New Orleans, Louisiana), and the socioeconomic impacts of these industries. In 2018, coastal recreation and tourism in the GOA region contributed 13 percent of the GDP and made up 58 percent of employment in the ocean economy sector, making this industry the largest employment sector for the region's ocean-based economy (NOAA 2019).

4.0.2 Issues of Programmatic Concern

4.0.2.1 Greenhouse Gas (GHG) Emissions

BOEM updated its analysis of life cycle GHG emissions with the publication of the 2024-2029 National OCS Oil and Gas Program. The analysis includes a newly developed quantitative estimate of a proposed action's impact on foreign oil production and the related upstream GHG emissions. The analysis for this Programmatic EIS builds on what was done in the National OCS Program by considering the impacts from a single representative GOA oil and gas lease sale. Importantly, while the location of the forecasted activities could shift under any of the three action alternatives (i.e., Alternatives B, C and D), the ranges in overall production and activity levels do not change, as discussed in **Chapter 3.3.1**. Therefore, the modelled GHG emissions are applicable to any action alternative.

This chapter provides an overview of BOEM's life cycle GHG emission estimates. The full analysis is included in **Appendix K**. "Life cycle" refers to emissions from all activities related to the upstream (exploration, development, and production), midstream (storage, refining, and transportation), and downstream (consumption) of a resource. Given the global nature of energy, in particular oil, BOEM includes both domestic and foreign GHG emissions in the analysis to the extent possible to capture both the emissions associated with OCS production as well as the resulting emissions associated with the impact that OCS production has on other domestic energy production and foreign oil production. The quantitative GHG emissions analysis can be categorized into two components: (1) the full life cycle GHG emissions estimates of domestically produced or consumed energy; and (2) the GHG emissions estimates of foreign oil production (upstream) and consumption (downstream). The potential general effects from climate-related factors to the environment, are discussed in the specific resource sections later in this chapter.

BOEM's GHG analysis considers a No Action Alternative in which there is no new OCS leasing. Because there is no new leasing in the No Action Alternative, there are no associated GHG emissions assigned to the No Action Alternative, as emissions from energy sources that are part of the energy market baseline (i.e. the level and sources of energy present in the absence of the proposed action) are considered the baseline level of emissions (see **Chapter K.2.1** for more detail). GHG emissions associated with OCS oil and gas production from existing leases would still occur in the absence of the proposed action, but because these emissions would occur regardless of future leasing decisions, they are not quantified separately. Rather, they are treated as part of the modeling baseline along with all other sources of energy not directly stemming from a new OCS lease sale. To the extent existing leases' production or other energy sources are displaced by the proposed action's production, BOEM accounts for the emissions reductions within its estimate of the total proposed action emissions. Total proposed action emissions are those associated with OCS exploration, development, and production from a lease sale under the proposed action after accounting for those emissions displaced from substitute energy sources which are not produced or consumed under the proposed action.

The total proposed action GHG emissions are the emissions from new OCS oil and natural gas activity and production as described in the analyzed exploration and development scenarios (**Chapter 3.3**). This also includes the reduction in GHG emissions based on displaced substitute energy sources, such as coal, biofuel, renewables, and onshore or imported oil and natural gas, displaced by the modeled OCS oil and gas production under the proposed action. When considering the full life cycle of energy produced or consumed domestically, BOEM's analysis indicates that the proposed action GHG emissions estimates are similar to those of displaced energy substitutes, and small changes in modeling assumptions could lead to different results. The total proposed action emissions range from 417 thousand metric tons CO_2 equivalents (CO_2e) below and 4.8 million metric tons CO_2e above the No Action Alternative GHG modeling baseline (**Appendix K**).

BOEM's analysis also considers GHG emission estimates resulting from a change in foreign oil production and consumption. If the proposed action is selected, BOEM estimates foreign oil consumption would increase by 168 million barrels over the period of proposed action production described in the high activity level E&D scenario. This is due to the decrease in prices caused by an increase in supply from anticipated OCS oil and natural gas production under the proposed action resulting in an increase in consumption.

Table 4.0-1 shows the estimates of life cycle GHG emissions from OCS oil and natural gas anticipated from new leases under the proposed action and those of domestically consumed or produced energy that would be displaced by the anticipated OCS oil and natural gas. **Table 4.0-1** also shows the change in GHG emissions associated with foreign oil production (upstream) and consumption (downstream) estimated to occur due to a decrease in oil prices under the proposed action. While BOEM provides estimates of GHG emissions resulting from a shift in foreign oil production and consumption, BOEM is not able to quantify the change in the global full life cycle GHG emissions resulting from the proposed action. BOEM provides a qualitative discussion of the unquantified components of global GHG emissions, i.e., those resulting from foreign oil's midstream and the full life cycle of foreign displaced non-oil energy substitutes (**Appendix K.4**).

Table 4.0-1 shows that BOEM estimates about 4.9 million metric tons of CO_2e would be emitted from upstream OCS oil- and gas-related activities for the proposed action at the high activity level. However, because of the OCS production, other energy sources would not be produced (i.e., displaced). These displaced sources would have generated 38.6 million metric tons of CO_2e upstream emissions. The displaced energy substitutes, primarily oil imports and domestic onshore oil and gas, have higher upstream GHG emissions per barrel of oil equivalent than OCS oil and gas. This leads to reductions in total proposed action emissions for the domestic upstream at all activity levels.

Table 4.0-1. Life Cycle GHG Emissions of the Proposed Action in Thousands of Metric Tons CO_2e.

Activity Level	Source	Domestic Upstream	Domestic Mid- & Downstream	Domestic Total	Foreign Oil Upstream	Foreign Oil Downstream
Low	OCS Oil & Gas Emissions	124	22,192	22,315	562	4,310

Activity Level	Source	Domestic Upstream	Domestic Mid- & Downstream	Domestic Total	Foreign Oil Upstream	Foreign Oil Downstream
Low	Displaced Energy Emissions	-2,880	-19,853	-22,732	**	**
Low	Total Proposed Action Emissions*	-2,756	2,339	-417	562	4,310
Mid	OCS Oil & Gas Emissions	1,651	126,439	128,090	3,487	26,739
Mid	Displaced Energy Emissions	-16,580	-111,916	-128,496	**	**
Mid	Total Proposed Action Emissions*	-14,928	14,522	-406	3,487	26,739
High	OCS Oil & Gas Emissions	4,927	300,173	305,100	8,295	63,587
High	Displaced Energy Emissions	-38,603	-261,673	-300,276	**	**
High	Total Proposed Action Emissions*	-33,676	38,500	4,824	8,295	63,587

Notes: Values rounded to nearest 1,000 metric tons.

For ease of comparison, BOEM provides combined totals of all three GHG emissions in CO_2 equivalents (CO_2e). Methane (CH_4) and nitrous oxide (N_2O) are converted to CO_2e using USEPA current Global Warming Potentials (USEPA 2023a).

* The Total Proposed Action Emissions are the emissions associated with the OCS oil and gas plus the reductions associated with displaced energy substitutes. These emissions represent total GHG emissions attributable to the proposed action, i.e., row 1 plus row 2 (for each activity level).

** BOEM is unable to quantitatively estimate energy substitutes in foreign markets. Thus, there are no estimates of displaced energy substitutes within the columns for the foreign GHG emissions estimates.

For the midstream and downstream, the proposed action high-activity level emissions are estimated at 300.2 million metric tons of CO_2e. However, the emissions reductions from the displacement of energy substitutes are estimated at 261.7 million metric tons of CO_2e. This results in total proposed action midstream and downstream GHG emissions of 38.5 million metric tons of CO_2e. The proposed action mid- and downstream GHG emissions are larger than those of the displaced substitutes at all activity levels. This increase is due to the slightly higher energy consumption and fuel switching towards oil and natural gas influenced by lower oil and natural gas prices as a result of the anticipated OCS oil and natural gas production from new leases under the proposed action.

In total, the life cycle analysis of domestically produced or consumed energy shows that selection of the proposed action results in only small changes (less than 2% relative to displaced emissions) in emissions from those under the No Action Alternative. For the low and mid-activity levels, the total proposed action emissions represent a slight decrease in emissions. However, at the high activity level, the proposed action results in a small increase in GHG emissions above the No Action Alternative baseline level of emissions.

Appendix K provides context for the domestic life cycle GHG emissions analysis by comparing Total Proposed Action Emissions for the high activity level to various annual state emissions. As shown in **Table K.2-9**, the 36-years of estimated OCS oil and gas activity associated with the proposed action (i.e., a single proposed OCS oil and gas lease sale) are estimated to

generate a similar volume of GHG emissions as those generated in Louisiana and Mississippi in a single year - 2022.

The domestic analysis indicates that the proposed action emissions are similar to those resulting from the displaced substitutes. When considering the impact of changes in foreign oil production and consumption, the proposed action represents an increase in global GHG emissions. BOEM quantitatively estimates the change in foreign oil's upstream and downstream GHG emissions as a result of lower global oil prices under the proposed action. **Table 4.0-1** shows BOEM's estimates of the increase in foreign oil upstream GHG emissions under the proposed action as well as the increase in GHG emissions from foreign oil consumption. Foreign oil production decreases under the proposed action. However, BOEM's domestic analysis accounts for a reduced upstream (production) GHG emissions from a decrease in oil imports consumed domestically. To avoid double counting when taking a global perspective, BOEM adjusts the foreign oil upstream GHG emissions by the amount already accounted for domestically. The increase in foreign oil consumption is adjusted, to avoid double counting when taking a global perspective, to account for exports of OCS oil consumed abroad and already included in the domestic downstream GHG emissions analysis. See **Appendix K.2.5.1** and **K.2.5.2** for a more detailed discussions of these adjustments. BOEM qualitatively considers shifts in the broader foreign energy market that are currently unable to be quantified. Like the impact on foreign oil's downstream, the foreign oil midstream would likely see an increase in GHG emissions. While foreign energy markets would see a decrease in GHG emissions due to increased oil consumption displacing substitute fossil fuel sources, (e.g., natural gas and coal), that decrease would not mitigate the quantified increase in foreign oil's upstream and downstream emissions.

After estimating GHG emissions, BOEM then places the estimated volumes of the GHG emissions attributable to the proposed action into context with a discussion of their potential impacts to the environment and resources we depend on to support our economy and lifestyle.

In conclusion, global GHG emissions would increase under the proposed action. BOEM is not providing a combined quantitative estimate of domestic and foreign emissions because BOEM's foreign GHG analysis is not quantified to the same extent as the domestic GHG analysis. However, as explained in **Appendix K**, were BOEM able to quantify the missing components of the foreign GHG analysis, such estimates would not be expected to change BOEM's conclusions about the relative impact differences between the proposed action and alternatives. Therefore, BOEM is relying on qualitative assessments to fill quantitative gaps where possible. BOEM's combined quantitative and qualitative GHG analyses represent the best available and scientifically credible approach for evaluating and comparing emissions under the proposed action and the No Action Alternative (Alternative A). BOEM has used the reliable scientific information available to date and reasonably accepted scientific methodologies to extrapolate from existing information. The incomplete or unavailable information above, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

4.0.2.2 Space-Use Conflicts Between BOEM Program Areas

There are some potential space-use conflicts or competing interests between BOEM's Program Areas on the OCS. When considering all available unleased blocks within the lease sale area, there could be space-use conflicts within blocks that may contain SSRAs, are included in the Wind Energy Area (WEA Options as of April 2024, final identified WEAs, and Wind Energy Lease(s) (i.e., OCS-G 37334). However, in the event that incompatibilities would arise, BOEM could use lease stipulations to help mitigate the potential conflicts. Pursuant to the Presidential Memorandum, *Temporary Withdrawal of All Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects*, issued on January 20, 2025, the President temporarily withdrew all areas within the OCS, as defined in section 2 of the OCS Lands Act, 43 U.S.C. § 1331, from disposition for wind energy leasing. The withdrawal became effective on January 21, 2025, and remains in effect until such time that the Presidential Memorandum is revoked. Therefore, any space use conflicts with unleased areas for wind energy would be removed until such time that the Presidential Memorandum is revoked.

Within designated blocks that may contain SSRAs, there is an increased potential for competing interests between the use of OCS sediment resources for coastal restoration and leasing for OCS oil and gas resources. A list of the current OCS blocks in the GOA identified as potentially containing significant sediment resources, as well as their respective data layers, is available at https://www.boem.gov/marine-minerals/managing-multiple-uses-gulf-mexico. As storms increase in frequency and strength, there has been, and would continue to be, an increased need for sediment dredging for coastal resiliency. Because some SSRAs may be in the blocks available for OCS oil and gas leasing under Alternative B, BOEM uses Information to Lessees and NTLs to inform lessees of SSRAs and areas of active dredging. In these blocks, BOEM's NTL No. 2009-G04 informs lessees of the regulatory requirements and additional guidance that bottom disturbing activities (including surface or near-surface emplacement of platforms, wells, drilling rigs, pipelines, umbilicals, and cables) must avoid, to the maximum extent practicable, significant OCS sediment resources. Any activity that lasts more than 180 days and is located within 305 lateral meters (m) (1,000 ft) and 20 vertical m (65 ft) below the natural seafloor of any designated sediment resources is considered bottom disturbing and inconsistent with the requirements of BOEM's NTL No. 2009G04. As of October 2016, BSEE typically requires removal of decommissioned pipelines in these designated areas. For pipelines outside of these areas, the BSEE Gulf of America Regional Supervisor may permit decommissioning-in-place (DIP) if he or she determines that the pipeline does not constitute a hazard or obstruction to navigation and commercial fishing operations, unduly interfere with other uses of the OCS, or have adverse environmental effects (30 C.F.R. § 250.1750). Pipelines previously decommissioned in place may be required to be removed if BSEE's Gulf of America Regional Supervisor determines that the pipeline is an obstruction (30 C.F.R. § 250.1754).

In addition, BOEM may require OCS oil and gas lessees to undertake measures deemed economically, environmentally, and technically feasible to protect SSRA resources to the maximum extent practicable. Measures may include modification of operations and monitoring of pipeline locations after installation. Under Alternatives C and D, blocks containing SSRAs are excluded from

leasing and would therefore have less space-use conflicts with GOA oil and gas development as the result of the proposed action. However, limited space-use conflicts could still arise from actions that might temporarily occupy similar space (e.g., vessel traffic and pipeline installations), but those actions could still be mitigated through the use of plan or permit conditions of approval.

Space-use conflicts between renewable energy activities in the Wind Energy Area Options (i.e., Areas A, B, C, D, E, F, G, and H) as of April 2024, the final identified WEAs (i.e., Areas I, J, K, L, and N), Wind Energy Leases (i.e., OCS-G 37334), and the placement of OCS oil and gas infrastructure could also occur under the proposed action (Alternatives B-D). The Wind Energy Area Options are described in the wind energy siting analysis and can be found at https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/GOM-WEA-Modeling-Report-Combined.pdf, and the final identified WEAs are detailed in the Memorandum for Area ID and can be found at https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/4683-Memorandum-for-Area-ID-GOM.pdf, and Wind Energy Lease OCS-G 37334 (https://www.boem.gov/renewable-energy/state-activities/lease-ocs-g-37334-rwe-offshore-us-gulf-llc It should be noted that the WEA Options are subject to change in the future as the needs of BOEM's Renewable Energy Program mature. Both conventional energy leases and renewable energy leases give BOEM the right to lease within an already leased area, provided the activity does not unreasonably interfere with the original lease holder's use of its lease. Renewable energy infrastructure occupies large areas and consists of many cables on the seafloor that connect the turbines and offshore substations. Although allowable, it could be difficult to place OCS oil and gas infrastructure within the same areas as the renewable energy infrastructure. In addition, there could be compounded safety issues from increased vessel traffic if renewable energy and OCS oil and gas infrastructure are placed near each other. However, the marine spatial planning modelling that BOEM performed with the NOAA (Randall et al. 2022) included oil and gas infrastructure distancing when determining the appropriate locations of the WEAs (Celata 2022; Kendall 2023). BOEM may fund studies or additional modeling in the future to examine whether these areas are compatible if the potential for conflicts arises or as the needs of BOEM's Renewable Energy Program mature. Under Alternatives C and D, GOA oil and gas leasing is excluded from the final and optional WEAs and Call Area, respectively. These exclusions would minimize the space-use conflicts between OCS wind energy and oil and gas development.

At this time, BOEM and BSEE are examining potential regulations that address the transportation and storage of CO_2 on the OCS. Potential future carbon sequestration projects in the GOA could have space-use issues with OCS oil- and gas-related activities. Since there is not an existing decision on potential regulations, carbon sequestration activities are considered speculative at this time and are not reasonably foreseeable under NEPA (see **Appendix B.4.2.7**). Information on State carbon sequestration activities is provided in **Appendix B.4.2.5**.

Another newly developing resource in the GOA that could potentially lead to space-use conflicts in the future are offshore critical minerals, however, they are not considered reasonably foreseeable at this time. BOEM is developing a National Offshore Critical Minerals Inventory (NOCMI) and using information collected from collaborative work with our partners at USGS and

NOAA to locate and assess deposits of these minerals and their environments. To quantify this reserve, BOEM actively documents the location and abundance of offshore critical minerals. The GOA is likely to contain heavy minerals and brine lakes. Recent projects include mapping brine pools on the seabed of the GOA. More information on critical minerals is available on the BOEM website at https://www.boem.gov/marine-minerals/critical-minerals.

Alternative A would limit adding more OCS oil- and gas-related, space-use conflicts that could occur with other OCS activities, including in the SSRA blocks, WEA Options as of April 2024, final identified WEAs, and Wind Energy Lease(s) (i.e., OCS-G 37334). Within the SSRA blocks there would not be competing interests between the use of OCS sediment resources for coastal restoration and leasing for OCS oil and gas resources from the proposed action since the proposed OCS oil and gas lease sale would not occur. Limiting the amount of infrastructure that may be installed within SSRA blocks could reduce potential safety concerns with the installation or movement of infrastructure that may impact a borrow site. In addition, reducing space-use conflicts between potential on-lease infrastructure on an SSRA block, particularly pipelines, that restrict access to sediment resources ensures that potential sediment resource areas remain viable for dredging that could occur in the SSRA blocks. Similarly, under Alternative A, space-use conflicts and potential infrastructure incompatibility between renewable energy activities in the WEA Options as of April 2024, final identified WEAs, and Wind Energy Lease(s) (i.e., OCS-G 37334) and the placement of OCS oil and gas infrastructure would not occur. Renewable energy infrastructure could be emplaced without the need for bottom-disturbing activity setbacks for OCS oil- and gas-related infrastructure and activities. In addition, there would not be increased vessel traffic in the area due to both renewable energy and new OCS oil- and gas-related activities in the same area. Carbon sequestration and critical minerals are emerging uses of the OCS. Limiting OCS oil and gas infrastructure in these prospective areas could reduce space-use conflicts and allow more area for these potential new projects.

4.0.2.3 Decommissioning

OCSLA and its implementing regulations, as well as the terms and conditions of the offshore oil and gas leases, ROWs, and RUEs granted by DOI and other applicable laws and regulations, require lessees, operation right holders, and holders of ROWs and RUEs to, among other things: (i) permanently plug all wells; (ii) remove all platforms and other facilities; (iii) decommission all pipelines; and (iv) clear the seafloor of all obstructions created by the lease, pipeline ROW, and RUE operations within one year after termination or when BSEE determines they no longer have future use (hereinafter, decommissioning activities). See 43 U.S.C.1334; 30 C.F.R. 250, subparts J and Q. Decommissioning trends and activities are summarized in **Chapter 3** with more detail in **Appendix B** and **C**. The potential impacts from decommissioning activities from the proposed action and cumulative OCS oil and gas activities were considered as part of the impact analysis for each resource in **Chapter 4**. Additionally, all applications for infrastructure decommissioning undergo site-specific NEPA reviews prepared by BOEM that are tiered to this Programmatic EIS for potential impacts and other compliance requirements. The GAO reviewed BSEE's management of oil and gas pipelines (GAO 2021) and oversight of decommissioning deadlines (GAO 2024). As a result, the

GAO made four recommendations to DOI to strengthen BSEE and BOEM's decommissioning oversight and enforcement. DOI has agreed with the recommendations made by these GAO reports and is currently working towards their implementation (see **Appendix C**).

4.0.3 Impact Analysis Framework

Chapters 4.1-4.17 describe the affected environment and analyze the potential impacts of a representative, single proposed OCS oil and gas lease sale on each resource category. These analyses incorporate by reference the baseline characterization of the environmental setting, affected environment, and description of potential impacts provided in the GOM Oil and Gas SID. New, relevant information released since development of the GOM Oil and Gas SID, and a summary of any incomplete or unavailable information and how it was addressed, are included throughout the resource analyses below. Each resource analysis begins by defining the resource, summarizing the affected environment, identifying the relevant impact-producing factors, and outlining the existing, applicable protective measures and regulatory requirements. Each resource then compares the potential impacts from routine OCS oil- and gas-related activities and accidental events for each of the alternatives, including Alternative A (i.e., cancellation of a single proposed OCS oil and gas lease sale). Cumulative impacts are analyzed within each resource section and then for all alternatives collectively in **Chapter 4.17**.

Lessees are required to perform OCS oil- and gas-related activities in accordance with all regulatory requirements. Therefore, this analysis includes the application of those regulatory requirements when making impact determinations. In addition, Alternatives B-D would require each lessee to avoid or minimize potential impacts on the environment by complying with various imposed lease stipulations or through post-lease conditions of approval. Mitigating measures in the form of lease stipulations are enforceable as part of the lease should the decisionmaker choose to implement them in a Record of Decision and Final Notice of Sale (see **Appendix J**). Post-lease mitigating measures are applied as conditions of approval for site-specific plans. To assist the decisionmaker in choosing which stipulations to apply, the impacts of a representative single sale are analyzed both with and without their application in each applicable resource analysis below. However, analysis of impacts from ongoing activities associated with previous OCS oil and gas lease sales (analyzed under Alternative A) assume lease stipulations and post lease mitigations are applied.

Figure 4.0-1 is a sand diagram that shows the different layers of factors that could affect each resource category considered in this Programmatic EIS. The bottom two layers of the sand diagram (green and blue) are discussed in detail in the GOM Oil and Gas SID and 2024-2029 National OCS Oil and Gas Program Programmatic EIS. The potential effects from routine OCS oil- and gas-related activities are derived from knowledge and analyses of past and present activities (i.e., blue layer) but can be applied to the assessment of a proposed action as well (i.e., orange layer). The top two layers (orange and yellow) are analyzed in further detail below with the application of a specific development scenario, incorporating the initial screening and description of potential effects in the GOM Oil and Gas SID (BOEM 2023b) by reference.

The discussion of the baseline conditions (green and blue layers) considers everything that is currently affecting the resource and includes all existing and past natural and anthropogenic IPFs other than OCS oil- and gas-related activities associated with future Gulf of America OCS oil and gas leasing. Non-OCS oil- and gas-related IPFs (green layer) include, but are not limited to, natural events such as major storms and hurricanes, climate-related factors and ocean acidification, commercial fishing, nonpoint-source runoff, fossil fuel combustion, military operations, and State oil and gas activities (see Chapter 3 of the GOM Oil and Gas SID). Past and present (i.e., ongoing) OCS oil- and gas-related activities (blue layer) is the second component of baseline conditions considered in this Programmatic EIS. The analysis of the action alternatives (orange layer) examines the effects that could occur from routine OCS oil- and gas-related activities and accidental events associated with a single proposed GOA oil and gas lease sale. Each resource chapter makes impact determinations using the definitions in **Table 4.0-2** and **Table 4.0-3**. Conclusions are reached for adverse impacts, and any beneficial impacts are identified and classified with a conclusion level where possible.

The cumulative analysis throughout this Programmatic EIS considers environmental and socioeconomic impacts that may result from the incremental impacts of a proposed action and the cumulative impacts of a proposed action when added to all past, present, and reasonably foreseeable OCS oil- and gas-related activities, as well as non-OCS oil- and gas-related activities (e.g., import tankering and commercial fishing. It incorporates by reference and builds on the analysis of current and future baseline conditions for the GOA and cumulative effects provided in the 2024-2029 National OCS Oil and Gas Program Programmatic EIS (BOEM 2023d). Past and present effects were incorporated into the baseline environmental conditions and evaluation of impacts under the No Action Alternative for each resource. This includes an evaluation of projected activity and cumulative effects from previous OCS oil and gas lease sales. The effects of a proposed OCS oil and gas lease sale (orange) are evaluated in context and addition to the effects of all past, present, and future IPFs (both OCS oil- and gas-related and non-OCS oil and gas-related; green, blue, and yellow layers) to determine the potential cumulative and incremental effects of a single proposed OCS oil and gas lease sale on each resource.

Consistent with the intent of NEPA, this analysis focuses on resources that could potentially be impacted by the Proposed Action. Our evaluation of all resources in **Table 2.4-2** revealed that Pelagic Communities and Habitats, Commercial Fisheries, Recreational Fishing, and Recreational Resources would experience impacts ranging from minor to negligible from the Proposed Action. To maintain focus and adhere to required page limits in this Programmatic EIS, we have streamlined the analysis of these four resources in the main body. **Appendix M** provides detailed explanations for their negligible or minor impacts. It is important to note, however, that these resources may be within the scope of analysis for future actions like subsequent lease sales or post-lease NEPA reviews.

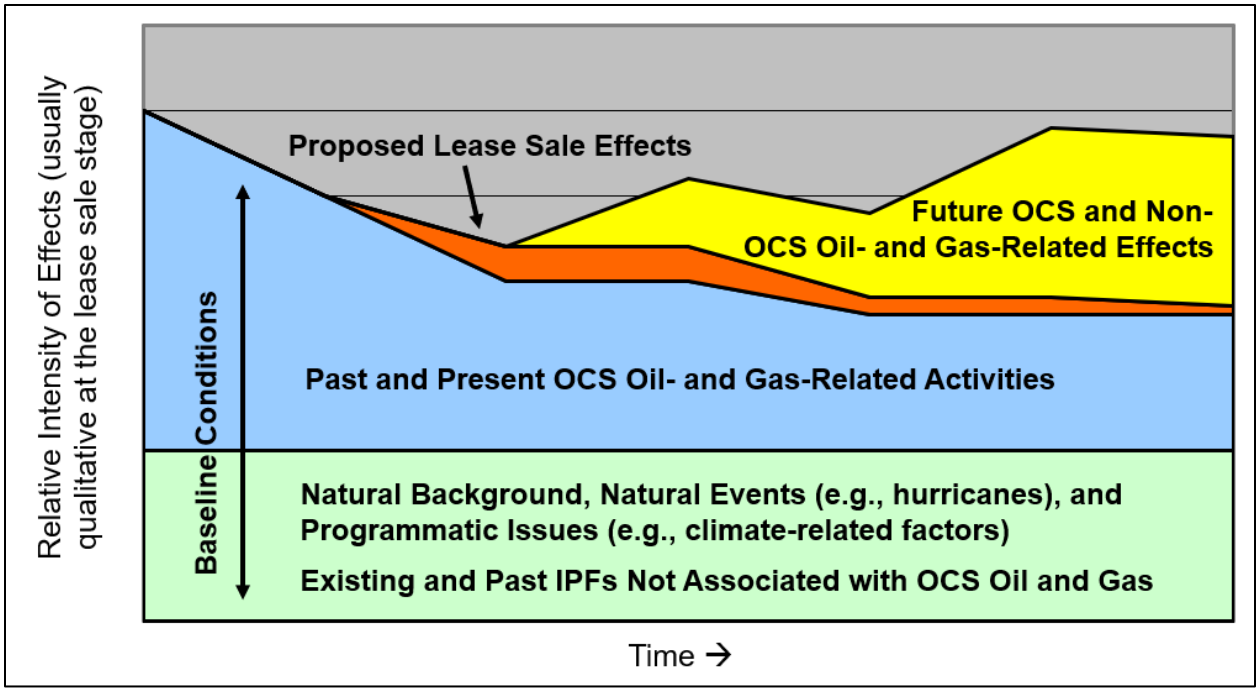

Figure 4.0-1. Sand Diagram of How an Effects Analysis is Layered (sand diagram is illustrative only and is not intended to depict actual scale or estimates for the various activities).

Table 4.0-2. Potential Adverse Impact-Level Definitions.

Impact Level	Biological, Archaeological, and Other Physical Resources	Socioeconomic Resources
None	The action has no effect.	The action has no effect.
Negligible	No measurable or detectable impacts. Impacts would be indistinguishable from localized existing conditions. The disturbance would not result in any perceptible changes in behavior of protected species.	No measurable or detectable impacts.
Minor	**Adverse localized impacts on the affected resource(s), including** • the local ecosystem health; • the extent and quality of local habitat for both special-status species and species common to the proposed project area; • acute change(s) in behavior but no mortality or permanent injury to an individual or group of protected species; • the richness or abundance of local species common to the proposed project area; • a measurable negative impact on air quality that is likely influenced by the emissions or distinguishable from localized existing conditions; • water quality; and • archaeological resource(s) could be avoided; • **OR** measurable impacts that occur would be small and the affected resource is expected to recover completely without remedial or mitigating action.	**Adverse localized impacts on the affected resource(s), including** • most adverse impacts on the affected activity or community could be avoided; • impacts would not disrupt the normal or routine functions of the affected activity or community; • **OR** the affected activity or community is expected to return to a condition with no measurable effects without remedial or mitigating action.
Moderate	**A notable and measurable localized adverse impact on the affected resource(s), including** • the local ecosystem health; • the extent and quality of local habitat for both special-status species and species common to the proposed project area; • impacts to protected species, some of which may be irreversible, that would include chronic behavioral changes or even death but that would not affect the fitness of the population; • the richness or abundance of local species common to the proposed project area; • a notable and measurable negative impact on air quality that is likely influenced by the emissions or distinguishable from localized existing conditions; • water quality; and • archaeological resource(s) would be anticipated, some of which may be irreversible; • **OR** the affected resource would recover completely when remedial or mitigating action is taken.	**A notable and measurable localized adverse impact on the affected resource(s), including** • mitigation would reduce adverse impacts substantially during the life of the proposed project, including decommissioning; • the affected activity or community would have to adjust somewhat to account for disruptions due to notable and measurable adverse impacts of the project; • **OR** once the impacting agent is gone, the affected activity or community is expected to return to a condition with no measurable effects when remedial or mitigating action is taken.
Major	**A regional or population-level impact on the affected resource(s), including** • ecosystem health; • the extent and quality of habitat for both special-status species and species common to the proposed project area; • physical injury, permanent disruption of behavioral patterns, or mortality of protected species to the extent the viability of the population is diminished; • species common to the proposed project area; • a notable and measurable negative impact on air quality, localized or regional, with chronic effects that would not fully recover even after remedial action is taken; • water quality; and • archaeological resource(s) would be anticipated; • **AND** the affected resource would not fully recover, even after the impacting agent is gone and remedial or mitigating action is taken.	**A regional or population-level impact on the affected resource(s), including** • mitigation would reduce adverse impacts somewhat during the life of the proposed project, including decommissioning; • the affected activity or community would have to adjust to significant disruptions due to large local or notable regional adverse impacts of the project; • **AND** the affected activity or community may retain measurable effects indefinitely, even after the impacting agent is gone and remedial action is taken.

Note: Additions to the above impact-level definitions for protected species are in italics.

Table 4.0-3. Potential Beneficial Impact-Level Definitions Being Considered.

Impact Level	Biological, Archaeological, and Other Physical Resources	Socioeconomic Resources
Negligible	Either no effect or no measurable or detectable impacts.	Either no effect or no measurable or detectable impacts.
Minor	**A small and measurable localized** • improvement in ecosystem health; • increase in the extent and quality of habitat for both special-status species and species common to the proposed project area; • increase in individuals or population(s) of species common to the proposed project area, which maintains or aids in species recovery to ideal population size or carrying capacity; • improvement in air or water quality; • **OR** limited aerial extent or short-term temporal duration of improved protection of archaeological resource(s).	**A small and measurable** • improvement in human health; • benefits for employment; • improvement to infrastructure/facilities and community services; • economic improvement; • **OR** benefit for tourism or cultural resources.
Moderate	**A notable and measurable localized** • improvement in local ecosystem health; • increase in the extent and quality of local habitat for both special-status species and species common to the proposed project area; • increase in individuals or populations of species common to the proposed project area, which maintains or aids in species recovery to ideal population size or carrying capacity; • improvement in air or water quality; • **OR** extensive/complete aerial extent, or long- term temporal duration of, improved protection of archaeological resource(s).	**A notable and measurable** • improvement in human health; • benefits for employment; • improvement to infrastructure/facilities and community services; • economic improvement; • **OR** benefit for tourism or cultural resources.
Major	**A regional or population-level** • improvement in the health of ecosystems; • increase in the extent and quality of habitat for both special status and commonly occurring species; • improvement in air or water quality; • **OR** permanent protection of archaeological resource(s).	**A large local or notable regional** • improvement in human health; • benefits for employment; • improvement to infrastructure/facilities and community services; • economic improvement; • **OR** benefit to tourism or cultural resources.

4.1 AIR QUALITY

"Air quality" refers to the degree to which the ambient air is free from pollution generated from various natural and anthropogenic air emission sources. The term "air emission" describes the gases and particles released by different sources. "Ambient air" refers to that portion of the atmosphere, external to buildings, that is accessible to the public (40 CFR 50.1(e)).

Air emissions and pollution are mobile and can undergo chemical transformations in the atmosphere. They may also deposit onto solid surfaces and bodies of water. The movement and mixing of air emissions and pollution is largely influenced by meteorology (e.g., temperature, sunlight, precipitation, and wind) of the region (Biazar et al. 2010), making it important to consider both when assessing air quality. Factors like circulation patterns, geography, time of day, season, and other variables can also influence the dispersion and transformation of pollutants, affecting the overall air quality in a region.

Air quality is evaluated through several pollution indicators, including CAPs, hazardous air pollutants (HAPs), GHGs, visibility, and other factors. Some pollution indicators, such as CAPs and HAPs, are known to have both direct and indirect effects on air quality. For example, O_3 is not an air emission but is classified as an ambient air pollutant (USEPA 2020c). In this analysis, both air emissions and ambient air pollutants are considered.

In this analysis, GHGs are also classified as air pollutants because they directly affect human health when found in ambient air (USEPA 2009). Specifically, GHGs like CH_4 present an environmental risk as a combustible gas (BSEE 2015b; National Institute of Standards and Technology 2021). Furthermore, CH_4 has a role in the formation of O_3, which is a harmful ambient air pollutant (USEPA 2020c; West and Fiore 2005). In addition to their effects on air quality, GHGs are key contributors to the greenhouse effect that influences the Earth's climate (National Research Council 2020). However, this chapter focuses on GHGs in relation to air quality, rather than their broader climate impacts. The contribution of GHGs from the proposed action to future climate impacts is discussed in **Chapter 4.0.2.1** and **Appendix K**.

4.1.1 Affected Environment

For this analysis, the affected environment comprises parts of the WPA, CPA, and EPA including the States of Texas, Louisiana, Mississippi, Alabama, and Florida and their respective State waters, as depicted in Figure 4.1-1 of the GOM Oil and Gas SID. This area also includes national parks and Federal wilderness areas (e.g., Breton Wilderness Area) where air quality and air quality-related values (AQRVs) are protected more stringently than under NAAQS. Chapter 4.1 of the GOM Oil and Gas SID examined the AQRVs (i.e., visibility, potential deposition effects, and potential ozone effects) for the Breton Wilderness Area as well as the following primary pollutants:

- criteria air pollutants (CAPs)—carbon monoxide (CO), lead (Pb), nitrogen oxides (NO_x) (includes NO_2), sulfur dioxide (SO_2), particulate matter less than or equal to 10 µm (PM_{10}), particulate matter less than or equal to 2.5 µm ($PM_{2.5}$), and O_3.

(Though not directly emitted, O_3 is also a criteria air pollutant formed from photochemical reactions);

- criteria precursor air pollutants (CPAPs)—ammonia (NH_3), volatile organic compounds (VOCs), and NO_x;
- select hazardous air pollutants (HAPs) and sources; and
- greenhouse gases (GHGs)— CO_2, CH_4, and nitrous oxide (N_2O).

There is limited monitoring data available for ambient concentrations of certain air pollutants, including HAPs and GHGs, in the region (USEPA 2009; 2023b; 2024a). Emissions inventory reports were used to estimate air emissions for pollutants that lack monitoring data. The *Air Quality Modeling in the Gulf of Mexico Region* (Wilson et al. 2019b), *Year 2017 Emissions Inventory Study* (Wilson et al. 2019a), and *Year 2017 National Emissions Inventory Data* (USEPA 2020a) that align with the inventory year were used to support this analysis and are incorporated by reference. **Chapter 4.1.3** discusses why the *Year 2017 Emissions Inventory Study* (Wilson et al. 2019a) is used in this analysis rather than the *Outer Continental Shelf Air Quality System (OCS AQS): Year 2021 Emissions Inventory Quality Assurance/Quality Control (QA/QC) Study* (Thé et al. 2023). Certain offshore emissions reported in the emissions inventories are subject to regulation, as indicated in **Table 4.1-2**.

Criteria Air Pollutants (CAPs): Ambient air quality monitoring shows that onshore CAP levels along the Gulf Coast are below the NAAQS, except for the Houston-Galveston-Brazoria nonattainment area for O_3 and the St. Bernard nonattainment area for SO_2 (**Figure 4.1-1**).

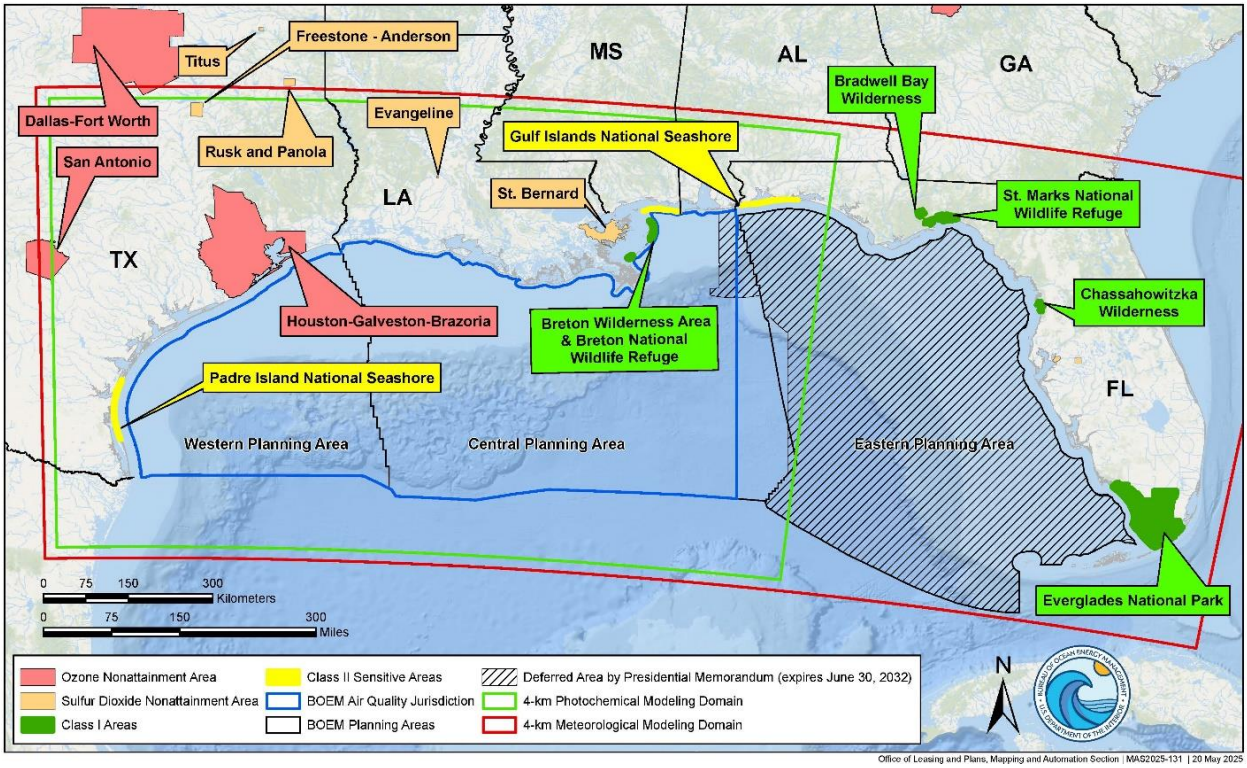

Figure 4.1-1. Gulf of America Region with the Planning Areas, Nonattainment Areas, BOEM's Air Quality Jurisdiction, and Class I and Sensitive Class II Areas.

Air Quality-Related Values (AQRVs): The current conditions of AQRVs in the Breton Wilderness Area concerning visibility and acid (nitrogen and sulfur) deposition are documented through air quality monitoring and were used to support this analysis (National Atmospheric Deposition Program 2021; 2023a; USEPA 2020b). This paragraph focuses solely on the current conditions of nitrogen deposition; other AQRVs, visibility and sulfur deposition, are addressed in Chapter 4.1 of the GOM Oil and Gas SID. The two National Atmospheric Deposition Program's (NADP) sites monitoring deposition near the Breton Wilderness Area are (1) the Southeast Research Station (LA30) located in Washington Parish, Louisiana; and (2) the Grand Bay National Estuarine Research Reserve (MS12) located in Jackson County, Mississippi (National Atmospheric Deposition Program 2023b). The MS12 site's year 2022 total nitrogen (N) deposition was 3.0 kilograms/hectare (kg/ha) (National Atmospheric Deposition Program 2023c). The LA30 site's year 2022 total nitrogen (N) deposition was 3.8 kg/ha (National Atmospheric Deposition Program 2023a). Across the U.S, critical loads range from 2.8 to 5.6 kg/ha/yr (Clark et al. 2018). Critical load "is used to describe the threshold of air pollution deposition that causes change to sensitive resources in an ecosystem;" thus, if the critical load threshold is exceeded, some effects may be experienced by sensitive resources (National Atmospheric Deposition Program 2020; USEPA 2011). The nitrogen (N) deposition threshold value for the Eastern U.S. is 0.010 kg/ha/yr (USFS et al. 2010). Regarding the AQRV for O_3 effects in the Breton Wilderness Area, the U.S. Fish and Wildlife Service (FWS), which oversees the area, has not established metrics for determining phytotoxic ozone concentrations (i.e., concentrations where negative effects on vegetation could be expected). As a result, the AQRV for O_3 effects in the Breton Wilderness Area is unknown; however, the Breton

Wilderness Area has some protection from ozone due to the secondary ozone NAAQS (8-hr O_3) standards.

Hazardous Air Pollutants (HAPs): Most HAP emissions are from onshore sources. However, acetaldehyde, benzene, ethylbenzene, formaldehyde, hexane, toluene, and xylenes from OCS oil- and gas-related sources contributed more than the 10 tons (11 short tons) per year threshold (adapted from the Clean Air Act Amendments § 7412(a)(1)), as shown in Table 2.1.1-2 of the GOM Oil and Gas SID, which may be substantial enough to influence local air quality. The OCS oil- and gas-related sources (excluding accidental events) contributed approximately 1-4 percent of total HAP emissions for each HAP compared to 96-99 percent for non-OCS oil- and gas-related sources in the offshore areas of the GOA and onshore areas of the five Gulf Coast States (see **Appendix B.2.1** of this Programmatic EIS and Chapter 2.1 of the GOM Oil and Gas SID). Because many variables influence the degree of impacts (e.g., location, meteorological conditions, and source type), each HAP emission has different localized and regional impacts on air quality, with urban areas likely to experience the most effects because of the higher density of air emission sources. Houston, Texas, had annual HAP concentrations less than their respective long-term air monitoring comparison values (AMCVs), except for benzene (Phillips et al. 2022). Acetaldehyde, benzene, and formaldehyde are likely to have the greatest effects to air quality compared to other HAPs because they contribute more than 50 percent to public health risks at a national level (USEPA 2014).

Greenhouse Gases (GHGs): This paragraph focuses solely on the current conditions of methane (CH_4), while CO_2 and N_2O are addressed in Chapter 4.1 of the GOM Oil and Gas SID. Non-OCS oil- and gas-related sources and oil- and gas-related sources contribute 89 percent and 11 percent of the CH_4 emissions in the GOA region, respectively (see Chapters 4.1.2.1 and 4.1.2.2 of the GOM Oil and Gas SID). Though there are more methane emission sources from non-OCS oil- and gas-related activities when compared to routine OCS oil- and gas-related activities (see **Appendix B**), petroleum and natural gas systems onshore and offshore are major contributors of anthropogenic methane to the environment at a national level (USEPA 2023e). The most immediate effects from methane emissions would be localized, whereas areas farther from the source would experience less effects due to the oxidation of methane (BSEE 2015b; Forster et al. 2007).

4.1.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in Chapter 4.1 of the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact air quality. Non-OCS oil- and gas-related activities have the potential to impact air quality (**Table 4.1-1**). These IPFs and their potential to affect air quality are discussed below and in greater detail in Chapter 4.1.2 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.1.2 of the GOM Oil and Gas SID.

Table 4.1-1. Impact-Producing Factors with the Potential to Impact Air Quality.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Air Emissions and Pollution	Unintended Releases into the Environment	Air Emissions and Pollution
-	Response Activities	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

There are several existing regulatory programs and requirements to reduce or minimize the environmental effects of these IPFs to air quality in the GOA (**Table 4.1-2**). For example, BOEM's regulations require air quality reviews for all post-lease plans (see Chapter 5.6 of the GOM Oil and Gas SID) and, if required based on site-specific environmental reviews, BOEM assigns conditions of approval that are enforced by BSEE. Lessees are required to conduct OCS oil- and gas-related activities, including decommissioning, in accordance with all regulatory requirements. Therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements when making impact determinations for routine activities.

Table 4.1-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Air quality reviews of all site-specific plans for compliance with NAAQS through OCSLA[2]	BOEM, BSEE	Air Emissions and Pollution – CAPs only	Chapter 5.6 of the GOM Oil and Gas SID, 30 CFR 550, 30 CFR 250
International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI and the Act to Prevent Pollution from Ships (APPS)	USEPA, USCG	Air Emissions and Pollution – CAPs only	33 U.S.C. 1901-1915 – Prevention of Pollution from Ships
Air quality permits for compliance with Section 328 of the Clean Air Act[3]	USEPA	Air Emissions and Pollution – CAPs and HAPs only	40 CFR 55

[1] See Chapter 6 of the GOM Oil and Gas SID for conditions of approval commonly applied at the post-lease stage.
[2] Only for activities in the Central and Western Planning Areas (west of longitude 87.5 degrees).
[3] Only for activities in the Eastern Planning Area (east of longitude 87.5 degrees).

4.1.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities from ongoing OCS oil and gas program (i.e., past lease sales in the GOA). However, the routine activities described would be similar for a single proposed OCS oil and gas lease sale and reasonably foreseeable future OCS oil and gas lease sales in the GOA.

Air Emissions and Pollution: To evaluate the impacts on ambient air concentrations, the modeled ambient air concentrations from the study *Air Quality Modeling in the Gulf of Mexico Region*

(Wilson et al. 2019b) were used where possible, and the *Year 2017 Emissions Inventory Study* (Wilson et al. 2019a) was used to estimate air emissions for pollutants that do not have modeled ambient air concentrations. **Chapter 4.1.3** discusses why the *Year 2017 Emissions Inventory Study* (Wilson et al. 2019a) is used in this analysis rather than the *Outer Continental Shelf Air Quality System (OCS AQS): Year 2021 Emissions Inventory Quality Assurance/Quality Control (QA/QC) Study* (Thé et al. 2023). **Table B.2-1** lists the phases and related sources of air emissions associated with OCS oil- and gas-related activities, including decommissioning. Chapter 2.1.1 of the GOM Oil and Gas SID discusses the OCS oil- and gas-related activities causing air emissions, including their estimated air emissions under existing baseline conditions.

When the total CAP and CPAP emissions of the GOA are combined, the routine OCS oil- and gas-related activities for the ongoing OCS oil and gas program (i.e., activities resulting from past lease sales in the GOA excluding the proposed action) contributed less than 1 percent of SO_2, PM_{10}, $PM_{2.5}$, Pb, VOCs, ammonia (NH_3), and CO, and 3 percent for NO_x to the total CAP and CPAP emissions in 2017. For total HAP emissions in the GOA, the ongoing OCS oil and gas program contributed an estimated 1-4 percent for each of the 28 HAPs listed in Chapter 4.1 of the Oil and Gas SID. For total GHG emissions in the GOA, the ongoing OCS oil and gas program contributed an estimated 1 percent for CO_2, 11 percent for CH_4, and 1 percent for N_2O. As discussed in Chapter 4.1.2.1 of the Oil and Gas SID, most air emissions in the GOA are attributed to onshore non-OCS oil and gas-related sources like motor vehicles, industrial processing, refineries, waste disposal, pesticides, and fertilizers.

Gorchov Negron et al. (2023) determined that the *Year 2017 Emissions Inventory Study* (Wilson et al. 2019a), which is incorporated by reference and used to support this analysis, underestimates reporting of CH_4 emissions from shallow-water facility sources such as cold vents (Ayasse et al. 2022; Gorchov Negron et al. 2023). The cold vents involve direct release of natural gas into the atmosphere (i.e., venting), usually for operational and safety reasons (American Petroleum Institute 2014; DOE 2019). The potential causes for the underestimates of methane emissions from shallow-water facilities could be unintended releases of methane (i.e., accidental events) or undetected leaks, noncompliance issues, misquantification of releases (e.g., flare efficiencies used to calculate methane emissions in the emission inventories), or misreporting (Gevondyan et al. 2024; Office of Inspector General 2022; Wilson et al. 2019a). For flare efficiencies, the *Year 2017 Emissions Inventory Study* assumed flares are operating under stable conditions with a combustion efficiency of about 98% unless an operator reported otherwise (Wilson et al. 2019a). A lower combustion efficiency value would increase methane emission estimates in the inventory. For misreporting, a recent BOEM (2024) report identified discrepancies in reported venting and flaring records between BSEE and the Energy Information Administration (EIA) (Gevondyan et al. 2024). Facilities related to rights-of-way are also being investigated for misreporting methane emissions. Approximately 36 platforms (14.4%) of total non-reporters in the *Year 2017 Emissions Inventory Study* were from right-of-way related facilities (Wilson et al. 2019a). In 30 CFR 556.105, a right-of-way refers to an authorization issued by BSEE under the authority of section 5(e) of the OCSLA for the use of submerged lands of the OCS for pipeline purposes.

A report from the Office of Inspector General (OIG) found concerns with inaccurate venting and flaring records submitted to BSEE by one company related to six of their more than 500 offshore facilities (Office of Inspector General 2022). It is possible that the shallow-water oil and gas platform "superemitters" described in the Gorchov Negron et al. (2023) study correlates to the findings in the OIG report on venting and flaring records and concerns that an unknown number of shallow-water operators are emitting more methane than they are reporting (Office of Inspector General 2022). The OIG report provided BSEE with two recommendations. First, it recommended that BSEE revise its annual facility inspection procedures to require inspectors to examine flaring reports for patterns that may reflect regulatory or statutory violations or amounts that exceed permissible limits. Second, the OIG recommended that BSEE develop a documented process to coordinate with Office of Natural Resources Revenue (ONRR) if violations are detected to ensure that ONRR receives the royalties owed for improperly vented or flared natural gas. BSEE implemented both OIG recommendations.

If similar discrepancies as described in the OIG (2022) report were occurring on a large scale, it could indicate that emissions for VOC, CO_2, CH_4, and HAPs are underestimated in the *Year 2017 Emissions Inventory Study*. While literature and the OIG report indicate that the *Year 2017 Emissions Inventory Study* underestimate methane (CH_4) emissions, the reasons as to why this is occurring, and to what extent, are unclear. BOEM will continue working closely with BSEE to ascertain the extent and causes of underreported methane emissions and possible implications to future emissions inventory estimates.

Though there are uncertainties in the methane data, the *Year 2017 Emissions Inventory Study* and underlying assumptions (e.g., compliance with existing regulatory requirements) provide a reasonable and credible scenario for purposes of this NEPA analysis without being overly speculative (see 43 CFR 46.30). Gorchov Negron et al. (2023) did find that CO_2 and NO_x emissions were well represented. Furthermore, the *Outer Continental Shelf Air Quality System (OCS AQS): Year 2021 Emissions Inventory Quality Assurance/Quality Control (QA/QC)* study investigated the calculation methods between calendar years 2017 and 2021 and did not identify any errors in the methane (CH_4) calculations (Thé et al. 2023).

The *Year 2017 Emissions Inventory Study* helped BSEE and BOEM identify noncompliance with air quality regulations, such as the misreporting of activity or equipment. BSEE continually works on reducing the likelihood of incidents of noncompliance. The frequency of noncompliance with air quality regulations is unclear, and it remains difficult to identify the number of shallow-water facilities underestimating CH_4 emissions, as well as the number of facilities that could be overestimating methane emissions reported in the entire emission inventories. There are currently no offshore air quality monitors that can be used to monitor facilities; however, BOEM, BSEE, NASA, and NOAA are actively collaborating on how to incorporate remote sensing technologies to improve monitoring of emissions, including CH_4, and regulatory compliance in the future (Dahan et al. 2022; Elvidge et al. 2013; Stauffer et al. 2024).

4.1.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities from the ongoing OCS oil and gas program (i.e., past lease sales in the GOA). However, the accidental events and effects described would be similar for a single proposed OCS oil and gas lease sale and reasonably foreseeable future OCS oil and gas lease sales in the GOA.

Unintended Releases into the Environment: Unintended releases into the environment associated with existing oil and gas leases can result in air emissions and pollution as discussed in **Appendix B.3.1**. The air emissions from OCS oil- and gas-related accidental events depends on the exploration and production products (i.e., oil and gas) and could include CPAPs, CAPs, HAPs, GHGs, and hydrogen sulfide (H_2S). As mentioned in **Section 4.1.2.1**, the reasons for the underestimated methane emissions reported at shallow-water facilities (Gorchov Negron et al. 2023) may potentially be from unintended releases of methane (CH_4) (i.e., accidental events), undetected leaks, misquantification, misreporting, or noncompliance events.

Response Activities: Response activities may include scheduled burnings or dispersants to minimize potentially significant degradation to air quality from the release itself (National Academies of Sciences 2022); however, response activities can also impact air quality through air emissions from equipment, vessels, aircraft, burning of gas and oil, and the application of dispersants via aircraft (see **Appendix B.3.1**).

4.1.2.3 Impact-Producing Factors from Non-OCS Oil and Gas-Related Activities

The non-OCS oil and gas-related activities and associated effects described in this section are applicable to ongoing non-OCS oil and gas-related activities (i.e., past and present non-OCS oil and gas-related activities in the GOA). However, the activities and effects described would also be similar for reasonably foreseeable future non-OCS oil- and gas-related activities in the GOA.

Air Emissions and Pollution: Air emissions and pollution from non-OCS oil- and gas-related activities influence air quality in the GOA. Chapter 2.1.2 of the GOM Oil and Gas SID discusses the non-OCS oil- and gas-related activities causing air emissions, including their estimated air emissions. Most of the CAP and CPAP emissions come from onshore sources, which contribute to the total CAP and CPAP annual emissions in the GOA – about 99 percent for SO_2, PM_{10}, $PM_{2.5}$, Pb, VOCs, NH_3, and (CO, and about 91 percent for NO_x. For the HAP annual emission inventories, onshore sources contribute to the total HAP emissions in the GOA, about 95-99 percent for each of the 28 HAPs. For GHG annual emission inventories, onshore sources contribute to the total GHG emissions in the GOA, about 99 percent for CO_2, 88 percent for CH_4, and 96 percent for N_2O.

Other Environmental Factors: Other environmental factors like climate-related effects from past and ongoing non-OCS oil- and gas-related activities influence air quality in the GOA. Rising regional temperatures and altered meteorological patterns (including more frequent stagnant air

episodes under persistent high-pressure systems) have been documented and are creating more favorable conditions for increased levels of air pollution (Horton et al. 2014; Nolte et al. 2018). Elevated ambient temperatures enhance the photochemical reaction rates that generate O_3 from precursor emissions like VOCs and NO_x. Likewise, prolonged air stagnation events (occurring more frequently during hotter summers) allow reactive air pollutants to concentrate instead of dispersing, leading to higher localized O_3 peaks (Horton et al. 2014). CH_4 from non-OCS oil and gas activities contribute to elevating background tropospheric ozone levels while also intensifying regional warming (Nolte et al. 2018).

Climate-driven changes are also affecting particulate matter and other air quality indicators in the region. Altered weather patterns, including longer dry seasons and drought conditions, have increased the frequency of wildfires and controlled burns in parts of the Gulf Coast and its broader airshed, which in turn leads to episodic spikes in $PM_{2.5}$ concentrations from smoke (Nolte et al. 2018). These fire-related emissions, combined with continuous releases from land-based flaring and combustion engines (e.g., diesel emissions from oil and gas transport), contribute to periods of degraded air quality and visibility. Observational data indicate that the region is experiencing more days with elevated ozone and $PM_{2.5}$ levels during years of anomalous heat and air stagnation (Nolte et al. 2018; USEPA 2023f). Additionally, methane releases from onshore oil and gas operations have an indirect impact to air quality: methane's contribution to warming and chemical reactions in the atmosphere facilitates further ozone formation on a global and regional scale (Bessagnet et al. 2024; USEPA 2023f).

4.1.2.4 Alternatives Analysis

Impacts were analyzed using the lowest and highest annual activity projections within the 40-year analysis period of a single OCS oil and gas lease sale to extrapolate the potential range of emissions. Based on the preliminary screening of air pollutants in Chapter 4.1.2.2.1 of the GOM Oil and Gas SID, the following air pollutants were carried forward for analysis in this Programmatic EIS: 1-hr NO_2 (CAP); annual NO_2 (CAP); 24-hr $PM_{2.5}$ (CAP); annual $PM_{2.5}$ (CAP); 8-hr O_3 (CAP); acetaldehyde (HAP); benzene (HAP); ethylbenzene (HAP); formaldehyde (HAP); hexane (HAP); toluene (HAP); xylenes (HAP); and CH_4 (GHG), as well as AQRVs on nitrogen deposition impacts and potential O_3 effects on vegetation for the Breton Wilderness Area.

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, the direct or indirect impacts to air quality as a result of the proposed action would be **none**. However, ongoing OCS oil- and gas-related activities associated with previous lease sales, and other non-OCS oil- and gas-related activities would continue to potentially affect air quality under all of the alternatives, including the No Action. Under existing conditions, the Houston-Galveston-Brazoria area is experiencing significant impacts (89 FR 51829) on air quality because of its current chronic nonattainment status for O_3 (**Figure 4.1-1**). A comparison of estimated emissions from sources in the GOA under Alternative A is shown in **Table 4.1-3**.

Table 4.1-3. Comparison of Estimated Emissions from Sources in the GOA under Alternative A.

Air Pollutant	Total Tons per Year (tpy) from Ongoing OCS Oil and Gas Sources (%)	Total (tpy) from OCS Sources Other than Oil and Gas (%)	Total (tpy) from Onshore Non-OCS Oil and Gas Sources (%)
Nitrogen dioxide (NO_x)	3.156	6.168	90.676
PM_{10}	0.059	0.107	99.834
$PM_{2.5}$	0.193	0.335	99.472
Ammonia (NH_3)	0.003	0.007	99.990
Sulphur dioxide (SO_2)	0.202	0.756	99.042
Acetaldehyde	0.139	0.099	99.761
Benzene	0.662	0.101	99.237
Ethylbenzene	0.169	0.075	99.755
Formaldehyde	0.369	0.129	99.503
Hexane	3.134	0.095	96.771
Toluene	0.290	0.017	99.693
Xylenes	0.227	0.044	99.729
Methane (CH_4)	11.387	0.118	88.496

Ongoing OCS Oil and Gas Activities: Ongoing OCS oil- and gas-related activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) could still have potential direct impacts to air quality through air emissions and pollution, unintended releases into the environment, and response activities as summarized above in **Chapter 4.1.2.1** and **4.1.2.2**. Ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The existing baseline is summarized in **Chapter 4.1.1,** with further detail in Chapter 4.1.1 of the GOM Oil and Gas SID. Impacts from ongoing OCS oil- and gas-related activities would likely range from **minor** to potentially **major** for certain areas. Given that the Houston-Galveston-Brazoria area is currently classified as nonattainment for ozone (**Figure 4.1-1**), impacts to that area could range from **moderate** to **major**. Individual pollutants with the potential for greater than negligible effects are discussed below.

Criteria Air Pollutants (CAPs): Table 4.1.2-1 of the GOM Oil and Gas SID shows that ongoing OCS oil and gas activities could contribute up to 35.7 percent to the 1-hr NO_2 NAAQS, 15 percent to the annual NO_2 NAAQS, 5 percent to the 24-hr $PM_{2.5}$ NAAQS, 4 percent to the annual $PM_{2.5}$ NAAQS, and 37 percent to the 8-hr O_3 NAAQS, which could result in potentially **minor** to **moderate** impacts to air quality.

Hazardous Air Pollutants (HAPs): **Table 4.1-3** shows that all HAPs resulting from ongoing OCS oil and gas activities would be expected to have **negligible** to **minor** impacts to air quality given their low contributions.

Methane (CH_4): **Table 4.1-3** shows that ongoing OCS oil and gas activities could contribute about 11.4 percent to annual CH_4 emissions from all activities in the GOA region, resulting in **minor** impacts to air quality under existing conditions. However, due to the uncertainty surrounding the CH_4 emissions in the *Year 2017 Emissions Inventory Study*, the associated environmental risks to localized areas could result in up to **moderate** impacts. Localized areas near substantial methane source(s) are likely to experience the most immediate effects.

Air Quality Related-Values (AQRVs) in the Breton Wilderness Area: Using the results from the *Air Quality Modeling in the Gulf of Mexico Region* study (Wilson et al. 2019b), ongoing OCS oil and gas sources could contribute about 0.4303 $kg/ha^{-1} \cdot yr^{-1}$ of nitrogen (N) deposition, resulting in **minor** impacts to air quality under existing conditions. O_3 effects on the Breton Wilderness Area from ongoing OCS oil and gas sources are uncertain because metrics have not been established. However, the secondary ozone NAAQS (8-hr O_3) does factor in effects on vegetation, which was examined above in the CAP section, and concluded that there could be **minor** to **moderate** impacts.

Non-OCS Oil- and Gas-Related Activities: Air emissions and pollution, and other environmental factors associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect air quality under the No Action alternative, as described in **Chapter 4.1.2.3** and Chapter 2.1.2 of the GOM Oil and Gas SID. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. Rising regional temperatures and altered meteorological patterns (including more frequent stagnant air episodes under persistent high-pressure systems) have been documented and are creating more favorable conditions for increased levels of air pollution (Horton et al. 2014; Nolte et al. 2018). Because non-OCS oil- and gas-related activities produce more air emissions and pollution than OCS oil- and gas-related activities as shown in **Table 4.1-3**, the impacts on air quality from non-OCS oil- and gas-related activities are greater.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a regionwide lease sale. This alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table 4.1-4**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.1-4. Impact Determinations for Routine and Accidental Impacts to Air Quality from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Air Emissions and Pollution	N/A	**Negligible** to **Moderate**	Same as Alternative B but with potentially less methane emissions	Same as Alternative B but with potentially less methane emissions
Unintended Releases into the Environment	N/A	**Minor** to **Moderate**	**Minor** to **Moderate**	**Minor** to **Moderate**
Response Activities	N/A	**Minor** to **Moderate**	**Minor** to **Moderate**	**Minor** to **Moderate**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors would be **none**. Impacts from ongoing OCS oil- and gas-related activities would likely range from **minor** to potentially **major** for certain areas. Given that the Houston-Galveston-Brazoria area is currently classified as nonattainment for ozone, impacts to that area could range from **moderate** to **major**. Individual pollutants with the potential for greater than negligible effects are discussed in Ongoing OCS Oil and Gas Activities above.

[1] No programmatic protective measures for air quality (e.g., lease stipulations) for inclusion at the lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for air quality would be considered and applied at the site-specific stage and, therefore, are considered part of the proposed action across all action alternatives (see Chapter 6 of the GOM Oil and Gas SID).

Alternative B – Regionwide OCS Lease Sale

Air Emissions and Pollution

Wilson et al. (2019b) represents reasonable assumptions and estimates suitable for this Programmatic EIS.

Criteria Air Pollutants (CAPs): A single lease sale's OCS oil- and gas-related sources could contribute up to 7.2 percent to the 1-hr NO_2 NAAQS, 4.5 percent to the annual NO_2 NAAQS, 2 percent to the 24-hr $PM_{2.5}$ NAAQS, 5.6 percent to the annual $PM_{2.5}$ NAAQS, and 6 percent to the 8-hr O_3 NAAQS, which could result in potentially **minor** to **moderate** impacts to air quality (see Table 4.1.2-1 of the GOM Oil and Gas SID).

Hazardous Air Pollutants (HAPs): **Table 4.1-5** shows the estimated HAP emissions from a single lease sale using the scenario ranges in **Table 3.3-1** to calculate emissions based on averages from the *Year 2017 Emissions Inventory Study* (Wilson et al. 2019a). Under the high-case activity scenario, there is the potential for up to **moderate** impacts from formaldehyde emissions, while impacts from all other HAPs are expected to be **negligible** to **minor**. Under the low-case scenario, all HAPs resulting from a single lease sale would be expected to have **negligible** impacts to air quality.

Table 4.1-5. Regionwide OCS Lease Sale Low- to High-End Estimated HAP Emissions in Tons per Year (tpy) by Water-Depth Range.

Water Depth (m)	Acetaldehyde (tpy)	Benzene (tpy)	Ethylbenzene (tpy)	Formaldehyde (tpy)	Hexane (tpy)	Toluene (tpy)	Xylenes (tpy)
0-60	0.1-2.3	0.0-1.0	0.0-0.1	0.3-5.8	0.0-1.9	0.0-0.5	0.0-0.4
60-200	0.1-2.5	0.0-2.1	0.0-0.2	0.3-7.0	0.0-5.4	0.0-1.7	0.0-1.0
200-800	0.1-1.9	0.0-1.8	0.0-0.2	0.3-4.9	0.0-2.7	0.0-1.8	0.0-1.0
800-1,600	0.1-3.6	0.0-1.0	0.0-0.1	0.3-7.7	0.0-1.3	0.0-0.5	0.0-0.3
1,600+	0.1-4.3	0.0-0.7	0.0-0.1	0.3-8.7	0.0-1.7	0.0-0.3	0.0-0.3
TOTALS	**0.7-14.7**	**0.2-6.5**	**0.0-0.8**	**1.4-34.0**	**0.0-13.0**	**0.0-4.9**	**0.0-3.0**

Methane (CH_4): **Table 4.1-6** shows the estimated CH_4 emissions from a single oil and gas lease sale using the scenario ranges in **Table 3.3-1** to calculate emissions based on averages from the *Year 2017 Emissions Inventory Study* (Wilson et al. 2019a). **Table 4.1-6** indicates that higher estimated CH_4 emissions would be expected from facilities in water depths less than 200 m (656 ft). Shallow-water facilities commonly vent gas, while deepwater facilities commonly flare gas (burning of natural gas). This is likely because shallow-water facilities tend to be older and not equipped with flares, the volume of gas production tends to be higher than deep water, and most structures are different than those in deep water (Argonne National Laboratory 2017; Gevondyan et al. 2024; Gorchov Negron et al. 2023). The offshore industry, however, is moving away from shallow water gas production using fixed structures to deepwater oil production with floating structures and subsea wells. As a result, venting events associated with fixed structures are likely to steadily decline in the future.

Under the high-case activity scenario, a single OCS oil and gas lease sale could contribute about 0.2 percent to the annual CH_4 emissions from all activities in the GOA region, resulting in **negligible** impacts to air quality under existing conditions. However, due to the uncertainty surrounding the CH_4 emissions for shallow-water facilities in the *Year 2017 Emissions Inventory Study*, which was used to estimate the CH_4 emissions for the single proposed OCS oil and gas lease sale in **Table 4.1-6**, the associated environmental risks to the localized area could result in up to **moderate** impacts. Methane (CH_4) is a combustible gas (National Institute of Standards and Technology 2021). Major impacts are not expected due to the oxidation of methane and its limited effect (40 CFR 51.100(s)) on O_3 production, which minimizes methane's impact to air quality regionally (BSEE 2015a; Forster et al. 2007). Localized areas near methane source(s), which are more frequently observed in water depths of 0-200 m (0-656 ft), are likely to experience the most immediate effects. It is reasonable to expect fewer venting activities from development occurring on future leases issued in water depths greater than 200 m (656 ft) because deepwater facilities commonly flare gas rather than vent (Argonne National Laboratory 2017; Gorchov Negron et al. 2023). Because venting is a primary CH_4 source from OCS oil and gas facilities, fewer venting activities could potentially reduce net methane emissions from the proposed action if most of the resulting leases are in water depths greater than 200 m (656 ft). If a facility's alternative to venting is flaring, CH_4 and VOC emissions are reduced but formaldehyde (HAP), NO_x, CO_2, and CO emissions increase (USEPA 2023f).

Table 4.1-6. Comparison of Estimated CH_4 Emissions for a Single Proposed Oil and Gas Lease Sale (from low to high) When Applying the Projected Production or Projected Activity Scenarios in **Chapter 3.3**.

Water-depth Range	0-60 m	60-200 m	200-800 m	800-1,600 m	1,600+ m
Potential CH_4 emissions (tpy) using projected *production*[1,2]	0-3,810	0-3,822	156-865	93-614	42-317
Potential CH_4 emissions (tpy) using projected *activity levels*[3]	0-463	0-1,021	0-499	0-337	0-390

[1] Emission estimates were based on total facilities amount of CH_4 emissions by water depth from the *Year 2017 Emissions Inventory Study* (Wilson et al. 2019a).

[2] Emission estimates were calculated using ongoing production totals (**Table 3.3-1**). Similar trends were observed using calendar year 2017 production totals (data not shown).

[3] Projected activity is only based on new facilities and not new activity occurring on existing facilities (e.g., tiebacks).

Air Quality-Related Values (AQRVs) in the Breton Wilderness Area: Using the results from the *Air Quality Modeling in the Gulf of Mexico Region* study (Wilson et al. 2019b), a single lease sale's routine OCS oil- and gas-related sources could contribute about 0.0180 kg/ha/yr of nitrogen deposition, resulting in **minor** impacts to air quality under existing conditions. Wilson et al. (2019b) made assumptions and estimates that remain suitable for this programmatic impact analysis for a single lease sale. O_3 effects on the Breton Wilderness Area from a single lease sale's OCS oil- and gas-related sources are uncertain because metrics have not been established. However, the secondary ozone NAAQS (8-hr O_3) does factor effects on vegetation, which was examined above in the CAP section, and concluded that there could be **minor** to **moderate** impacts.

Unintended Releases into the Environment and Response Activities

Air quality can be impacted by unintended releases into the environment and response activities associated with the proposed action (see **Appendix B.3**). The nature and types of impacts from these events would be the same as those discussed for ongoing OCS oil- and gas-related activities under existing conditions. Depending on the magnitude of an accident(s), the affected air quality should recover with or without remedial action. The majority of oil spills (>95%) that have historically occurred in the GOA have volumes of 1 barrel (bbl) or less, as discussed in **Appendix B.3.1.1**. Remedial actions, such as scheduled burnings or dispersants, would contribute to air emissions, but controlling the activities to happen at certain times would allow responders to minimize significant degradation to air quality (National Academies of Sciences 2022). The type of air pollutants emitted would depend on the products. Accidental events would have a **minor** to **moderate** impact across all action alternatives depending on the magnitude of the event and associated response activities. For catastrophic events, see the GOM Catastrophic Spill Event Analysis technical report (BOEM 2021b).

Alternatives C and D

Under Alternatives C and D, there would be less acreage available for leasing in shallow water depths (i.e., less than 200 m [656 ft]). Venting is a primary CH_4 source on oil and gas structures in water depths less than 200 m (656 ft), and **Table 4.1-6** indicates higher estimated methane emissions in shallow-water areas compared to deepwater areas. Therefore, leasing less in

shallow water could potentially decrease venting activities and associated methane emissions (see Alternative B for a discussion of impacts from methane). If a facility's alternative to venting is flaring, methane and VOC emissions are reduced but formaldehyde (HAP), NO_x, CO_2, and CO emissions increase (USEPA 2023f). Air pollutants can react with each other under different meteorological conditions and form other air pollutants at other temporal and spatial scales, causing increases and decreases in air pollutant concentrations. Though under Alternatives C and D there would be less acreage available for leasing in shallow-water depths, this analysis considers air quality for the entire GOA region, and spatial redistribution of activities with no change in the activity levels (**Chapter 3.3.2**) does not change the potential impacts to the GOA region as a whole.

Overall, the impacts of Alternative C or D to regional air quality would likely be similar to Alternative B because both alternatives would still make enough areas in shallow waters available for leasing that activity ranges across all water depths would remain comparable to Alternative B. That said, methane emissions could potentially lessen when compared to Alternative B if leasing under Alternative C or D caused subsequent activity to substantially shift to water depths greater than 200 m (656 ft), where less venting would be anticipated. While it would not change the overall impacts to air quality, if methane emissions were reduced under Alternative C or D, it could lessen the proposed action's net contribution to GHGs as discussed in **Chapter 4.0.2.1**.

4.1.2.5 Cumulative Impacts

The baseline environmental conditions for air quality and evaluation of impacts under the No Action Alternative (Alternative A) include past and present effects from air emissions. This cumulative analysis builds on that foundation by also evaluating potential effects from reasonably foreseeable future OCS oil and gas lease sales and reasonably foreseeable non-OCS oil- and gas-related activities.

In addition to the number and types of contributing activities, the way pollutants interact in the environment is also central to understanding cumulative impacts. These impacts can occur when multiple air pollutants, such as the CAPs, HAPs, CH_4, and N deposition, mix and persist in the atmosphere over time. These combined effects may lead to greater adverse impacts than the sum of each pollutant's impact in isolation. For example, urban areas along the Gulf Coast like the Houston-Galveston-Brazoria area, currently designated as nonattainment for the 8-hr O_3 NAAQS, may be particularly susceptible to cumulative effects due to the higher density of air emission sources in those areas (Li et al. 2023). Despite ongoing research, there remains insufficient information to conclusively assess the long-term cumulative impacts of these pollutant interactions over the 40- to 70-year analysis period described in **Chapter 3.3.2**. However, new efforts in multi-pollutant planning and control are underway to improve understanding and management of these complex interactions (USEPA 2023e; 2023g), as directed under the Clean Air Act and related statutes.

Cumulative OCS Oil and Gas Program: Cumulative impacts from the broader OCS Oil and Gas Program (see **Table 3.3-2**), include emissions from ongoing and reasonably foreseeable future OCS oil- and gas-related activities. These activities may contribute to air quality degradation through

routine air emissions and pollution, unintended releases into the environment, and associated response activities as described in **Chapters 4.1.2.1** and **4.1.2.2**. Emissions would occur episodically over extended periods, varying in magnitude and geographic distribution depending on the nature and timing of leasing and associated activities. The affected environment and existing baseline are summarized in **Chapter 4.1.1,** with further detail in Chapter 4.1.1 of the GOM Oil and Gas SID. Ongoing OCS oil- and gas-related activities would continue to influence baseline conditions regardless of which alternative is selected, with impacts ranging from **minor** to potentially **major** for certain areas. Given that the Houston-Galveston-Brazoria area is currently classified as nonattainment for ozone (O_3) (**Figure 4.1-1**), impacts to that area could range from **moderate** to **major**. As shown in **Table 3.3-1**, the cumulative projections for OCS oil and gas production from 2024 to 2093 are expected to have higher levels of production compared to the ongoing production levels. Therefore, the impacts from future lease sales are expected to be notable and measurable and would result in higher levels of cumulative emissions than from ongoing OCS oil- and gas-related activities.

This Programmatic EIS evaluates air quality impacts using annual contributions relative to regulatory thresholds, rather than aggregating emissions over the entire life cycle of a single proposed OCS oil and gas lease sale. Thresholds, such as the NAAQS, are intended to protect public health and welfare from cumulative impacts stemming from all contributing sources. Given the uncertainty in year-to-year activity levels, this analysis adopts an annual high-case scenario, based on historically high production levels, as a conservative estimate of potential peak impacts in any given year over the 40-year analysis period. Although actual emissions from any single OCS oil and gas lease sale are unlikely to reach these upper bounds annually within the 40-year period, this approach ensures that worst-case effects are appropriately considered.

Table 4.1-7 presents the total cumulative emissions per pollutant over the lifespan of a single OCS oil and gas lease sale, with estimated combined emissions under the high-case single OCS oil and gas lease sale scenario distributed across a 40-year period. Although this information is provided, analyzing impacts based on the total combined volume of emissions over the full single OCS oil and gas lease sale lifespan would be highly speculative and unreliable. This is due to uncertainties in future meteorological conditions, which could either worsen or improve cumulative air quality, as well as other complex and interacting variables that influence regional air pollution over long timeframes. Furthermore, total cumulative emissions were not used for impact analysis because there are no established scientific thresholds for a 40- to 70-year period that would allow for meaningful comparison to emissions from a single OCS oil and gas lease sale. Instead, existing air quality standards are based on shorter-term averaging periods, which are typically set at 1 hour, 3 hours, 8 hours, 24 hours, or annually, depending on the pollutant and are intended to protect public health and welfare from cumulative impacts stemming from all contributing sources.

Table 4.1-7. Estimated Low- to High-End Range of Total Cumulative Emissions Over the Lifespan of a Single OCS Oil and Gas Lease Sale.

Air Pollutant	Total Emissions (low to high) from a Single OCS Oil and Gas Lease Sale (tons)
Nitrogen oxides (NO_x)	633-12,424
PM_{10}	63-1,058
$PM_{2.5}$	59-1,000
Ammonia (NH_3)	1-19
Sulphur dioxide (SO_2)	88-1,353
Acetaldehyde	3-56
Benzene	1-28
Ethylbenzene	0-3
Formaldehyde	6-137
Hexane	0-61
Toluene	0-20
Xylenes	0-12
Methane (CH_4)	1-12,368

Non-OCS Oil- and Gas-Related Activities: In addition to OCS oil- and gas-related activities, future non-OCS oil- and gas-related activities may also contribute to cumulative air quality impacts. These include proposed port infrastructure as described in **Appendix B.4.2.7**. NEPA assessments for these proposed ports suggest that the impacts on air quality would generally be minor. For example, the Texas GulfLink Deepwater Port is proposed approximately 32 miles off the coast of the Houston-Galveston-Brazoria area, where air quality impacts are expected to be minor (USCG and MARAD 2024). Reasonably foreseeable non-OCS oil- and gas-related activities also include site assessment efforts associated with renewable energy leases. The *Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Outer Continental Shelf of the Gulf of Mexico: Final Environmental Assessment* provides estimated annual emissions for these site characterization activities and concludes that impacts on air quality are expected to be negligible to minor (BOEM 2023c).

Weather-related phenomena, including rising temperatures and a higher frequency of wildfires, from future non-OCS oil- and gas-related activities are also expected to intensify over time. Estimating these future impacts on air quality remains challenging, as other emission sources, such as biogenic emissions and those from wildfires, may vary with future changing environmental conditions. These weather-related phenomena are projected to elevate levels of criteria air pollutants such as O_3 and particulate matter (West et al. 2023). Chapter 4.1.2 of the GOM Oil and Gas SID describes the air pollutants of concern and their potential impacts on human health and the environment. Even if anthropogenic emissions were to stop, future effects would persist due to the long atmospheric lifetime of GHGs (Archer and Brovkin 2008, as cited in Gevondyan et al. 2023). For example, methane has an average atmospheric lifetime of about a decade, while CO_2 may persist for hundreds of years (NOAA 2022a). Although there are ongoing efforts at local, State, national, and international levels to reduce GHG emissions, current projections suggest that emissions are expected to continue increasing over the coming decades. This continued increase

would add to the existing concentrations of GHGs in the atmosphere. For additional discussion see **Appendix B.4.2**.

Incremental Contribution of the Proposed Action: Activities associated with a single proposed OCS oil and gas lease sale, regardless of the alternative, would represent a small fraction of overall activity within the existing OCS Oil and Gas Program in the GOA. These activities would contribute less than 1 percent of the cumulative annual emissions in the region when compared to all other sources, including OCS oil- and gas-related activities associated with past sales and other future sales (see **Table 4.1-8**). Beyond routine operations, accidental events and emissions from abandoned infrastructure, such as wells, may also contribute to cumulative methane emissions. Aside from the leaking wells from the Taylor Energy platform that was toppled during Hurricane Ivan, BOEM is currently unaware of any notable actively leaking offshore wells. However, there is no requirement for air quality monitoring data on decommissioned oil and gas wells in the GOA. Additional research is needed to better understand the potential risks and implications these sources may have on cumulative air quality impacts.

Table 4.1-8. Comparison of Estimated Emissions from Sources in the GOA under a Proposed Action.

Air Pollutant	Total (tpy) from a Single OCS Oil and Gas Lease Sale – High Case (%)	Total (tpy) from Ongoing OCS Oil and Gas Sources (%)	Total (tpy) from OCS Sources Other than Oil and Gas (%)	Total (tpy) from Onshore Non-OCS Oil and Gas Sources (%)
Nitrogen oxides (NO_x)	0.151	3.151	6.159	90.538
PM_{10}	0.007	0.059	0.107	99.827
$PM_{2.5}$	0.023	0.193	0.335	99.449
Ammonia (NH_3)	0.001	0.003	0.007	99.989
Sulphur dioxide (SO_2)	0.043	0.202	0.756	98.999
Acetaldehyde	0.011	0.139	0.099	99.750
Benzene	0.018	0.662	0.101	99.219
Ethylbenzene	0.007	0.169	0.075	99.748
Formaldehyde	0.016	0.368	0.129	99.486
Hexane	0.053	3.133	0.095	96.720
Toluene	0.006	0.290	0.017	99.687
Xylenes	0.007	0.227	0.044	99.722
Methane (CH_4)	0.164	11.368	0.117	88.351

The relative contribution of a single OCS oil and gas lease sale is comparable under all action alternatives. While Alternatives C and D would limit available acreage for leasing in shallow-water areas compared to Alternative B, the overall activity levels across the GOA region as a whole would remain unchanged, and spatial redistribution of activities would not be expected to differ meaningfully (see **Chapter 3.3.2**).

In summary, BOEM's evaluation indicates potentially significant cumulative effects on air quality when considering past, present, and reasonably foreseeable OCS oil and gas and non-OCS oil- and gas-related activities in the GOA collectively. In the context of all contributing sources, the *incremental contribution* (**Figure 4.0-1,** solid orange area) of a proposed GOA oil and gas lease sale to cumulative impacts on air quality would likely be **minor** to potentially **major** for certain areas such as the Houston-Galveston-Brazoria area. Because the Houston-Galveston-Brazoria area is classified as serious nonattainment for O_3 as of July 2024 (**Figure 4.1-1**), an additional lease sale would add to cumulative impacts that are already significant and could range from **moderate** to **major**. This would occur if notable and measurable levels of O_3 resulting from the proposed action (a single OCS oil and gas lease sale) were to reach the Houston-Galveston-Brazoria area, hindering the long-term ability of the area to recover from its chronic nonattainment status for ozone within the USEPA deadlines. According to air quality modeling results, current O_3 levels at the monitoring sites in Texas are projected to decline in the coming years (Wilson et al. 2019b). Therefore, an OCS oil and gas lease sale would not be expected to lead to a notable increase in cumulative impacts on air quality, either locally or regionally. Cancellation of a proposed lease sale (i.e., No Action) would not stop most of the OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would still occur and could have impacts similar to those described in **Chapters 4.1.2.1** through **4.1.2.4** above.

4.1.3 Incomplete or Unavailable Information

BOEM has identified the following incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on air quality:

- There is limited monitoring data for ambient concentrations of HAPs and GHGs for the region (USEPA 2009; 2023b). However, this would not likely change the impact conclusions because emissions inventory reports were used to estimate air emissions for HAPs and GHGs.
- Current conditions of AQRV for ozone effects on the Breton Wilderness Area are unavailable because FWS has not established metrics for determining phytotoxic O_3 concentrations. However, some protection is provided under the secondary ozone NAAQS (8-hr O_3).
- The *Outer Continental Shelf Air Quality System (OCS AQS): Year 2021 Emissions Inventory Quality Assurance/Quality Control (QA/QC)* study is the most recent available inventory for OCS offshore oil- and gas-related sources in the GOA (Thé et al. 2023). However, the non-platform sources database for the 2021 inventory did not capture all OCS oil- and gas-related sources as comprehensively as the 2017 inventory due to an inability to acquire automatic identification system (AIS) data for some sources, changes in data requirements and collection methods, and utilization of a new and novel software. Thus, BOEM determined it more prudent to use the *Year 2017 Emission Inventory Study*

(Wilson et al. 2019a) to account for non-platform sources (e.g., support vessels and helicopters) and more completely capture the range of potential effects from all types of OCS oil- and gas-related sources under the proposed action. The *Outer Continental Shelf Air Quality System (OCS AQS): Year 2021 Emissions Inventory Quality Assurance/Quality Control (QA/QC)* study was the first inventory year in which operators reported their facility non-platform sources, making comparisons with the 2017 inventory incomplete (Thé et al. 2023). Though future inventories intend to capture all OCS oil- and gas-related sources for the non-platform sources database, they would not be expected to change the overall conclusions presented in this Programmatic EIS given the approach used in the *Year 2017 Emissions Inventory Study*. The *Year 2017 Emission Inventory Study* still provides a reasonable account of emissions because there have been no changes to the types of OCS oil- and gas-related activities.

- USEPA revised the annual $PM_{2.5}$ NAAQS from 12.0 microgram per cubic meter ($\mu g/m^3$) to 9.0 $\mu g/m^3$ (USEPA 2024b). The impact conclusions would not likely change because the 9.0 $\mu g/m^3$ was used in **Chapter 4.1.2.3**. However, official designations for nonattainment areas along the GOA have not occurred. Most local parishes/counties in the Gulf Coast area are expected to already meet the updated NAAQS (USEPA 2024d).

- Information about scenario decommissioning activities for pipelines (whether removed or abandoned in place) is not available in **Table 3.3-2.** However, **Chapter 3.2.5** indicates that from 2015 to 2024 approximately 94 percent of pipelines were abandoned-in-place in accordance with 30 CFR 250.1750-51. It is reasonable to assume similar future trends under existing regulatory standards. This is unlikely to affect the overall conclusions presented in this Programmatic EIS, as abandonment in place is expected to be associated with less vessel activity and lower air emissions when compared to removal, which was accounted for in this analysis.

BOEM has used the most reliable and available scientific information to date, along with reasonably accepted scientific methodologies to extrapolate from existing information. Therefore, the incomplete or unavailable information above, while relevant, would not likely change the impact conclusions and is not essential to a reasoned choice among alternatives.

4.2 WATER QUALITY

Water quality is the biological, chemical, and physical condition of a water body, and its effects on surrounding ecosystems. Key factors used to assess water quality in coastal and offshore environments include temperature, salinity, dissolved oxygen levels, pH, oxidation-reduction potential (Eh), presence of pathogens, optical properties (such as clarity, turbidity, and

dissolved/suspended matter), as well as concentrations of chlorophyll, nutrients, trace elements (e.g., metals), and other contaminants like heavy metals, plastics, and hydrocarbons.

4.2.1 Affected Environment

Coastal waters of the GOA include all bays and estuaries from the Rio Grande River to Florida Bay. Coastal water quality ratings in the GOA region ranges from poor to good, with an overall rating of fair (USEPA 2012). The largest contributing inputs from the U.S. coast are from the Mississippi and Atchafalaya Rivers in Louisiana. Additional freshwater inputs into the GOA originate in Mexico, the Yucatán Peninsula, and Cuba. Coastal water quality is influenced by a variety of factors including contaminated sediment, the loss of wetlands, water temperature, salinity, total dissolved solids, suspended solids (turbidity), nutrients, and anthropogenic inputs via runoff, terrestrial point-source discharges, and atmospheric deposition. See Chapter 4.2 of the GOM Oil and Gas SID for more detailed information.

For offshore waters, including both State waters and the Federal OCS in the GOA, water quality is influenced by oceanic circulation patterns, which become stronger farther from shore. These patterns disperse and dilute anthropogenic contaminants, impacting water quality differently in offshore areas compared to nearshore regions. While OCS waters generally experience less direct impact from land-based pollution, they are still subject to direct influences from factors like offshore energy development (Kennicutt II 2017). Additionally, sediment quality in the deep GOA and water quality can mutually influence each other, though limited research exists on the interaction between sediment and the ocean in this context. For more detailed information, see **Chapter 4.0.1** in this document and Chapters 3.1 and 3.2 of the GOM Oil and Gas SID.

4.2.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact water quality. Non-OCS oil- and gas-related activities also have the potential to impact water quality (**Table 4.2-1**). These IPFs and their potential to affect water quality are discussed below and in greater detail in Chapter 4.2.2 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.2.2 of the GOM Oil and Gas SID.

Table 4.2-1. Impact-Producing Factors with the Potential to Impact Water Quality.

OCS Oil- and Gas-Related Routine Activities[1]	**OCS Oil- and Gas-Related Accidental Events**[1]	**Non-OCS Oil- and Gas-Related Activities**
Air Emissions and Pollution	Unintended Releases into the Environment	Air Emissions and Pollution
Discharges and Wastes	Response Activities	Discharges and Wastes
Bottom Disturbance	-	Bottom Disturbance
Coastal Land Use/Modification	-	Coastal Land Use/Modification
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

There are several existing regulatory programs and requirements that reduce or minimize the environmental effects of these IPFs to water quality as outlined in **Table 4.2-2** and further described in the *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025a). Lessees are required to perform OCS oil- and gas-related activities in accordance with all regulatory requirements; therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations. While the USEPA primarily regulates discharges from OCS oil and gas activities, BOEM manages regulations through its planning process, and BSEE oversees enforcement and compliance responsibilities to protect the marine environment from degradation. Additionally, the USEPA and the U.S. Coast Guard (USCG) have regulations that prevent marine degradation from vessels.

Table 4.2-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure[1]	**Enforcing Agency**	**Impact-Producing Factor(s) Reduced/Avoided**	**Supporting References and Sections**
Post-lease Water Quality Reviews	BOEM, BSEE	Discharges and Wastes	Chapter 5.11 of the GOM Oil and Gas SID
Federal Water Pollution Control Act of 1948, amended in 1972 as the Clean Water Act (CWA)	USEPA	Discharges and Wastes, Bottom Disturbance	Chapters 2.2, 4.2.2, and 5.11 of the GOM Oil and Gas SID
CWA Section 402, the National Pollutant Discharge Elimination System (NPDES) for Regions 4 and 6	USEPA	Discharges and Wastes, Bottom Disturbance	**Appendix B.2.2** of this Programmatic EIS, Chapters 2.2 and 5.11 of the GOM Oil and Gas SID
Vessel Incidental Discharge Act (VIDA) Framework for Incidental Discharges under CWA Section 312(p)	USEPA, USCG	Discharges and Wastes	Chapters 4.2.2.2 and 5.11 of the GOM Oil and Gas SID
BSEE Decommissioning Requirements (30 CFR 250. Q)	BSEE	Discharges and Wastes, Bottom Disturbance	Chapter 4.2.2.2 of the GOM Oil and Gas SID, **Appendix B.2.3** of this Programmatic EIS
BSEE Pollution Prevention (30 CFR 250.300)	BSEE	Unintended Releases into the Environment	Chapter 5.13 of the GOM Oil and Gas SID

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
International Convention for the Prevention of Pollution by Ships (MARPOL 73/78), MARPOL Annex V Treaty	International Maritime Organization (IMO); USCG	Discharges and Wastes; Unintended Releases into the Environment	https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Inspections-Compliance-CG-5PC-/Commercial-Vessel-Compliance/Domestic-Compliance-Division/MARPOL/; 33 U.S.C. 1901-1915; 33 CFR 151. A; Chapter 2.9.1.7 of the GOM Oil and Gas SID

[1] See Chapter 6 of the GOM Oil and Gas SID for conditions of approval commonly applied at the post-lease stage.

4.2.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities from the ongoing OCS oil and gas program (i.e., past lease sales in the GOAR). However, the routine activities and effects described would be similar for a single proposed OCS oil and gas lease sale and reasonably foreseeable future OCS oil and gas lease sales in the GOA.

Discharges and Wastes: Offshore oil and gas operations primarily generate produced water, drilling fluids and cuttings, operational waters (bilge, ballast, fire, cooling), deck drainage, and sanitary/domestic wastes. These discharges, detailed in **Appendix B.2.2** and Chapter 2.2.1 of the GOM Oil and Gas SID, can transport trace metals, hydrocarbons, and suspended materials, affecting areas within 1,000–2,000 m (3,281–6,561 ft) for drilling fluids and cuttings, and within several hundred meters for produced waters (Continental Shelf Associates Inc. 2004a; Cordes et al. 2016; USEPA 2022).

Produced water, the largest waste stream from offshore oil and gas production, may include formation water, injection water, and well-treatment, stimulation, or completion fluids. It may also contain dissolved solids more concentrated than seawater, as well as inorganic and organic chemicals and radionuclides (radium-226 [Ra-226] and radium-228 [Ra-228]). The discharge of produced water is regulated to limit oil and grease concentrations to 42 mg/L daily maximum and 29 mg/L monthly average. These discharges are prohibited within 1,000 m of areas of biological concern, and in some cases, well fluids may be treated to meet discharge criteria by separating the free oil from water. See Chapter 2.2 of the GOM Oil and Gas SID for more information.

The discharge of routine operational waste streams in the GOA is regulated by USEPA Regions 4 and 6. Section 402 of the Clean Water Act (CWA), 33 U.S.C. 1342, authorizes the USEPA to issue National Pollutant Discharge Elimination System (NPDES) permits, including general permits specifically tailored for offshore oil and gas operations in the OCS (see **Table 4.2-2**).

USEPA Region 4 and Region 6 issue their respective general permits, each with conditions that ensure compliance with the CWA, including Section 403, which prohibits unreasonable degradation of the environment (BOEM 2025a; USEPA 2022; 2023d). In addition to general permits, individual NPDES permits may be required for operations with unique environmental concerns, often necessitating more detailed monitoring and stricter adherence to environmental protection standards.

Both Regions 4 and 6 require that well treatment, completion, and workover fluids not contain priority pollutants. This requirement does not currently apply to produced water. Fluids injected into boreholes during hydraulic fracturing are considered well treatment (acidizing) and workover (proppant injection) fluids, as discussed in Chapter 2.2 of the GOM Oil and Gas SID and in Appendix B.2.2.2. Flowback fluids from hydraulic fracturing are managed as well treatment fluids, completion fluids, and workover fluids under the NPDES permit. The USEPA requires testing of both produced water and well treatment, completion, and workover fluids under the NPDES program. Analyses required by the NPDES permit include oil and grease (once per month, by gravimetric Method 10056) and chronic Whole Effluent Toxicity (WET) testing. Chronic WET testing must be conducted once every 6 months for Region 4, after passing 3 consecutive bimonthly tests; for Region 6, the testing frequency depends on discharge volume: once per calendar year for discharges of less than 4,600 barrels (bbl)/day, and once per calendar quarter for discharges of 4,600 bbl/day or more. For Region 6, acute toxicity testing (48-hour) is required with each discharge of well treatment, completion, and workover fluids. However, if well treatment, completion, or workover fluids are commingled with produced water, the discharge is treated as produced water and subject to the same regulatory requirements for testing and monitoring.

Until the VIDA is fully implemented (see **Appendix B.2.2.4, Table 4.2-2**), vessels must follow the 2013 VGP requirements for offshore waste discharges. The USEPA maintains VGP issuance authority. All vessels in U.S. and international waters must also comply with International Maritime Organization's MARPOL regulations, which address operational discharges, oily water releases, noxious liquid substances, and waste disposal (see **Table 4.2-2**). The USCG enforces MARPOL requirements in U.S. waters.

Decommissioning procedures for offshore infrastructure, including pipelines, umbilicals, and other associated equipment, must follow 30 CFR 250.Q (see **Table 4.2-2**). This includes requirements like pigging, flushing, and seawater filling, unless BSEE grants specific waivers (Chapter 4.2.2.2 of the GOM Oil and Gas SID and **Appendix C**). During decommissioning, various activities like the cutting or separation of pipelines may lead to unintended releases of residual fluids or contaminants into the environment (Shams et al. 2023). The NPDES General Permit for Region 6 requires operators to capture materials from pipelines, umbilicals, and equipment before disconnection to minimize the risk of contamination. Unintended releases, whether from pipelines or other sources, could adversely affect water quality during decommissioning operations, as discussed below in **Chapter 4.2.2.2**.

Onshore support facilities such as terminals, construction facilities, and processing facilities could produce discharges that affect coastal water quality and are discussed in Chapters 2.2.1.13 and 4.2.2.2 of the GOM Oil and Gas SID. Point-source discharges from these facilities, such as pipe outfalls, are regulated through compliance with NPDES permits through the USEPA. Non-point sources, such as rainfall runoff, are typically managed through stormwater systems. The CWA section 402(l)(2) exempts stormwater runoff from oil and gas operations from requiring a NPDES permit, provided it does not come into contact with overburden, raw materials, intermediate products, finished products, byproducts, or waste on-site (see **Table 4.2-2**). However, such runoff may still be subject to oversight under USEPA or authorized state programs to minimize environmental impacts. Additionally, facilities and activities that do not qualify for this exemption, like conventional petroleum refineries and liquified natural gas (LNG) re-gasification terminals, must obtain NPDES permit coverage for their stormwater runoff.

Bottom Disturbance: Seafloor disturbances may occur during routine OCS oil- and gas-related activities, including permitted discharges at the seafloor. These disturbances can cause sediment resuspension, temporary release of components (e.g., metals and nutrients) in the sediment, and increased turbidity (**Appendix B.2.3**). The spatial footprint of discharge, which varies with factors such as volume, depth, local hydrography, and particle size distribution (Neff 2005; Niu et al. 2009), can result in cuttings deposits from a single deep-water well reaching up to 20 m (66 ft) in thickness within 100 to 500 m (328 to 1640 ft) of the well site (Breuer et al. 2004; Jones et al. 2006; Pivel et al. 2009). As a result of these discharges, the highest cutting concentrations are usually in sediments within 100 m (328 ft) of the platform, though some cuttings may be found up to 2 km (1.2 mi) from the discharge point (Continental Shelf Associates Inc. 2006; Cordes et al. 2016).

During decommissioning, explosive severance activities can also affect water quality. The detonation of explosives (which contain small amounts of lead and mercury in the detonators) releases by-products including heat, particulate carbon, and atmospheric gases (carbon dioxide, nitrogen, carbon monoxide) into the water column. These by-products cause only short-term, minor alterations to dissolved gas concentrations. The explosions also create localized turbidity and can temporarily release contaminants from disturbed sediments into the water column, though these impacts typically dissipate as sediment plumes resettle within weeks (MMS 2005). When sediments are disturbed, it is possible for contaminants to be mobilized, potentially impacting local ecosystems (Caetano et al. 2003; Fanning et al. 1982; Roberts 2012). Overall, these disturbances and impacts on water quality tend to be localized. While dislodging of material and sediment resuspension may occur during decommissioning activities, all decommissioning activities must follow regulations in 30 CFR 250.1703, which reduces this occurrence (see **Table 4.2-2**).

Coastal Land Use/Modification: The construction of onshore infrastructure such as ports, support facilities, construction facilities, and processing facilities to support OCS oil- and gas-related activities may result in coastal land use and modification (**Appendix B.2.5**), which could increase the potential for erosion, runoff, and turbidity. However, as noted in **Appendix B.2.5**, existing onshore oil and gas infrastructure is expected to be sufficient to handle development associated with a proposed

action. Therefore, impacts to water quality as a result of coastal land use/modification associated directly with a single lease sale would be **negligible**.

Air Emissions and Pollution: Routine OCS operations produce air emissions that can contribute to acidic deposition, acidification, and eutrophication in the GOA (Caldeira and Wickett 2003; Driscoll et al. 2003; Paerl et al. 2002; USEPA 2020c; Vitousek et al. 1997; Wanninkhof et al. 2015). However, the extent that emissions from GOA oil and gas operations would specifically contribute to local ocean acidification is difficult to constrain (Osborne et al. 2022). This is in part because of the dynamic air and water systems in the GOA that are influenced by multiple factors, including local emissions and inputs from global ocean and air circulation (**Chapter 4.2.2.4**). However, air emissions of pollutants under NAAQS from OCS oil and gas activities that are known to impact ocean acidification and eutrophication are regulated. Acidic deposition would also contribute to eutrophication, which can induce hypoxia and lower water pH, causing nutrient enhanced acidification (Glibert 2020; USEPA 2008; 2020c). For a more detailed discussion on air quality and air emissions, see **Chapter 4.1**.

4.2.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities from the ongoing OCS oil and gas program (i.e., past lease sales in the GOA). However, the accidental events and effects described would be similar for a single proposed OCS oil and gas lease sale and reasonably foreseeable future OCS oil and gas lease sales in the GOA.

Unintended Releases into the Environment: Oil spills have the greatest potential to affect water quality. **Appendix B.3.1** discusses notable past oil spills, historical trends, and different oil component groups and their properties and persistence in the environment (**Table B.3-1**). Industry practices and government regulations, including those under the MARPOL, minimize spill risks and ensure preparedness to respond should an incident occur (**Table 4.2-2**). These regulations provide guidance to prevent and minimize accidental pollution from ships. However, despite these measures, large tropical storm events, faulty equipment, or human error may still cause accidental releases and spills into the environment from pipelines, structures, and vessels associated with OCS oil- and gas-related activities (Shams et al. 2023).

Pipeline and umbilical decommissioning can also pose a risk of accidental releases. During decommissioning, pipelines are flushed with uninhibited seawater, and pigging is required to remove residues, in accordance with BSEE regulations under 30 CFR 250.Q. Decommissioning in place requires flushing with uninhibited seawater, and for pipelines carrying oil, BSEE regulations mandate that pigging must be performed before flushing to ensure the removal of residual hydrocarbons, unless the Regional Supervisor determines that pigging is not practical (30 CFR 250.1751(b)). The USEPA Region 6 NPDES General Permit also mandates that flushed materials are captured and properly disposed of before disconnection (see **Table 4.2-2**). Nevertheless, decommissioning processes may still occasionally lead to accidental releases or leaks of hydrocarbons, scale,

paraffin, and naturally occurring radioactive material (NORM) from both internal and external surfaces. Similarly, decommissioning umbilicals could release residual fluids like methanol and monoethylene glycol. Releases are limited because pipelines and umbilicals are cut only after flushing, making leaks unlikely. Immediate containment measures are implemented to ensure residual contaminants remain isolated from ocean water. See **Appendix C** and Chapter 2.3.1.3 of the GOM Oil and Gas SID for more information on infrastructure decommissioning. Additionally, structural components related to wells decommissioned in place may pose risks of unintended releases over time, despite proper plugging and abandonment (National Academies of Sciences, Engineering, and Medicine 2022).

Aging infrastructure, including pipelines and idle structures, is vulnerable to damage from corrosion, erosion, and extreme weather events like hurricanes. These factors can compromise structural integrity and lead to unintended releases of residual hydrocarbons or chemicals. However, if infrastructure is properly decommissioned, there should be no residual materials left to leak. Some studies suggest that the increase in releases may be due not only to the expansion of pipeline networks but also to the deterioration of older active lines. This is based on evidence that steel pipelines in saltwater marine environments are particularly susceptible to corrosion. Properly decommissioned pipelines pose little threat for spillage (Jernelöv 2010; National Academies of Sciences 2022). However, information on the extent to which this influences spill occurrences is sparse (see **Chapter 4.2.3**., *Incomplete or Unavailable Information*). The volume of hydrocarbons released from aging infrastructure is difficult to quantify, as spill data does not specifically identify aging as the cause (National Academies of Sciences, Engineering, and Medicine 2022). Most recorded spills are small and dissipate quickly (ABS Consulting Inc. 2016), and any leaks from aging structures would likely disperse and degrade naturally. Though BSEE inspects idle infrastructure for safety and environmental compliance, it does not include decommissioned pipelines or structures, which are typically flushed with seawater before abandonment.

While it is impossible to completely eliminate the risk of spills, the magnitude and severity of impacts from such events depend on several factors, including spill composition, location, volume, water depth, duration, and weather conditions. Most spills that occur in the GOA are small (<1,000 bbl), with the majority being <1 bbl. However, more extensive degradation of water quality could occur from spills >1,000 bbl. At depth, a spill >1,000 bbl could introduce large quantities of oil into the water column, with meteorological and oceanographic conditions having a substantial effect on weathering processes (Alloy et al. 2016; Driskell and Payne 2018; Roberts et al. 2017).

See the GOM Catastrophic Spill Event Analysis technical report (BOEM 2021b) for an assessment of potential impacts resulting from a low-probability catastrophic spill in the GOA similar in nature to the *Deepwater Horizon* oil spill. This analysis is not part of the proposed action and is separate from the OSRA for a single oil and gas lease sale and the Cumulative OCS Oil and Gas Program, which is discussed in the next paragraph. Catastrophic spills of 1 million bbl or more are rare and not reasonably foreseeable. The estimated return period for a spill of this magnitude is 165 years. This means that in any given year, the probability for a catastrophic spill to occur is about 0.6

percent (Ji et al. 2014). From these estimates, catastrophic events are not considered reasonably foreseeable as part of the proposed action under NEPA.

The OSRA model estimates the combined probabilities of oil spills >1,000 bbl and >10,000 bbl occurring and those spills contacting sensitive resource areas (see **Appendix B.3.1.1**). As part of the most recent OSRA analysis, BOEM uses oil-spill occurrence rates from ABS Consulting Inc. (2016) and the estimated future volume of oil production as inputs, along with years of oceanographic and meteorological data to model movement of spilled oil in GOA waters (Anderson and LaBelle 2000; Anderson et al. 2012; Ji and Schiff 2023). The occurrence rates in Anderson et al. (2012) show that, in the past, most spills (>95 percent) have been 1 bbl or less. Small spills (<1,000 bbl) would dissipate quickly through dispersion and weathering (Chapter 4.2.2.3 of the GOM Oil and Gas SID).

Chemical and synthetic-based drilling fluids are commonly used in oil and gas operations. These drilling fluids may also accidentally spill into the environment due to equipment failure, weather (e.g., wind and waves), collisions, and human error; however, the amount of product spilled over time is relatively low (see **Appendix B.3.1**). Oil and gas operations use a variety of other chemicals with common alcohol-based chemicals, such as methanol and ethylene glycol, used in deepwater operations for the prevention of gas hydrate formation. These exhibit comparatively low toxicity, whereas ammonium chloride and zinc bromide have potential to negatively impact marine life (Chapter 2.9.1.2 of the GOM Oil and Gas SID). Historically, there are only a few, low-volume chemical spills annually, with some years having no chemical spills at all (**Tables B.3-3** and **B.3-4**). From 2007 to 2014, small chemical spills occurred at an average annual volume of 15.9 bbl, while large chemical spills occurred at an average annual volume of 231.9 bbl (see **Appendix B.3.2**). In general, adverse effects from chemical spills, primarily changes in pH and increased turbidity, are likely to be short-term and localized in impact.

The discharge of trash and debris into the sea or navigable waters of the United States is prohibited under the Water Pollution Control Act, unless processed by a comminutor and able to pass through a 25-mm (1-in) mesh screen. While microplastics in the GOA are an increasing environmental concern (**Chapter 4.2.2.4**), discharges from OCS oil- and gas-related activities are likely not a major contributor (Grace et al. 2022). BSEE has a marine trash and debris program regulated through 30 CFR 250.300 with the goal to minimize pollution, including trash and debris. Currently, about 80 percent of the trash and debris found in the ocean are from land-based sources (USEPA 2017). **Appendix B.3.1.3** of this Programmatic EIS and Chapter 2.9.1.7 of the GOM Oil and Gas SID provide more information on trash and debris as an IPF.

Response Activities: Response activities associated with unintended releases, such as the use of dispersants or in-situ burning, may cause short-term impacts to water quality as these can provide additional pathways for dissolved and burned hydrocarbons to incorporate into the water column. Nevertheless, chemical dispersants are generally considered the most effective oil-spill response tool when utilized quickly after a spill, and effective use of dispersants in offshore waters deeper than 10 m (33 ft) helps minimize adverse impacts in the water column (National Academies

of Sciences 2022). **Appendix B.3.2** of this Programmatic EIS and Chapter 5.13.3 of the GOM Oil and Gas SID provide an extensive discussion on oil-spill response planning and efforts.

4.2.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

The non-OCS oil- and gas-related activities and associated effects described in this section are applicable to ongoing non-OCS oil and gas-related activities, (i.e., past and present non-OCS oil and gas-related activities in the GOA). However, the activities and effects described would be similar for reasonably foreseeable non-OCS oil- and gas-related activities in the GOA.

Air Emissions and Pollution: Air emissions and pollution from non-OCS oil- and gas-related activities may affect water quality through uptake of atmospheric CO_2, but the magnitude of these effects is not well understood. Ocean acidification is a potential long-term cumulative effect with atmospheric CO_2 mixing with seawater, which is discussed below as a component of climate-related factors.

Discharges and Wastes: There would be point and nonpoint sources of discharges and wastes that have the potential for cumulative impacts to GOA water quality (See **Appendix B.2.2**). Point sources, such as inputs from facilities (both OCS oil and gas related and non-OCS oil and gas related), must meet NPDES permit requirements and comply with the Clean Water Act (Chapter 4.2; BOEM 2025a), including the decommissioning of equipment (e.g., pipelines). However, nonpoint sources, particularly runoff, remain a major concern as a non-OCS oil- and gas-related impact to water quality. In addition to nutrient runoff from agriculture, land-based nonpoint sources are the largest input of oil in the GOA annually (National Academies of Sciences 2022). The combination of these regulated and unregulated discharges and wastes can have long-term, cumulative impacts on water quality.

Of increasing concern are marine debris and microplastics found throughout the water column. These pollutants come from a variety of sources, with Mississippi River discharge as a major input into the GOA (Di Mauro et al. 2017; Kane et al. 2020; Lecke-Mitchell and Mullin 1997; Wessel et al. 2016). Despite the GOA's high microplastic concentrations, there are limited data on their effects on offshore environments and water quality (Di Mauro et al. 2017; Shruti et al. 2021; Summers et al. 2024). Research by Summers et al. (2024) used particle-tracking and hydrodynamic models to investigate the behavior of microplastics released from major Texas and Louisiana rivers into the GOA. The research highlighted how river flows, storms, and seasonal currents influence microplastic distribution in coastal and offshore areas (Summers et al. 2024). As microplastics and larger marine debris decompose and breakdown, they can introduce toxic chemicals into seawater (Grace et al. 2022). However, the potential cumulative water quality impacts of this remain largely inconclusive (Ziccardi et al. 2016). See Chapter 3.5 in the GOM Oil and Gas SID for more information on Marine Trash and Debris.

Bottom Disturbance: Temporary bottom disturbance may also occur from activities like commercial fishing (see **Appendix B.4.6**). Additionally, severe weather events like hurricanes or

winter storms have the potential to expose and displace both active and decommissioned-in-place pipelines on the OCS, which could result in bottom disturbance and associated water quality impacts. Studies indicate that extreme oceanic events can damage offshore petroleum infrastructure through turbidity currents and sediment resuspension processes (Harris et al. 2020a).

Coastal Land Use/Modification: Ongoing coastal development, including residential and industrial construction, and port expansion, is expected to intensify due to growing coastal populations and economic activities (Kildow et al. 2016; Merk et al. 2015; Sengupta et al. 2018). This development often leads to habitat degradation, increased erosion, and sedimentation, impacting water quality by introducing excess sediments, nutrients, and contaminants into coastal waters. Expansions of ports and dredging activities exacerbate these issues by increasing turbidity and resuspending sediments, which can cause temporary fluctuations in oxidation-reduction reactions and release potential contaminants into the water (see Chapter 2.5.2 of the GOM Oil and Gas SID).

Other Environmental Factors: Natural processes in the environment would also affect water quality and can also be heavily influenced by human activity (see **Appendix B.4.2.9**). Cumulatively, natural seeps are the second largest input of oil into the GOA and they occur independent of the proposed action or other human activity. Natural seeps release more oil to the marine environment on an annual basis than the *Deepwater Horizon* oil spill (National Academies of Sciences, Engineering, and Medicine 2022).

Eutrophication and hypoxia are processes that naturally occur in aquatic environments but are exacerbated by human activities that result in nutrient runoff, wastewater discharges, and river inputs. These events would continue to contribute to cumulative impacts on water quality. Research indicates that non–point-source pollution, which the CWA does not directly address, is the most pressing and challenging water quality stressor in the northern GOA (National Research Council 2012). For more information, see Chapters 2.2, 3.3, 3.4, 3.5 of the GOM Oil and Gas SID.

Climate-related factors known to influence water and sediment chemistry include ocean acidification (pH), rising sea surface temperatures, and changing storm activity. These factors promote changes in flushing regimes, freshwater inputs, and water chemistry (Cabral et al. 2019). Climate-related factors may increase stratification and cause more intense seasonality in river flow, which, in turn, could exacerbate hypoxia (Rabalais and Turner 2019). BOEM provides a larger discussion on climate-related factors in **Appendix B.4.2.9**.

Another byproduct of increased atmospheric CO_2 is ocean acidification. This is an increasingly important issue regarding water quality in the GOA, particularly along the coasts (Cai et al. 2011; Hu et al. 2015). Ocean acidification can impact chemical and biological aspects of the marine environment and affect oceanic carbon sequestration (Hofmann and Schellnhuber 2009). Modeled calculations suggest pH decreased from 1863 to 2003 in the Caribbean-wide region (Andersson et al. 2019). In the GOA open ocean, the partial pressure of CO_2 at the ocean surface is increasing at rates consistent with trends observed at long-term ocean time series stations (Kealoha et al. 2020). This increase in partial pressure corresponds to an increase in atmospheric CO_2

absorption into the ocean, resulting in ocean acidification. Along with a warming ocean and the air-sea CO_2 flux, the Loop Current is a major basin-scale driver of ocean conditions that can also affect acidification in the GOA (Osborne et al. 2022).

4.2.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct or indirect impacts to water quality would occur as a result of the proposed action (i.e., a single proposed OCS oil and gas lease sale). However, ongoing OCS oil- and gas-related activities associated with previous sales, and other non-OCS oil- and gas-related activities would continue to potentially affect water quality under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would still potentially affect water quality through air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, unintended releases into the environment, and response activities, as summarized above in **Chapter 4.2.2.1** and **4.2.2.2**. These impacts primarily result from routine discharges, seafloor disturbances, air emissions, and unintended releases. Effects from routine discharges like produced water and drilling fluids typically remain localized within 1,000 to 2,000 m (3,281 to 6,562 ft) of discharge points (Continental Shelf Associates Inc. 2004a; Cordes et al. 2016; USEPA 2022). Therefore, impacts to water quality from ongoing oil and gas activities could be up to **moderate** within 2,000 m (6,562 ft) of discharge points, but would be **negligible** beyond 2,000 m (6,562 ft) given the localized, short-term nature of most routine discharges and compliance with NPDES permit requirements. Similarly, seafloor disturbances create temporary and localized sediment resuspension and turbidity.

Unintended releases present the greatest potential risk for impacting water quality. **Appendix B.3.1** discusses relevant past oil spills, historical trends, and the properties and persistence of different oil component groups in the environment. Historical OCS spills have had marginal to notable effects on water quality to date, depending on severity of a specific spill, but overall the effects have been marginal given that historically most spills are small and dissipate quickly. The effects from reasonably foreseeable spills associated with the ongoing oil and gas program are expected to be similar or reduced in the future because of safety and technological improvements in the oil and gas industry, and oil spill occurrence rates are not expected to change substantially.

As infrastructure ages, it becomes more vulnerable to damage from corrosion and extreme weather events, increasing the risk of hydrocarbon releases over time (Jernelöv 2010; National Academies of Sciences 2022). Additionally, ongoing operations produce air emissions that contribute to acidic deposition and eutrophication in marine environments (Caldeira and Wickett 2003; Driscoll et al. 2003), although the specific extent to which these emissions contribute to local

ocean acidification remains difficult to quantify due to the complex, dynamic nature of Gulf water systems (Osborne et al. 2022). Ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.2.1** and in further detail in Chapter 4.2.1 of the GOM Oil and Gas SID. Routine discharges from ongoing oil and gas activities are regulated through NPDES permits and typically short-term and localized. Similarly, most accidental releases are also small, short-term, and localized. Therefore, ongoing OCS oil and gas activities would have mostly **minor** impacts on water quality, with a slight risk for up to **moderate** impacts if notable changes to water quality conditions within 2,000 m (6,562 ft) of discharge points were to occur, or in the event of a large-volume, long-duration spill.

***Non-OCS Oil- and Gas-Related Activities*:** Air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, and other environmental factors associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect water quality under the No Action alternative. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. Research indicates that non–point-source pollution, which the CWA does not directly address, is the most pressing and challenging water quality stressor in the northern GOA (National Research Council 2012).

The largest input of pollutants into Gulf waters comes from nonpoint sources, particularly land-based runoff containing nutrients and oil (National Academies of Sciences 2022). This is compounded by increasing marine debris and microplastics introduced primarily through Mississippi River discharge (Di Mauro et al. 2017; Kane et al. 2020), which release toxic chemicals as they decompose (Grace et al. 2022). Ongoing coastal development further degrades water quality through erosion and sedimentation from construction and port expansion activities (Kildow et al. 2016). Climate-related factors continue to alter fundamental water chemistry through ocean acidification and temperature increases, potentially intensifying existing problems like eutrophication and hypoxia (Rabalais and Turner 2019). Additionally, natural seeps contribute substantially to oil in GOA waters, though their annual input is less than the release from the *Deepwater Horizon* spill (National Academies of Sciences 2022).

IPFs from non-OCS oil and gas-related activities, in addition to other environmental factors, would occur on a much broader scale and through a wider range of pathways compared to those from OCS oil- and gas-related activities. These IPFs and environmental factors have the potential to more substantially affect water quality, particularly given the diffuse and persistent nature of land-based runoff, nutrient inputs, and marine debris originating from non-OCS sources. Most notably, pollutant loads from nonpoint sources and expanding coastal development are likely to be more influential on long-term water quality conditions in the GOA than those associated with offshore oil and gas operations. These impacts would continue to occur under the No Action alternative, even in the absence of ongoing OCS activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS oil and gas lease sale. This alternatives analysis focuses on the potential environmental impacts of a regionwide lease sale (Alternative B), and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table 4.2-3**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.2-3. Impact Determinations for Routine and Accidental Impacts to Water Quality from a single proposed OCS oil and gas lease sale for Alternatives B-D.

Impact-Producing Factor	BOEM Protective Measures[1]	Alternative B	Alternative C	Alternative D
Air Emissions and Pollution	N/A	**Minor** localized	**Minor** localized, **Negligible** in areas excluded from leasing	**Minor** localized, **Negligible** in areas excluded from leasing
Discharges and Wastes	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**, **Negligible** in areas excluded from leasing	**Negligible** to **Moderate**, **Negligible** in areas excluded from leasing
Bottom Disturbance	N/A	**Negligible** to **Minor** localized	**Negligible** to **Minor** localized, **Negligible** in areas excluded from leasing	**Negligible** to **Minor** localized, **Negligible** in areas excluded from leasing
Coastal Land Use/Modification	N/A	**Negligible** to **Minor** localized	**Negligible** to **Minor** localized, **Negligible** in areas excluded from leasing	**Negligible** to **Minor** localized, **Negligible** in areas excluded from leasing
Unintended Releases into the Environment	N/A	**Minor** to **Moderate**	**Minor** to **Moderate**, **Negligible** in areas excluded from leasing	**Minor** to **Moderate**, **Negligible** in areas excluded from leasing
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors would be **none**. Ongoing OCS oil- and gas-related activities associated with previous sales would continue to have **negligible** to up to **moderate** impacts.

[1] No programmatic protective measures related to water quality for application at the lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for water quality would be considered at the site-specific stage, or via oversight by other regulatory agencies (e.g., USEPA, USCG, BSEE).

Alternative B – Regionwide OCS Lease Sale

Discharges and Wastes: Discharges and wastes would have **negligible** to **moderate** impacts to water quality given the level of routine OCS oil- and gas-related activities from a single oil and gas lease sale (**Table 3.3-2**) that could generate discharges and waste (e.g., exploration, development, and production wells; and vessel trips), and because USEPA Region 4 and Region 6 NPDES permits include standards and operator requirements for discharges to minimize impacts to water quality (see **Table 4.2-2**). Impacts on water quality from operational discharges related to a proposed OCS oil and gas lease sale would be minimized because of (1) mandatory compliance with USEPA regulations to prevent unreasonable degradation of the marine environment; (2) prohibitions on discharge of some waste types; (3) prohibitions on discharge near sensitive biological communities; (4) monitoring requirements and toxicity testing; (5) mixing zone, settling, and dilution factors; (6) operational discharges are temporary in nature; and (7) any effects from elevated turbidity that would be short term (due to factors 5 and 6 above), localized (due to factor 5 above), and reversible. Effects have been shown to be relatively localized within 1,000 - 2,000 m (3,281 - 6,562 ft) of the discharge for drilling fluids and cuttings and within several hundred meters for produced waters (Cordes et al. 2016; USEPA 2022). Therefore, impacts to water quality could be up to **moderate** within 2,000 m (6,562 ft) of discharge points but **negligible** beyond 2,000 m (6,562 ft) given the localized, short-term nature of most routine discharges and compliance with NPDES permit requirements.

Bottom Disturbance: Bottom disturbance would affect water quality close to the seafloor where oil and gas operations occur through resuspended sediments and increased turbidity but are expected to be localized and short-term (due to the same factors 5 and 6 above) while adhering to regulations (see **Table 4.2-2**). Given their localized and short-term nature, along with the routine activities forecasted in **Table 3.3-2** for a single proposed oil and gas lease sale that could lead to bottom disturbance (e.g., structure installation; pipeline installation; structure removal; and exploration, development, and production wells), any impacts are expected to be **negligible** to **minor**.

Coastal Land Use/Modification: Coastal land use/modification would affect water quality in proximity to where the construction of onshore infrastructure occurs by increasing the potential for turbidity, runoff, and erosion. These impacts would be **negligible** to **minor** given their temporary nature and localized extent (Chapter 4.2.2 of the GOM Oil and Gas SID). Furthermore, existing onshore oil and gas infrastructure and navigation channels are expected to be sufficient to handle development associated with a proposed action. While an oil and gas lease sale and subsequent OCS oil- and gas-related activity would contribute to the continued need for maintenance dredging of existing navigation channels, new navigation channel or onshore infrastructure construction as a direct result of a single OCS oil and gas lease sale is not likely. Federal channels and canals are maintained throughout the relevant onshore area by the U.S. Army Corps of Engineers (USACE), State, county, commercial, and private interests. The USACE is charged with maintaining all larger navigation channels in the area of interest. **Chapter 4.14** discusses potential impacts from the proposed action to land use and coastal infrastructure as a resource.

Air Emissions and Pollution: Air emissions and pollution could affect water quality in the GOA by contributing to acidic deposition, ocean acidification, and eutrophication. While the air quality section (Chapter 4.1.2) addresses direct air quality impacts, it does not evaluate these marine water quality impact pathways from air emissions. Given the level of routine OCS oil- and gas-related activities in **Table 3.3-2** for a single proposed oil and gas lease sale that could generate air emissions and pollution (including G&G surveys, structure and pipeline installation and decommissioning, structure removal, vessel trips, and helicopter operations), these water quality impacts are expected to be **minor.** Air emissions from the proposed action must comply with all applicable regulations and would be subject to rapid dilution and dispersion in the marine environment. Additionally, the ocean's natural buffering capacity would prevent substantial water quality degradation (see **Chapter 4.1.2**).

Unintended Releases into the Environment: Under Alternative B, unintended releases into the environment (primarily oil spills) could have **minor** to **moderate** impacts on water quality, depending on the magnitude and severity of the event. Larger volume, longer duration spills would generally result in greater negative impacts to water quality than smaller volume, short duration spills.

Response Activities: Response activities would have **negligible** to **minor** impacts on water quality. Response vessels and aircraft would adhere to operational discharge regulations (see **Table 4.2-2**), but certain response activities such as the use of dispersants and in-situ burning could cause temporary negative impacts on water quality. Dispersants and in-situ burning both put additional hydrocarbons into the dissolved phase, with burning also resulting in sinking hydrocarbon residuals. These activities would temporarily increase dissolved hydrocarbon concentrations in the water column. See Chapter 4.2.2.3 of the GOM Oil and Gas SID for more detail.

In summary, based on the description of the IPFs above and the scenario projections for a single oil and gas lease sale provided in **Chapter 3**, the overall adverse impacts from IPFs associated with Alternative B on water quality would be **negligible.** This is because OCS oil and gas operators must follow regulations to minimize water quality impacts during routine activities (see **Table 4.2-2**), expected impacts would be localized and short-term, historical trends and OSRA analyses show that most spills (>95%) are 1 bbl or less, and any small spills (<1,000 bbl) would dissipate quickly through dispersion and weathering.

Alternative C –Targeted Lease Sale Area

Alternative C represents a geographical constraint on available acreage for leasing, which could change the spatial distribution of activities compared to Alternative B but not the types of activities or their overall levels. Since there would still be substantial acreage available across all water depths and because overall activity levels would remain in the same ranges as under Alternative B, any potential differences in spatial distribution of activity would not result in a meaningful difference in overall impacts to water quality when compared to Alternative B. Therefore, the impact conclusions are the same as under Alternative B but with lowered potential for direct

impacts in the excluded areas (see **Figure 2.2-2**). For these excluded areas, water quality impacts would be **negligible** for all IPFs.

Alternative D – Targeted Lease Sale Area with Additional Exclusions

Alternative D would allow for a proposed lease sale within a substantially smaller geographic area than Alternative C. Alternative D would potentially change the spatial distribution of activities compared to Alternative B. As with Alternative C, it would not change the types of activities or their overall levels to a degree that would result in a meaningful difference in overall impacts to water quality from the proposed action when compared to Alternative B. Therefore, the impact conclusions are the same as under Alternative B but with lowered potential for impacts in those areas excluded (see **Figure 2.2-3**). For these excluded areas, water quality impacts would be **negligible** for all IPFs.

4.2.2.5 Cumulative Impacts

This cumulative analysis incorporates and builds on the evaluation of past and present effects under Alternative A by also considering the potential effects from reasonably foreseeable future OCS oil and gas lease sales and reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect water quality through air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, unintended releases into the environment, response activities, and strikes and collisions as described in **Chapters 4.2.2.1** and **4.2.2.2**. Ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.2.1** and in further detail in Chapter 4.21 of the GOM Oil and Gas SID. The impacts from ongoing OCS oil- and gas-related activities would be **minor** to **moderate**. Future lease sales would only add incrementally to the past and present impacts. However, it is worth noting that wells and structures are being decommissioned and removed at much higher rates than installations over the past decade (see **Chapter 3.2.5**), a trend expected to continue for the foreseeable future. In 2000, there were approximately 4,000 platforms in the GOA. By 2024, the number of structures dramatically decreased to roughly 1,400 platforms. Similarly, active or non-decommissioned wells have decreased from approximately 16,000 in 2000 to less than 5,000 by the end of 2024. This net reduction in overall infrastructure would likely result in decreases in cumulative discharge volumes and associated water quality impacts across the program area as a result of the cumulative OCS oil and gas program.

While future lease sales may extend impacts, the types of impacts would remain similar though future OCS oil and gas activities might alter the geographic location of currently affected areas as new lease blocks are developed. Despite development in new areas, the overall operational footprint of OCS structures is decreasing as decommissioning and structure removals outpace new installations. The cumulative volume of regulated discharges could increase incrementally over time in newly developed areas, though all would continue to be regulated by

NPDES permits issued by USEPA Regions 4 and 6. There could also be instances when future development overlaps with decommissioning of aging infrastructure, causing temporarily intensified but localized impacts in certain areas. It is important to note that decommissioning activities themselves can involve short-term discharges, such as those associated with well plugging and abandonment, pipeline flushing, and structure removal. While these impacts are typically localized and temporary, they should be considered when evaluating the full cumulative effect on water quality. As production in some areas ends and facilities are decommissioned, routine discharges from oil and gas operations would cease at those locations, and new lease sales would shift operational activities to different areas. The impacts from these activities would extend several decades into the future based on the project activity scenarios outlined in **Table 3.3-2**, though the intensified impacts at any specific location would be temporary in nature. Overall, the long-term cessation of routine operational discharges from decommissioned facilities supports the conclusion of a gradual decline in cumulative discharge-related impacts, despite episodic increases associated with decommissioning operations. Though operational footprints could change over time, established regulatory frameworks would continue to limit water quality impacts to localized areas within acceptable thresholds.

Aging infrastructure, including pipelines and umbilicals (whether still in operation, abandoned, awaiting decommissioning, or out of service), may contribute to cumulative impacts on GOA water quality. Over time, pipelines, particularly those no longer in use, may become more vulnerable to corrosion and damage from erosion, leading to potential release of residual materials like hydrocarbons, metals, and microplastics. While decommissioning practices, including flushing, are regulated by the BSEE (30 CFR 250.Q; **Appendix B**) and subject to the EPA's NPDES permits to minimize these risks, further research is needed to better understand the long-term risk of such effects and the effectiveness of current decommissioning requirements (Auer 2002). Additionally, pipelines that are placed out of service may contain treated seawater, which often includes corrosion inhibitors, scale inhibitors, and biocides. If accidentally released, these chemicals could affect water quality by introducing toxic, persistent, or nutrient rich compounds into the marine environment (Brandon et al. 1995; Leung 2001). Furthermore, extreme weather events like hurricanes may displace both active and decommissioned infrastructure, potentially causing localized disturbances to water quality (Bender et al. 2024). The extent of the impact from aging infrastructure is currently unknown (See **Chapter 4.2.3**). Decommissioned infrastructure that is left in place may eventually degrade over time. While some of this breakdown could result in environmental impacts, not all of it would necessarily be negative.

Non-OCS Oil- and Gas-Related Activities: Future non-OCS oil- and gas-related activities include proposed deepwater ports as described in **Appendix B.4.2.7**. These proposed ports could affect water quality through various activities like dredging for access channels and berths, could increase turbidity and suspend sediments, potentially mobilizing contaminants if present. In addition, operational discharges including cooling water with altered temperature profiles, treated wastewater releases, and minor hydrocarbon discharges from support vessels could further degrade water quality. Environmental impact statements for these ports suggest that the impacts on water quality could range from no effect to moderate, depending on the specific activities and locations. For

example, the Texas GulfLink Deepwater Port is proposed approximately 32 miles off the coast of the Houston-Galveston-Brazoria area and water quality impacts are expected to be negligible to minor (USCG and MARAD 2024).

Also, site assessment activities for renewable energy leases would have limited water quality impacts from vessel discharges and potential accidental spills. Appendix F of the *Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Outer Continental Shelf of the Gulf of Mexico: Final Environmental Assessment* concluded that water quality impacts from these activities would be negligible due to their temporary nature, regulatory compliance, and implementation of best management practices (BOEM 2023c). The cumulative impacts on water quality from non-OCS oil- and gas-related activities may contribute substantially to overall effects in the GOA. However, assessment of many reasonably foreseeable non-OCS impacts remains incomplete due to varying regulatory timelines for environmental impact statement development across different jurisdictions. In contrast, OCS activities undergo consistent environmental review through BOEM's established processes, allowing for more systematic monitoring and mitigation. When considering both the known and reasonably foreseeable impacts, non-OCS activities occurring over broader geographic areas and often closer to sensitive coastal environments warrant careful consideration in the cumulative effects analysis for water quality. While the magnitude of impacts between OCS and non-OCS activities is difficult to quantify precisely due to assessment limitations, the broader spatial distribution and coastal proximity of non-OCS activities suggest they could potentially represent a substantial portion of the overall cumulative impacts on GOA water quality.

Climate-related factors which are reasonably foreseeable and could contribute to cumulative impacts to water quality, include ocean acidification, changes to sea surface temperature, and weather patterns. The potential impacts from these factors are discussed in **Chapter 4.2.1** and are expected to continue. Any changes in storm intensity and frequency, coupled with higher sea levels, could increase coastal flooding and erosion, degrade coastal habitats, or influence the resuspension and distribution of bottom sediment (Wren and Leonard 2005). If storm frequency and intensity increase (Chapter 3.4.2 of the GOM Oil and Gas SID), the additional disturbance of sediment may increase impacts to water quality in nearshore and coastal areas. While there is currently no consensus on the extent to which climate may impact hurricane frequency in the Atlantic since 1900 (NOAA 2012; 2023b), observations since the 1980s show an increasing trend in the intensity of tropical cyclones in the North Atlantic. However, evidence for the continuation of this trend remains uncertain due to data limitations (NOAA 2023b).

Incremental Contribution of the Proposed Action: Activities associated with a single proposed OCS oil and gas lease sale, regardless of the alternative, would represent only a small fraction of activity when compared to the cumulative OCS Oil and Gas Program in the GOA (**Table 3.3-2**). Past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA could potentially have **minor** to **moderate** cumulative effects on water quality. While this assessment acknowledges the combined influence of ongoing OCS oil and gas activities, non-point source pollution, non-oil and gas industrial activities (including legacy impacts from events

such as the *Deepwater Horizon* oil spill), and other environmental factors, this conclusion is supported by several key considerations. First, water quality monitoring conducted in compliance with the CWA demonstrates that impacts from routine oil and gas discharges generally remain localized and temporary, with parameters returning to background levels within established mixing zones as required by NPDES permits (see **Table 4.2-2**). Second, while localized exceedances of water quality criteria may occur near discharge points, regional monitoring has not documented widespread or persistent impairment of designated uses attributable to the cumulative OCS program. Third, the offshore waters of the GOA demonstrate considerable capacity for dilution and natural attenuation of pollutants, as evidenced by post-*Deepwater Horizon* recovery studies. Finally, the regulatory framework provided by CWA standards, to include the NPDES permit requirements provides specific, enforceable mechanisms to maintain water quality within acceptable thresholds.

Quantitative analysis of these potential cumulative impacts, however, would be highly speculative due to uncertainties in future conditions and lack of established scientific thresholds for comparison over a 40- to 70-year period. Within the context of all other sources affecting regional water quality, the incremental contribution of a single proposed OCS oil and gas lease sale to cumulative impacts on water quality would be **negligible** when applicable regulations are followed and enforced. An OCS oil and gas lease sale would not be expected to result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by water quality in the area of analysis. Therefore, when the proposed lease sale is added to these existing cumulative impacts, the overall cumulative impact on water quality would still be expected to range from **minor** to **moderate**. Water quality monitoring data shows that changes in water parameters from oil and gas activities generally remain localized and adhere to regulatory requirements established by the CWA. While accidental events may also contribute to cumulative water quality impacts, adherence to NPDES permit requirements, BOEM oil spill prevention and response protocols, and other regulatory safeguards helps limit these contributions (see **Table 4.2-2**).

The cumulative impacts on water quality would not differ between action alternatives because the primary mechanisms affecting water quality (discharges, potential spills, bottom disturbance) would be similar across all alternatives, differing only in spatial distribution based on lease blocks offered. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and likely have impacts similar to those described in **Chapters 4.2.2.1** through **4.2.2.4** above. However, it should be noted that some activities, such as oil and gas extraction, may cease following decommissioning of facilities, potentially reducing impacts from cumulative oil and gas activities over time.

4.2.3 Incomplete or Unavailable Information

The chemical formulations of well treatment, workover, and completion fluids and hydraulic fracturing fluids can vary widely depending on the specific operation. The composition of fluids used before and after treatment, as well as the resulting discharge, is determined by the type of operation

being conducted. These fluids are treated, tested, and discharged as a combined waste stream under NPDES General Permit requirements. Due to the lack of comprehensive data on these fluids and waste streams (Boehm et al. 2001), uncertainties remain regarding their potential long-term and cumulative impacts. However, the small relative volume and short duration of these discharges reduces the overall environmental risk (AECOM and Marine Ventures International 2021). Given the complexity and challenges in acquiring complete data, a full understanding of the long-term environmental effects may never be achieved. However, in developing the Region 4 and Region 6 NPDES General Permits, USEPA found no scientific evidence of significant adverse changes in ecosystem diversity, productivity, or biological community stability, nor a threat to human health through direct exposure or consumption of exposed aquatic organisms, or unreasonable loss of aesthetic, recreational, scientific, or economic values related to the discharges (USEPA 2023c).

Ocean acidification, changing sea-surface temperatures, land-use change can influence water quality, potentially worsening issues like stratification and eutrophication. However, the full extent of these impacts remains unknown given the information currently available. Additionally, while sediment and water quality in the deep GOA can influence each other, research on these sediment-water quality interactions in deepwater environments is limited. Despite some localized effects, water quality generally improves with distance from shore (Kennicutt II 2017). Exceptions to this trend include hypoxic zones and the water just above natural oil and gas seeps (Ward and Tunnell Jr. 2017). Therefore, while the incomplete or unavailable information summarized above is relevant, it would likely not change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

BOEM acknowledges that there is incomplete information on the long-term impacts of DIP. Aging pipelines and umbilicals become more susceptible to damage from corrosion, mudslides, and seabed erosion, which can compromise structural integrity. This damage may result in the release of some residual materials, though it is possible that materials could remain adhered to the walls of the pipeline. In either case, the impact from these residuals is minimized during decommissioning. In the GOA, abandoned umbilicals typically consist of an external polymer layer (Frazer and Madden 2015). The degradation of these umbilicals, depending on their composition, could lead to the release of microplastics and other materials into the GOA ecosystem. The overall volume of hydrocarbons or chemicals released into the environment from aging infrastructure cannot be quantified, as the data on infrastructure and spills is not collected in a manner that allows for the identification of aging as a source of spills (National Academies of Sciences 2022). It is worth noting, however, that the vast majority of recorded pipeline spills in general are less than 1 bbl, which disperse and dissipate quickly (ABS Consulting Inc. 2016). Furthermore, both active and decommissioned in place pipelines on the OCS are vulnerable to exposure and displacement during major storm events (e.g., hurricanes, winter storms) (Bender et al. 2024). Such events could impact water quality by introducing metals and nutrients through sediment transport and resuspension.

A 2002 Minerals Management Service (MMS, the predecessor of BSEE and BOEM) study indicates that the procedure outlined in 30 CFR 250.1006 for flushing out-of-service pipelines removes impurities that pose a risk to the integrity of the pipeline (Auer 2002; BSEE 2012). These

practices appear to help preserve the pipeline for potential future reactivation, however, the sample size was limited (consisting of only four pipeline segments), and more research is needed for statistical reliability. BSEE recently awarded a study that seeks to improve BSEE and BOEM's understanding and oversight of pipeline subsea infrastructure by assessing the potential environmental impacts from pipelines and pipeline subsea infrastructure (including those decommissioned-in-place). The study focuses on the contamination risk from residual potentially hazardous materials within pipelines and associated equipment (e.g., scale, paraffin, chemicals, NORM) after decommissioning requirements are completed. The research findings will be made available to BOEM to assist with future NEPA analyses that support BSEE's pipeline permitting program, and for assessing if future policy or regulatory modifications are warranted.

Furthermore, if BSEE determines a pipeline or facility previously approved and DIP could now interfere with other uses of the OCS, or cause undue or serious harm or damage to the human, marine, or coastal environment, BSEE reserves the right to mandate its removal in accordance with 30 CFR 250.Q. Though the incomplete information about DIP is relevant, it cannot be obtained within the timeframe contemplated for the proposed action. However, it is not essential to a reasoned choice among alternatives given the existing regulatory requirements in place and BSEE's ability to adaptively manage future decommissioning, as well as mandate the removal of infrastructure previously decommissioned-in-place, if deemed necessary. BSEE typically adds high risk facilities to its Increased Oversight List. This ensures that the BSEE district offices are visually inspecting these facilities at a higher frequency than normal. Furthermore, BSEE regulations require all facilities, including those relinquished back to predecessors through bankruptcy, be properly maintained and monitored. This includes testing of safety valves and sensors, draining of vessels have properly maintained Nav-aid systems and fog horns, and performing pollution inspections designed to reduce spills and leaks. See **Appendix C** for more information on decommissioning oversight and environmental compliance.

4.3 Coastal Communities and Habitats

This chapter focuses on the biological aspects of coastal habitats and communities and on the potential effects to these resources from the IPFs described in **Chapter 3** and **Appendix B**. The potential impacts to human populations and socioeconomic factors associated with these coastal habitats are discussed in subsequent chapters (e.g., recreational resources [**Chapter 4.12**], land use and coastal infrastructure [**Chapter 4.14**], and social factors [**Chapter 4.16**]). The U.S. Gulf of America coastline spans 1,630 mi (2,623 km) from the southern tip of Texas east to the Florida Keys and contains more than 750 bays, estuaries, and sub-estuary systems (USEPA 2012). Coastal habitats considered in this analysis include estuaries, wetlands, mangroves, SAV, beaches and barrier islands, dunes, oyster reefs and coastal coral reefs, extending no farther than the State/Federal water boundary line of the GOA. Saltwater marshes, saltwater mangrove swamps, and non-vegetated areas (e.g., sand bars, mudflats, and shoals) are the most common GOA coastal habitats (Dahl and Stedman 2013). Most of the GOA coastal waters are designated as essential fish habitat, and coastal barrier sand dunes along Alabama and the Florida panhandle contain critical habitat for four subspecies of beach mouse.

4.3.1 Affected Environment

Coastal estuaries provide critical nursery grounds and adult habitat for numerous species of birds, fish, and invertebrates. The SAV, including seagrass beds, provides foraging and nursery habitat for fish and invertebrates, and is important for carbon sequestration, nutrient cycling, and sediment stabilization (Duarte et al. 2004; 2005; Frankovich et al. 2011; Heck Jr. et al. 2003; Orth et al. 2006). Wetlands cycle pollutants and nutrients, trap sediments, minimize erosion, and provide defense against storm surge in coastal areas. Barrier islands protect the mainland from shoreline erosion; act as habitat for birds, crustaceans, and burrowing small mammals (e.g., beach mice); and serve as critical stopover areas for migrating birds (Britton and Morton 1989; Morton 2003; Rosati 2009).

Natural and anthropogenic IPFs (e.g., storms, sea-level rise, ocean acidification, land subsidence, and water management measures) have contributed to a long-term trend of wetland loss in the coastal GOA by altering the flow of water, sediments, and nutrients. In the GOA, a large band of hypoxic waters occurs annually as a result of excessive nutrient loading from the Mississippi and Atchafalaya Rivers and summertime stratification on the Louisiana-Texas shelf. The hypoxic zone persists until wind-driven circulation mixes the water column and the large spring/summertime riverine inputs subside. Hypoxic conditions can lead to alterations in community structure within coastal habitats by rendering habitat unusable and forcing mobile species to redistribute. For more information on coastal communities and habitats of the GOA, see the GOM Oil and Gas SID and Biological Environmental Background Report.

4.3.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning activities, with the potential to impact coastal communities and habitats. Non-OCS oil- and gas-related activities also have the potential to impact coastal communities and habitats (**Table 4.3-1**). These IPFs and their potential to affect coastal communities and habitats are discussed below and in greater detail in Chapter 4.3.1 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.3.1 of the GOM Oil and Gas SID.

Table 4.3-1. Impact-Producing Factors with the Potential to Impact Coastal Communities and Habitats.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil and Gas-Related Activities
Discharges and Wastes	Unintended Releases into the Environment	Air Emissions and Pollution
Bottom Disturbance	Response Activities	Discharges and Wastes
Coastal Land Use/ Modification	-	Bottom Disturbance
-	-	Coastal Land Use/Modification
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

Several existing regulatory programs and requirements reduce or minimize the environmental effects of these IPFs to coastal communities and habitats in the GOA. Regulatory requirements enforced by BOEM, BSEE, and other agencies are included in **Table 4.3-2** and further described in the *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025a). Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with all regulatory requirements; therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

Table 4.3-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure	**Enforcing Agency**	**Impact-Producing Factor(s) Reduced/Avoided**	**Supporting References and Sections**
Clean Water Act (NPDES Permits)	USEPA	Discharges and Wastes	**Chapter 3.4.2** of this Programmatic EIS; Chapter 5.11 of the GOM Oil and Gas SID
Marine Protection, Research, and Sanctuaries Act	USEPA	Discharges and Wastes	33 U.S.C. 1401 et seq.
Pollution Prevention	BSEE	Unintended Releases into the Environment	30 CFR 250.300 (BSEE)
International Convention for the Prevention of Pollution by Ships (MARPOL 73/78), MARPOL Annex V Treaty	International Maritime Organization (IMO); USCG	Discharges and Wastes; Unintended Releases into the Environment	https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Inspections-Compliance-CG-5PC-/Commercial-Vessel-Compliance/Domestic-Compliance-Division/MARPOL/; 33 U.S.C. 1901-1915; 33 CFR 151. A; Chapter 2.9.1.7 of the GOM Oil and Gas SID
Ballast Water Management for Control of Nonindigenous Species in Waters of the United States	USCG	Discharges and Wastes	33 CFR 151.A; Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4701-4751), as amended by the National Invasive Species Act of 1996
Wetland Compensatory Mitigation	USACE; USEPA; State agencies	Bottom Disturbance	Clean Water Act Section 404
Coastal Zone Management Act	NOAA, States	Coastal Land Use/Modification	16 U.S.C. 1251 and 15 CFR 930

Regulatory Requirement or Protective Measure	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
National Contingency Plan (CWA, Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan)	USCG; USEPA; State, Regional, and local governments	Unintended Releases into the Environment (accidental oil spill)	40 CFR 300. 311 Clean Water Act; Oil Pollution Act of 1990 (33 U.S.C. 2701), the National Response Framework, Executive Orders 12580 and 12777, Secretarial Order 3299
Marine Debris Research, Prevention, and Reduction Act	USEPA, USCG	Unintended Releases into the Environment (accidental marine debris)	33 U.S.C. 1901 et seq.; OCS Report BOEM 2025-040; NMFS 2025 BiOp (NMFS 2020) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol

4.3.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOAR).

Discharges and Wastes: The OCS oil- and gas-related activities in both offshore and onshore waterways result in discharges and wastes (e.g., sanitary wastes, drill muds and cuttings, produced waters, vessel discharges [including from vessels used in decommissioning activities], and ballast). While discharged substances have the potential to alter water quality and coastal habitat suitability, the USEPA regulates discharges through NPDES general permits in support of the CWA (see **Appendix B.2.2** for more information) and requirements under the Marine Protection, Research, and Sanctuaries Act (also referred to as the Ocean Dumping Act). Additionally, all vessels in U.S. and international waters are required to adhere to the International Maritime Organization's regulations under the International Convention for the Prevention of Pollution from Ships (MARPOL) limiting discharges, avoiding release of oily water, and prohibiting disposal of solid wastes. Ballast water may carry biological materials such as plants, animals, and microorganisms, which may introduce nonnative species. To prevent the spread of aquatic nuisance species, the USCG implements a Ballast Water Management Program that applies the provisions of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended by the National Invasive Species Act of 1996. Lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with these regulatory requirements, as enforced by the agencies indicated in **Table 4.3-2**.

Most operational discharges such as produced sands, oil-based or synthetic-based drilling muds and cuttings, along with fluids from well treatment, workover, and completion activities, occur offshore and are diluted and discharged according to the USEPA's regulations. While offshore produced-water discharges can extend over 2 km (1 mi) from the source, the majority of the ecological impacts occur within 200-300 m (656-984 ft) of the source (Cordes et al. 2016) and are, in

most cases, too distant to pose a threat to coastal communities and habitats. Seepage or discharges from onshore sources such as waste sites, ports, or oil storage sites into adjacent wetland areas can occur, potentially resulting in changes to soil chemical composition and/or vegetation injury or mortality.

***Bottom Disturbance*:** Bottom disturbance from OCS oil- and gas-related activities affecting coastal communities and habitats includes infrastructure and anchor emplacement (including pipeline installation), infrastructure removals (including pipeline decommissioning), and dredging. Anchoring may crush or smother SAV, oyster beds, or coastal coral reef habitats. Infrastructure (including pipelines) emplacement and removal may disturb coastal habitats, resulting in injury or mortality to living habitat-forming organisms such as SAV or marsh grasses. Many existing OCS pipelines made landfall on barrier island and wetland shorelines, and have contributed to land loss in these areas. However, the installation of new pipelines that make landfall is rare (**Chapter 3.2.4**), and modern pipeline installation techniques are less destructive for wetlands than previously used methods. Depending on how a pipeline was installed, decommissioning a pipeline by removal in coastal areas may be considered more destructive to habitats (causing greater disturbance) than allowing a pipeline to be DIP. However, allowing a pipeline to be DIP in coastal areas would extend the impacts of its placement longer term. In either case, decommissioning by removal or DIP of pipelines in coastal areas may result in at least some degree of disturbance due to the activities required to prepare the pipeline for decommissioning (e.g., flushing, disconnecting from other infrastructure). Delayed removal (decommissioning) of a pipeline in coastal areas would delay any post-removal recovery of the surrounding habitat (e.g., vegetation) that may occur. Installation, decommissioning, and dredging actions would be subject to approval by agencies with regulatory authority in state waters (e.g., USACE and State agencies). Mitigation and regulatory measures, such as avoidance or compensatory wetland mitigations, may be applied by those agencies.

Dredging of coastal waterways and ports supports, in part, OCS oil- and gas-related activities including the transport of large OCS platforms, other structures, and vessel passage. Dredging may result in the destruction (e.g., crushing and smothering) of coastal benthic habitats, such as SAV or oyster reefs. Dredging can also disrupt hydrodynamics, sediment transport, and morphology of coastal ecosystems leading to increased erosion rates, turbidity, land loss, and salinity changes (Boesch et al. 1994; Cox et al. 2022; De Vriend et al. 2011; Jeuken and Wang 2010; Nichols 1988; Onuf 1996; van Maren et al. 2015; Vellinga et al. 2014; Wilber and Clarke 2001). However, these actions would also be subject to approval by agencies with regulatory authority in state waters (e.g., USACE and State agencies), including mitigation or regulatory measures.

Coastal Land Use/Modification: Onshore construction to support OCS oil- and gas-related activities (e.g., roads, onshore support bases including those that accommodate decommissioned structures/equipment) can result in alteration or loss of available habitat including wetlands, mangroves, and estuaries. These activities can also increase sediment deposition in wetlands and streams, negatively impacting important habitats, such as oyster reefs (e.g., decreased feeding and respiration) and SAV (e.g., smothering and reduced light availability) (Colden and Lipcius 2015;

Eisemann et al. 2021). The Coastal Zone Management Act requires that Federal actions be consistent with enforceable policies of a State's federally approved coastal management program. State and Federal permitting agencies discourage the placement and expansion of facilities in wetlands and require mitigation of impacts (e.g., CWA, USACE's 404 permit, and State permitting programs). Additionally, the GOA has a well-established industrial infrastructure network, and future expansion is expected to be limited (**Appendix B.2.5**). Vessel activity from OCS oil and gas- related activities (e.g., tankers and support vessels, including those used in decommissioning) can increase wave erosion and therefore habitat loss or degradation in coastal and estuarine habitats, depending on how a particular canal is armored and maintained (Johnston et al. 2009; Robb 2014; Thatcher et al. 2011). Turbidity and resulting sedimentation from coastal erosion can result in negative impacts as described above. Vessel-induced saltwater intrusion may also occur and negatively impact habitat suitability in otherwise brackish or freshwater bodies.

4.3.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOAR).

Unintended Releases into the Environment: BSEE requires that lessees take measures to prevent unauthorized discharge of pollutants into offshore waters (30 CFR 250.300). Additionally, the International Maritime Organization's regulations under MARPOL, the National Contingency Plan, and the Marine Debris Research, Prevention, and Reduction Act contain regulations and guidance to prevent, minimize, and/or respond to accidental pollution from ships. However, large tropical storm events, faulty equipment, or human error may still cause accidental releases and spills into the environment from pipelines, structures, and vessels associated with OCS oil- and gas-related activities, including decommissioning activities. The distance from shore of OCS oil- and gas-related activity in many cases reduces the probability of spilled oil reaching coastal communities and habitats, as it undergoes weathering and biodegradation before it reaches the coast (OSAT-2 2011). Nonetheless, coastal communities and habitats can be vulnerable to these incidents, particularly from spills resulting from coastal pipeline rupture or vessel accidents (Fischel et al. 1989). Impacts to coastal habitats depend on factors including oil type, volume, and condition, as well as affected habitat characteristics (e.g., permeability of substrate, wave energy, and tidal influence). Oil exposure may result in substantive injury (e.g., reduction in transpiration and carbon fixation) and mortality to wetland vegetation, which may increase coastal habitat vulnerability to erosion. Oil can impact mangroves by coating the breathing surfaces of the roots, killing the plant within days. Chronic exposure to oil can result in defoliation and canopy thinning, leaf yellowing, reduced growth, poor seedling establishment, and mortality (Duke et al. 1997; Hoff and Michel 2014; Lewis et al. 2011). Oil can thicken as its volatile components are degraded and form tar balls or aggregations that incorporate sand, shell, and other materials as it reaches beaches. While SAV can, in some cases, avoid direct contact with spilled oil, other negative effects, such as shading from surface oil, can occur (Erftemeijer and Lewis III 2006; U.S. Navy 2018).

Although vessel (including decomissioning vessels) and structure operators are required to take preventative measures against the loss of solid waste (e.g., plastic), accidental releases may still occur and pollute coastal habitats. The accumulation of plastic debris on the seafloor can inhibit gas exchange between sediment pore waters and overlying waters (Moore 2008). Plastics can also further breakdown into microplastics, carrying pollutants and heavy metals into coastal environments and negatively impacting the survival and development of filter feeders such as oysters (Craig et al. 2022; Kumar et al. 2021; Moore 2008).

Spill Response: Response activities, including physical prevention methods such as booms and barrier berms, can cause mortality if they are lifted onto marsh vegetation by wave action. They can also alter hydrology, negatively impacting productivity or causing mortality for certain species of SAV (Frazer et al. 2006; Kenworthy and Fonseca 1996; Zieman et al. 1984). Oiled marshes may incur secondary impacts associated with the cleanup process, such as trampled vegetation, accelerated erosion, and the burying or mixing of oil into marsh soils (Long and Vandermeulen 1983; Mendelssohn et al. 1993; Zengel et al. 2015). Along beaches, cleanup activities can occur where intertidal and supratidal species occur, resulting in crushing and mortality. Offshore *in-situ* burning may result in residue balls that can move inshore and contaminate benthic habitats and shorelines. Burning can also affect air quality for coastal plants (Michel and Rutherford 2013).

4.3.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil and gas-related activities also influence coastal communities and habitats in the GOA through air emissions; discharges and wastes; bottom disturbance; coastal land use modification, and other environmental factors. Each IPF is summarized below, with additional detail in Chapter 4.3.1.2.1 of the GOM Oil and Gas SID. Effects from these IPF categories would vary depending on their frequency, duration, and geographic extent as discussed below.

Air Emissions and Pollution: Potential sources of non-OCS oil- and gas-related air emissions and pollution include natural (e.g., bacterial processes) and anthropogenic (e.g., State oil- and gas-related activities, manufacturing, motor vehicles) (see **Appendix B.4.2.1** for examples). Anthropogenic activities, such as fossil fuel combustion and agriculture, release large amounts of nitrogen, sulfur, and carbon into the atmosphere. In the form of nitrogen, sulfur, and carbon oxides and ammonia, these chemicals can disrupt the chemistry of coastal soils and surface waters, leading to reduced pH (i.e., acidification). Acidified waters may hinder growth of calcifying organisms such as oysters (Osborne et al. 2022). In addition to altering local pH, atmospheric deposition of sulfur and nitrogen oxides enhance nutrient loads in coastal ecosystems. Current atmospheric deposition rates are presented in **Chapter 4.1**. In moderation, nutrient enrichment may enhance growth for some coastal vegetation types. However, severe nutrient loading can cause eutrophication (over-abundance of nutrients) of coastal waters downwind of anthropogenic emissions, leading to algal blooms and shifts in biological diversity (Howarth et al. 2000; Paerl 1997; Paerl et al. 2002). Algal blooms diminish water clarity and, in some cases, lead to toxic conditions and loss of SAV (Bittick et al. 2018; Kennicutt II 2017). Elevated concentrations of carbon dioxide in the atmosphere, including

from anthropogenic sources, may act as a fertilizer and stimulate plant production, although the response is variable and influenced by local environmental factors.

Discharges and Wastes: Potential sources of non-OCS oil- and gas-related discharges and wastes include, but are not limited to, fresh water, wastewater, stormwater runoff, grey water from vessels, chemical wastes, nutrients (e.g., nitrogen and phosphorus), dredged material, State oil and gas discharges, and other materials (e.g., trash including plastics). These inputs can alter salinity and increase turbidity and organic material in coastal waters (Bianchi et al. 2010). Degraded water quality can negatively affect vegetation in wetlands and seagrass beds, which can lead to increased shoreline erosion and loss of habitat. Excess nutrients in the water can have large-scale ecological consequences on the coastal and estuarine habitats of the GOA. In the Mississippi-Atchafalaya basin, high organic and inorganic nutrient loads cause eutrophication, which in turn can lead to low-oxygen (hypoxic) conditions that kill or displace many species and lead to “dead zones” through an intermediate step of microbial consumption of settled out phytoplankton blooms (Bianchi et al. 2010; Rabalais et al. 2002). Plastics are commonly found in coastal habitats, including beaches and wetlands, and can similarly degrade localized habitat quality as described earlier (**Chapter 4.3.2.2**). Accidental oil spills can also occur from ongoing State oil- and gas-related activities, resulting in similar effects to coastal communities and habitats as described earlier (**Chapter 4.3.2.2**).

Bottom Disturbance: Non-OCS oil- and gas-related bottom disturbance can result from activities such as vessel and buoy anchoring, moorings, military operations, artificial reef emplacement, dredging, trawling, State oil- and gas-related activities, and renewable energy site assessment and characterization (e.g., geotechnical/sub-bottom sampling, and biological surveys). Anchoring may crush coastal habitats, such as SAV, oyster beds, or coastal coral reefs. Dredging of coastal waterways and ports may also result in the crushing of coastal benthic habitat or smothering via increased turbidity and sedimentation. Increased turbidity from bottom disturbance may also limit the amount of light available for SAV. Inshore commercial fishing activity (e.g., trawling) can also cause increased turbidity and resultant sedimentation, potentially smothering benthic habitat.

Coastal Land Use/Modification: Potential sources of non-OCS oil- and gas-related coastal land use/modification include onshore construction (e.g., hotels, seawalls, bridges, roads, oil- and gas-related facilities), vessel traffic (e.g., shipping, recreational and commercial fishing, and cruise ships), and dredging of navigation canals. These activities can result in coastal habitat and hydrologic alteration, increased turbidity and sedimentation of nearby waterways, and vessel-induced wave erosion. These impacts may result in a net altering of ecosystem function, potentially creating suboptimal conditions for coastal communities and habitats such as oyster reefs, marsh grasses, and SAV.

***Other Environmental Factors*:** Ocean acidification, changes to sea surface temperature, sea-surface height, wind speed, and weather patterns can all impact coastal communities and habitats of the GOA. The potential impacts from these factors are expected to continue. Higher water temperatures can lead to sea-level rise, increased ocean stratification, deoxygenation, and eutrophication of coastal waters, and altered patterns of ocean precipitation, circulation, and

freshwater input (Doney et al. 2012; Rodgers 2021). Tropical storms and cyclones (especially hurricanes) may increase in intensity due to climate-related factors. These storms and cyclones introduce fresh water and nutrients, and increase storm surge, flooding, and physical damage in coastal areas (Bruyère et al. 2017; Patrick et al. 2020). Ocean acidification (i.e., reduction in ocean pH) can hinder the growth of calcium carbonate shells in shellfish, although responses can vary among and within species (Osborne et al. 2022). The eastern oyster (*Crassostrea virginica*) may be particularly vulnerable under prediction scenarios (Osborne et al. 2022), causing concern for the function of this important benthic habitat in coastal areas of the GOA. Coastal areas are impacted by sea level rise and increased sea surface temperatures, with wetlands lost at higher rates in Louisiana than in the combined rest of the contiguous U.S. (Couvillion et al. 2017). Sea-level rise along the Gulf Coast over the next three decades is projected to be, on average, 14-18 in (36-41 cm) (Sweet et al. 2022). This may result in permanent flooding or isolating of coastal habitat, rendering it unsuitable for its associated communities.

4.3.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, the direct or indirect impacts to coastal communities and habitats that would occur as a result of the proposed action (i.e., a proposed OCS oil and gas lease sale) are **none**. However, there are ongoing OCS oil- and gas-related activities associated with previous lease sales and non-OCS oil- and gas-related activities would continue to potentially affect coastal communities and habitats under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would potentially affect coastal communities and habitats through discharges and wastes, bottom disturbance, coastal land use/modification, unintended releases into the environment, and response activities as described above in **Chapter 4.3.2.2.**

Discharges and wastes from ongoing activities that could otherwise result in altered water quality and habitat suitability or the introduction of nonnative species are subject to the same regulations and mitigations as described **Chapter 4.3.2.1**, lessening potential impacts in coastal areas. Bottom disturbance from ongoing activities has the potential to impact coastal areas in similar ways as described above in **Chapter 4.3.2.1** (crushing/smothering of benthic habitat, coastal disturbance, alterations to hydrodynamics, sediment transport, coastal morphology). However, because of the amount of existing coastal infrastructure and navigation canals, impacts from bottom disturbance from ongoing activities are expected to be minimal. Similarly, the construction of onshore infrastructure (e.g., support bases) is unlikely due to the existing amounts of infrastructure, lessening impacts (e.g., sediment deposition) from coastal land use/modification. Vessel traffic may impact coastal communities and habitats in similar ways as described above under **Chapter 4.3.2.1** (e.g., wave erosion, turbidity, sedimentation, saltwater intrusion) attributable to OCS oil- and gas-

related activities. Unintended releases into the environment from ongoing activities could injure or kill wetland vegetation, including SAV, increasing vulnerability to erosion, and pollute coastal areas with spill byproducts (e.g., tar balls). Response to these spills could further result in mortality to wetland vegetation through impacts from booms being lifted onto shorelines, or from trampling by anthropogenic foot traffic, further increasing the risk of erosion to these habitats. Beach intertidal and supratidal species could also experience injury or mortality from cleanup efforts and be polluted by residue balls that result from oil slick burning.

The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.3.1** and in further detail in Chapter 4.3.1.1 of the GOM Oil and Gas SID. Considering the regulations and mitigating measures (e.g., those from USACE and State coastal programs, including compensatory mitigation; **Table 4.3-2**), the amount of existing coastal infrastructure, and the amount of ongoing activity (see **Chapter 3**), impacts from ongoing OCS oil and gas activities would range from **negligible** to **moderate**. Most coastal activities would be regulated and mitigated; however, a coastal spill could result in more notable impacts to coastal habitat availability or suitability. OCS oil- and gas-related vessels may also contribute to localized shoreline erosion depending on how a canal is armored and maintained.

***Non-OCS Oil- and Gas-Related Activities*:** Air emissions and pollution, discharges and wastes, bottom disturbance, and coastal land use/modification associated with past and present non-OCS oil- and gas-related activities, and other environmental factors, would continue to potentially affect coastal communities and habitats under the No Action alternative, as described above. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. Non-OCS oil- and gas-related air emissions (through atmospheric deposition) and discharges and wastes would continue to increase nutrient loads in coastal areas, potentially altering the coastal environment through reduced pH, eutrophication, induced hypoxia, and algal blooms as described earlier. Accidental oil spills could still result from state oil and gas activities and be concentrated in sensitive coastal habitats, potentially injuring or killing coastal vegetation including SAV. Dredging to support non-OCS oil- and gas-related activities (e.g., commercial shipping, cruise ships) would still occur and would have the potential to injure or remove coastal habitat, and increase turbidity and sedimentation in surrounding areas. Onshore construction for non-OCS oil- and gas-related structures (e.g., coastal housing, seawalls, bridges, roads) would alter or remove coastal habitat. Non-OCS oil- and gas-related vessel traffic (e.g., commercial shipping) would continue to contribute to vessel-induced shoreline erosion in coastal areas. Finally, underlying environmental factors such as ocean acidification, changes to sea surface temperature, and changes to weather patterns (among the other factors listed earlier) would continue to affect coastal communities and habitats. Of all of these, the most notable adverse impacts to coastal communities and habitats would include changes in habitat extent and suitability from climate-related factors (e.g., sea-level rise), anthropogenic inputs (e.g., nutrient loading), and coastal construction (leading to habitat loss and erosion). Overall, these impacts would be much more influential on coastal communities and habitats than those resulting from OCS oil- and gas-related activities; and they

would still occur to coastal communities and habitats without the presence of ongoing OCS oil- and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing, which could change the spatial distribution of the scenario activities but not their overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table 4.3-3**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.3-3. Impact Determinations for Routine and Accidental Impacts to Coastal Communities and Habitats from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Discharges and Wastes	N/A	**Negligible**	**Negligible**	**Negligible**
Bottom Disturbance	N/A	**Minor**	**Minor**	**Minor**
Coastal Land Use/Modification	N/A	**Minor**	**Minor**	**Minor**
Unintended Releases into the Environment	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. Considering the regulations and mitigating measures (see **Table 4.3-2**), the amount of existing coastal infrastructure, and the amount of ongoing activity (see **Chapter 3**), impacts from ongoing OCS oil and gas activities would range from **negligible** to **moderate**.

[1] No programmatic protective measures for application at the OCS oil and gas lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for coastal communities and habitats would be considered at the site-specific stage.

Alternative B – Regionwide OCS Lease Sale

Alternative B considers a proposed regionwide OCS lease sale area. Though estuarine and coastal areas are not included in the proposed OCS lease sale area, impacts from the proposed action may extend to coastal areas due to vessel transit, onshore support, and the connectivity of water bodies. The majority of the EPA is excluded from leasing under this alternative, which greatly reduces or eliminates potential impacts to coastal communities and habitats in the northeastern GOA (e.g., along Florida).

Discharges and Wastes: Discharges and wastes can occur from any routine oil and gas activity, including decommissioning activity, except for helicopter operations (**Table 3.3-4**). Given the

level of these activities described in **Table 3.3-2** and described in **Appendix C** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts from discharges and wastes to coastal communities and habitats are expected to be relatively undetectable and **negligible** due to the applicable regulations described earlier, the likely rapid dispersal of suspended materials via current and wave action, and the fact that most operational discharges occur offshore and are in most cases too distant to pose a threat to coastal communities and habitats.

Bottom Disturbance: Based on the description of the potential impacts above and the expected amount of activity, including decommissioning activity, that would cause bottom disturbance in coastal communities and habitats described in **Table 3.3-2** and **Appendix C**, impacts from bottom disturbance to coastal communities and habitats are expected to be **minor**. The anticipated amount of pipeline landfalls and pipeline decommissionings in coastal areas is extremely low and the amount of dredging activity (likely maintenance) and anchoring that would be attributed to a proposed action is relatively small (see **Chapter 3**). Impacts to habitat quality are expected to be highly localized in areas already used in the OCS oil and gas industry.

Coastal Land Use/Modification: Impacts from coastal land use/modification to coastal communities and habitats are expected to be **minor**, as onshore industrial infrastructure is already largely in place (including support and helicopter bases). However, the relative amount of added vessel traffic from service vessels including decommissioning vessels (**Table 3.3-2** and described in **Appendix C**) could result in adverse localized impacts to habitat quality and extent from erosion.

Unintended Releases into the Environment: Impacts from unintended releases into the environment from OCS oil- and gas-related activities, including decommissioning activities, to coastal communities and habitats are expected to be **negligible** to **moderate**. Impacts from trash and marine debris (including plastics) tied to a single proposed OCS oil and gas lease sale would be largely undetectable and negligible. Non-oil spills (e.g., chemical spills and synthetic-based fluid spills) would likely be relatively infrequent based on the occurrences of these accidental spills calculated over the past decade (**Tables B.3-3** and **B.3-4**). These spills could also disperse before reaching coastal habitats due to wind and wave action. Based on the number and volume of accidental oil spills estimated for a single proposed OCS oil and gas lease sale (**Chapter 3**), negative impacts to coastal communities and habitats could range from undetectable for small spills or spills occurring farther offshore (potential for oil to weather and biodegrade before reaching shore), to notable, localized impacts for larger spills or spills occurring nearshore. For information about catastrophic oil spills, which are not reasonably forseeable under a proposed action, see the GOM Catastrophic Spill Event Analysis technical report (BOEM 2021b).

Spill Response: Similarly, impacts from spill response to coastal communities and habitats would depend on the spill size and vicinity to coastal habitat. These impacts are expected to be **negligible** to **minor**. No spill response activities may be necessary if accidental spills are small or if they occur far enough offshore and weather before reaching coastal habitats. Spill-response methods such as booms deployed offshore would also have no effect on coastal habitats. Highly localized impacts to coastal communities and habitats as described earlier may occur in the case of

nearshore spills or if spills are of magnitude to reach the coastline from offshore sources and necessitate nearshore cleanup methods.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative B on coastal communities and habitats would be **negligible** to **moderate**, with more notable impacts mainly attributable to unintended releases into the environment.

Alternative C –Targeted OCS Lease Sale Area

The potential spatial redistribution of activity under Alternative C would not change impact conclusions for coastal communities and habitats from those under Alternative B. Whole and partial SSRA blocks and whole and partial blocks proposed to be subject to the Blocks South of Baldwin County, Alabama, Stipulation are removed from potential leasing under this alternative. This may result in fewer activities in the vicinity of adjacent coastal communities and habitats, further decreasing the potential for offshore spills to reach coastal habitats. The need for coastal spill response from offshore spills may be correspondingly less likely. However, spills from vessels and pipelines in coastal areas may still occur. Therefore, these area exclusions do not change the overall suite of IPFs and impact conclusions from Alternative B.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative C on coastal communities and habitats would be **negligible** to **moderate**, with more notable impacts mainly attributable to unintended releases into the environment.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

The potential spatial redistribution of activity under Alternative D would not change impact conclusions for coastal communities and habitats from those under Alternative B or C. In addition to the exclusions under Alternative C, Alternative D would additionally remove from leasing consideration whole and partial blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath. This may result in even fewer activities in the vicinity of adjacent coastal communities and habitats, further decreasing the potential for offshore spills to reach coastal habitats. The need for coastal spill response from offshore spills may be correspondingly less likely. However, spills from vessels and pipelines in coastal areas may still occur. Therefore, this area exclusion does not change the overall suite of IPFs and impact conclusions from Alternative C or D.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative D on coastal communities and habitats would be **negligible** to **moderate,** with more notable impacts mainly attributable to unintended releases into the environment.

4.3.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which include ongoing OCS oil- and gas-related activities, could potentially affect coastal communities and habitats through discharges and wastes, bottom disturbance, coastal land use/modification, unintended releases into the environment, and response activities as described above in **Chapters 4.3.2.1** and **4.3.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.3.1** and in further detail in Chapter 4.3.1.1 of the GOM Oil and Gas SID. Considering the regulations and mitigating measures (e.g., those from USACE and State coastal programs, including compensatory mitigation; **Table 4.3-2**), the amount of existing coastal infrastructure, and the amount of ongoing activity (see **Chapter 3**), these ongoing impacts would be **negligible to moderate**. Future lease sales would add localized but measurable impacts to the past and present impacts. The amount of service vessel trips (**Table 3.3-2**) estimated for cumulative activities over a 70-year period would result in vessel traffic impacts (e.g., vessel-induced wave erosion) and discharges and wastes in coastal areas attributable to OCS oil- and gas-related activities. However, armored navigation channels would help minimize potential impacts from vessel-induced wave erosion, and beach nourishment projects along the Gulf coast may help mitigate and protect against shoreline erosion. Additionally, discharges and wastes would be expected to be subject to the same regulatory measures as ongoing activities (e.g., NPDES permits in support of the CWA), lessening their potential impacts. The number of new pipelines that make landfall, coastal construction, and coastal dredging to support OCS oil- and gas-activities would also be expected to remain relatively low for future activities due to the amount of existing infrastructure already in place along the Gulf coast, lessening potential impacts from bottom disturbance (e.g., physical destruction of habitat, turbidity, sedimentation). The steady installation and decommissioning of offshore infrastructure (e.g., platforms, wells, pipelines) over a 70-year period, while not directly affecting coastal communities and habitats, would extend the risk of unintended spills into the environment. Potential spills may weather before reaching coastal habitats, but larger spills and spills occurring near shore could negatively impact coastal habitats as described earlier under **Chapter 4.3.2.2**. Spill response may also result in negative impacts (e.g., vegetation trampling) as described earlier under **Chapter 4.3.2.2**.

The regulations and mitigating measures applicable to ongoing OCS oil- and gas-related activities (**Table 4.3-2**) would be expected to be applied to future OCS oil- and gas-related activities. Given these regulations and mitigating measures (e.g., USACE and State coastal programs, including compensatory mitigation), and the existing amount of coastal infrastructure, impacts from cumulative OCS oil- and gas-related activities are expected to be similar to effects experienced from

ongoing oil- and gas-related activities. It would be likely that most coastal infrastructure would be maintained to support future activities, and not require construction of new facilities. Similarly, the number of new pipelines that make landfall would continue to be very small. OCS oil- and gas-related vessels may still contribute to localized shoreline erosion depending on how a canal is armored and maintained. While most coastal activities would be regulated and mitigated, a coastal spill and cleanup could still result in more notable impacts to coastal habitat availability or suitability, as described earlier under **Chapter 4.3.2.2**. If future oil- and gas-related activity trends further offshore, the potential for an accidental spill that originates at a structure or well may have a higher likelihood of degrading before reaching coastal habitats. Regardless of the distribution of oil- and gas-related activity offshore, it is anticipated that the demand for coastal infrastructure would remain relatively constant.

Non-OCS Oil- and Gas-Related Activities: Other IPFs or programmatic concerns that are reasonably foreseeable and could contribute to cumulative impacts to coastal communities and habitats include non-OCS oil- and gas-related air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, and other environmental factors. The potential impacts from these factors are discussed earlier under **Chapter 4.3.2.3**, and would be expected to continue. Of these, changes to environmental factors (e.g., sea-level rise), anthropogenic inputs (e.g., nutrient loading), and coastal construction (leading to habitat loss and erosion) would be of the greatest threat to coastal communities. The potential impacts from ocean acidification, changes to sea surface temperature, sea-surface height, wind speed, and weather patterns, are discussed earlier in **Chapter 4.3.1** and are expected to continue. Sea-level rise along the Gulf Coast over the next three decades is projected to be, on average, 14-18 in (36-41 cm) (Sweet et al. 2022), which may result in permanent flooding or isolating of coastal habitat, rendering it unsuitable for its associated communities. Tropical storms and cyclones (especially hurricanes) may increase in intensity due to climate-related factors, and introduce fresh water and nutrients, increase storm surge, flooding, and physical damage in coastal areas as described earlier. Non-OCS oil- and gas-related air emissions (through atmospheric deposition) and discharges and wastes may continue to increase nutrient loads in coastal areas, potentially altering the coastal environment through reduced pH, eutrophication, induced hypoxia, and algal blooms. Any rise or increase of other uses of the OCS (e.g., carbon sequestration, offshore wind) may increase the demand for coastal infrastructure (e.g., support bases) or bottom disturbance (e.g., transmission cables), potentially leading to coastal habitat alteration or loss. It is also possible the demand for other infrastructure to support the growing human population (e.g., coastal dwellings, roads, bridges) may increase during the 70-year scope of future cumulative activities, which would result in coastal disturbance as described earlier. Overall, these cumulative impacts would be much more influential on coastal communities and habitats than those resulting from cumulative OCS oil- and gas-related activities.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion of activity when compared to the existing OCS Oil and Gas Program in the GOA (see **Table 3.3-2**). BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA

as having a substantial effect on coastal communities and habitats. The incremental contribution of impacts from one lease sale to those cumulative effects would not increase the level of cumulative impacts notably. Therefore, the incremental contribution of a proposed Gulf of America OCS oil and gas lease sale to cumulative impacts of coastal communities and habitats would be **negligible** to **minor** when properly regulated and mitigated. Localized adverse impacts may occur from unintended releases into the environment, but the overall amount of coastal infrastructure (e.g., coastal facilities and pipelines) necessary to support OCS oil- and gas-related activities in already largely in place, and would be regulated and mitigated if proposed. Based on the analysis above, an OCS oil and gas lease sale would not be expected to result in, or have a notable or measurable contribution to the cumulative impacts already being experienced by coastal communities and habitats in the area of analysis.

The cumulative effects on coastal communities and habitats would not differ between action alternatives. While the distribution of areas offered for leasing vary among alternatives, the total amount of activity would not, and the use of coastal areas would largely be expected to be the same among alternatives. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Chapters 4.3.2.1** through **4.3.2.4** above. However, it should be noted that some activities, such as oil and gas extraction, may cease following decommissioning of facilities, potentially reducing impacts over time.

4.3.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on coastal communities and habitats. Projections of relative sea-level rise are uncertain; therefore, future impacts to northern GOA ecosystems are unknown beyond predictions based on models and trends. Similarly, determining the effects of ocean acidification in the northern GOA is challenging because it receives large freshwater and nutrient influxes that enhance carbonate chemistry variability (Osborne et al. 2022). Future rates of coastal development are also unknown. There are unknowns about future planned restoration efforts, such as what specific projects would ultimately be constructed and their success. Although additional information on these IPFs may be relevant to the evaluation of impacts to coastal communities and habitats, BOEM has determined that such information is not essential to a reasoned choice among alternatives. Existing projections of sea-level rise and other climate-related factors provide sufficient information about the types and general estimated intensity of impacts anticipated. Additionally, future coastal development and restoration efforts would be expected to result in mainly localized effects. BOEM used the best available science to determine the range of reasonably foreseeable impacts and applied accepted scientific methodologies to integrate existing information and extrapolate potential outcomes in completing this analysis and formulating the conclusions presented here.

4.4 BENTHIC COMMUNITIES AND HABITATS (INCLUDING PROTECTED CORALS)

Benthic fauna inhabit the seafloor throughout the GOA at all water depths. Benthic organisms interact with seafloor sediment through bioturbation, oxygenation, and cementation of the sediments. Microbial communities and, within the photic zone, microalgae, macroalgae, and rooted vegetation also inhabit the seafloor. All benthic communities are trophically linked and contribute substantially to global carbon cycling.

Naturally occurring geological (exposed bedrock) or biogenic (authigenic carbonate relict reef) seafloor with measurable vertical relief serves as important habitat for a wide variety of sessile and mobile marine organisms in the GOA. Encrusting algae and sessile invertebrates such as corals, sponges, sea fans, sea whips, hydroids, anemones, ascidians, and bryozoans may recruit to and colonize these hard substrates, creating “live bottom” (Cummins Jr. et al. 1962). Corals and large sponges function as structural architects, adding complexity to the benthic habitat.

Elkhorn (*Acropora palmata*), staghorn (*Acropora cervicornis*), boulder star (*Orbicella franksi*), lobed star (*Orbicella annularis*), mountainous star (*Orbicella faveolata*), rough cactus (*Mycetophyllia ferox*), and pillar (*Dendrogyra cylindrus*) corals are listed under the Endangered Species Act (ESA) as threatened due to the decrease in their population sizes. Distribution of those listed species within the U.S. EEZ ranges from the State of Florida to the FGBNMS and the U.S. territories of Puerto Rico, U.S. Virgin Islands, and Navassa Island. Critical habitat was designated for the elkhorn and staghorn coral species by NMFS in 2008 and includes four counties in Florida (i.e., Palm Beach, Broward, Miami-Dade, and Monroe Counties) (73 FR 72210). In September 2023, NMFS designated critical habitat for five threatened Caribbean coral species (e.g., *Orbicella annularis, O. faveolata, O. franksi, Dendrogyra cylindrus,* and *Mycetophyllia ferox*) pursuant to Section 4 of the ESA (88 FR 54026). Twenty-eight mostly overlapping areas within the species’ ranges in Florida, Puerto Rico, the U.S. Virgin Islands, Navassa Island, and the FGBNMS were identified to contain the features essential for the reproduction, recruitment, growth, and maturation of the listed corals. *Orbicella annularis, O. faveolata, and O. franksi* are found within the designated critical habitat within the FGBNMS.

4.4.1 Affected Environment

Benthic fauna inhabit the seafloor throughout the GOA at all water depths. Documented benthic ecosystems in the GOA include muddy, soft bottom; oyster reefs; coral and sponge dominant banks (shallow and mesophotic topographic features, e.g., the FGBNMS, Pinnacle Trend features, the South Texas Banks, and low-relief features in the eastern GOA, etc.); hydrocarbon seeps along the continental margin; and marine canyons, escarpments, and seamounts on the abyssal plain (Briones 2004). Connectivity with areas adjacent to and within the GOA depends on pelagic larval transport by surface currents. Most GOA hard bottom benthic communities are diverse and characterized by high species richness and low abundance, while soft bottom communities are characterized by low species richness and high abundance. Suspension feeders are generally most abundant in high-energy environments, and deposit feeders are most abundant in low-energy environments in areas with fine-grained, muddy sediments (Snelgrove 1999). For more detail, see

Chapter 3.4 of the Biological Environmental Background Report (BOEM 2021a). The analysis for this Programmatic EIS will focus on the hard bottom communities due to the ubiquitousness of soft bottom in the GOA.

The GOA shallow-water coral reefs occupy roughly 1,019 mi^2 (2,640 km^2) of the entire GOA (<0.2% of the area), with the largest distribution along the Florida coast (Tunnell Jr. et al. 2007). Coral reefs provide key ecosystem functions, including coastal protection from storms and erosion, habitat, and spawning and nursery grounds for numerous fishes, as well as human ecosystem functions like tourism, fishing, and recreation. For more detail, see Chapter 3.2.6 of the Biological Environmental Background Report (BOEM 2021a).

Staghorn, rough cactus, and pillar corals are not considered in this analysis as their distributions do not overlap any areas that may be offered in the GOA under Alternatives A-D and are too distant to be reasonably affected by routine activities or accidental events occurring in the potential lease areas included in Alternatives A-D. Only ESA-listed corals and designated coral critical habitat located within the midshelf and shelf-edge topographic features, all of which are located within the FGBNMS, are considered in this analysis.

4.4.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined several IPFs from OCS oil- and gas-related activities, including decommissioning , and non-OCS oil- and gas-related activities that have the potential to impact benthic communities and habitats, including protected corals (see **Table 4.4-1**). These IPFs and their potential to affect benthic communities and habitats and protected corals are discussed below and in greater detail in Chapters 4.3.2 of the GOM Oil and Gas SID and Chapter 4.4 of the Biological Environmental Background Report (BOEM 2021a). Noise, lighting, and visual impacts from both OCS-oil- and gas-related activities and non-OCS oil- and gas-related activities were initially identified in the GOM Oil and Gas SID as IPFs that could affect benthic communities and habitats. For both noise and lighting and visual impacts, any impact is expected to be small and localized, and recovery would occur without remedial or mitigating action. Therefore, those two IPFs have been scoped out of this analysis due to the relative size and scope of this proposed action in comparison to the potential cumulative impacts of those IPFs (i.e., small) on benthic communities and habitats, including protected corals (BOEM 2021a). Additional supporting rationale for the IPFs that were not analyzed in detail in this Programmatic EIS can be found in Chapters 4.3.2.2.1 and 4.3.2.2.2 of the GOM Oil and Gas SID.

Generally, ESA-listed corals may experience the same types of potential IPFs from OCS oil and gas-related activities, including decommissioning, as other coral species inhabiting live bottom (shallow-water) habitats. Given their low or declining populations, however, the relative impacts from OCS oil- and gas-related activities on a particular group of ESA-listed coral colonies could be disproportionately higher than on other non-listed coral species. BOEM, therefore, consults

with NMFS to minimize any potential impacts to these species (refer to the 2025 BiOp; NMFS 2025a).

Table 4.4-1. Impact-Producing Factors with the Potential to Impact Benthic Communities and Habitats and Protected Corals.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil and Gas-Related Activities
Bottom Disturbance	Unintended Releases into the Environment	Bottom Disturbance
Discharges and Wastes	Response Activities	Discharges and Wastes
Offshore Habitat Modification/ Space Use	Strikes and Collisions	Offshore Habitat Modification/ Space Use
-	-	Other Environmental Factors

[1]These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

There are several existing regulatory programs and requirements that reduce or minimize the environmental effects of these IPFs to benthic communities and habitats, including protected corals, in the GOA. The stipulations and mitigating conditions of approval, as well as regulations provided in the National Marine Sanctuaries Act (NMSA) for the FGBNMS listed in **Table 4.4-2** all reduce impacts to sensitive benthic communities by not allowing bottom-disturbing activities within No Activity Zones of topographic features and by distancing bottom-disturbing activity from sensitive benthic habitat to prevent physical disturbance and sedimentation on the habitat. The avoidance measures required through BOEM lease stipulations and conditions of plan approval are generally referenced as “avoidance and distancing requirements for bottom-disturbing activities” henceforth for simplicity.

Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with all regulatory requirements and applicable lease stipulations as outlined in **Table 4.4-2** and enforced by BOEM, BSEE, and other agencies. Therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

Table 4.4-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Mitigating Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Topographic Features Stipulation	BOEM	Bottom Disturbance, Discharges and Wastes, Response Activities	NTL No. 2009-G39, Biologically-Sensitive Underwater Features and Areas; Chapters 5.10 and 7.6 of the GOM Oil and Gas SID

Regulatory Requirement or Mitigating Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Live Bottom (Pinnacle Trend) Stipulation	BOEM	Bottom Disturbance, Discharges and Wastes, Response Activities	NTL No. 2009-G39, Biologically-Sensitive Underwater Features and Areas; Chapters 5.10 and 7.9 of the GOM Oil and Gas SID
Hard Bottom Habitat and Chemosynthetic Communities Avoidance Mitigations	BOEM	Bottom Disturbance, Discharges and Wastes, Response Activities	NTL No. 2009-G39, Biologically-Sensitive Underwater Features and Areas; NTL No. 2009-G40, Deepwater Benthic Communities; Chapters 5.10, 6, and 7.9 of the GOM Oil and Gas SID
Marine Plastic Pollution Research and Control Act	USCG	Unintended Releases into the Environment (accidental marine debris)	33 U.S.C. 1901; OCS Report BOEM 2025-040; NMFS 2025 BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
Magnuson–Stevens Fishery Conservation and Management Act (Essential Fish Habitat Consultation)	NOAA	Bottom Disturbance; Noise; Discharges and Wastes; Unintended Releases into the Environment	50 CFR 600
National Contingency Plan (CWA, Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan)	USCG; USEPA; State, Regional, and local governments	Unintended Releases into the Environment (accidental oil spill and spill response)	40 CFR 300. 311 Clean Water Act; Oil Pollution Act of 1990 (33 U.S.C. 2701), the National Response Framework, E.O.s 12580 and 12777, S.O. 3299
Marine Debris Research, Prevention, and Reduction Act	USEPA, USCG	Unintended Releases into the Environment (accidental marine debris)	33 U.S.C. 1901; OCS Report BOEM 2025-040; NMFS 2025 BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
Clean Water Act Section 402, the National Pollutant Discharge Elimination System (NPDES) for Regions 4 and 6	USEPA	Discharges and Wastes	**Chapter 3.4.2** of this Programmatic EIS; Chapters 2.2 and 5.11 of the GOM Oil and Gas SID

Regulatory Requirement or Mitigating Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
International Convention for the Prevention of Pollution by Ships (MARPOL 73/78), MARPOL Annex V Treaty	International Maritime Organization (IMO); USCG	Discharges and Wastes; Unintended Releases into the Environment	https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Inspections-Compliance-CG-5PC-/Commercial-Vessel-Compliance/Domestic-Compliance-Division/MARPOL/; 33 U.S.C. 1901-1915; 33 CFR 151. A; Chapter 2.9.1.7 of the GOM Oil and Gas SID
Marine Protection, Research, and Sanctuaries Act	USEPA	Discharges and Wastes; Unintended Releases into the Environment	33 U.S.C. 1401 et seq.
National Marine Sanctuaries Act – Flower Garden Banks National Marine Sanctuary, including NMSA 304(d)	NOAA	Bottom Disturbance	15 CFR 922.L; 16 U.S.C. 1434(d)

[1] See Chapter 6 of the GOM Oil and Gas SID for conditions of approval commonly applied at the post-lease stage.

4.4.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Bottom Disturbance: Physical disturbance of the seafloor from OCS oil- and gas-related activities, including decommissioning, may result in the destruction of sessile benthic organisms and hard bottom and/or chemosynthetic habitat and soft sediment turbation. Impacts that cause bottom disturbance may be temporary (e.g., anchoring, structure and pipeline removal, site clearance activities) or more persistent within the environment (e.g., structure or pipeline installation). Potential effects from bottom disturbance may include crushing of hard substrates and structure-forming organisms including corals and sponges, burial of organisms, and scarring of the seafloor. The spatial extent of the seafloor disturbance would depend on the specific activity, local environmental conditions, physical regime (e.g., water depth, bottom currents, light penetration, etc.), and local habitat and community composition, extent, and health. The degree of impact and recovery potential depends on the type of hard bottom habitat (i.e., topographic features, pinnacles, low-relief features, cold seeps, brine pools, etc.), individual feature size and surface area, distance between features, community structure, species richness, organism density, and other attributes coupled with the spatial extent and duration of the bottom disturbance. Anthropogenic bottom disturbance is often sufficient to cause loss of species diversity within benthic communities, particularly in the deep sea (summarized in Jones et al. 2006).

Increased turbidity resulting from seafloor disturbance can reduce feeding efficiency and clog filter-feeding structures of hard-substrate organisms, and decrease larval settlement success (summarized in Lissner et al. 1991). The impact to filter feeders from bottom disturbance and sediment suspension may result in preferential recolonization by epibenthic deposit feeders, resulting in an overall change of species composition (Jones et al. 2006). Sessile and mobile invertebrate species adapted to living in turbid environments, such as several tall and flexible gorgonian species, may be less affected by increased turbidity. Reduction in available geological or biogenic substrate may also have secondary ecological effects on organisms that use complex structural microhabitats to, for example, lay eggs (Etnoyer and Warrenchuk 2007; Shea et al. 2018).

BOEM requires protective measures through lease stipulations, post-lease mitigations, and through EFH consultation to minimize and avoid impacts from bottom-disturbing activities to protect sensitive, slow-to-recover hard bottom habitats. These distancing mitigations, enforced by BSEE, ensure that bottom-disturbing activity is sufficiently distanced from sensitive benthic habitat, including ESA-listed corals and designated coral critical habitat, to prevent most impacts. These mitigations reduce the potential for sensitive, hard bottom habitats to be negatively impacted by disallowing destruction of hard bottom features and distancing turbidity and sedimentation effects. Depending on the location of the proposed activities, an NMSA consultation may be required and could result in additional mitigations for hard bottom habitat (e.g., further distancing requirements). Bottom disturbance is not mitigated for soft bottoms, and damage to these habitats may still occur. However, soft bottom communities are far more common in the GOA and generally recover relatively quickly (3 months to 2.5 years) in comparison to hard bottom communities (8-10 or more years) (Brooks et al. 2006; Rogers and Garrison 2001; Tamsett et al. 2010; Wilber and Clarke 2007). Without the application of BOEM mitigating measures, there is the potential for bottom disturbance to cause crushing, turbidity, and sedimentation to sensitive benthic organisms.

Discharges and Wastes: The spatial footprint of discharge varies with discharge volume, water depth, local hydrography, sediment particle size distribution, settlement rate, floc formation, and time (Neff 2005; Niu et al. 2009). Discharges from vessels and structures from OCS oil- and gas-related activities, including decommissioning activities, are subject to regulatory requirements such as the NPDES permitting process, MARPOL Annex V Treaty, and others (**Table 4.4-2**). Enforcement of the relevant laws and regulations is conducted by several Federal agencies, including the USEPA, NOAA, BSEE, and USCG, and lessees are required to perform OCS oil- and gas-related activities in accordance with these regulatory requirements.

The operation of oil- and gas-related vessels, including those used for decommissioning activities, may result in incidental discharges (e.g., bilge, ballast, and cooling water) which can cause localized effects to water quality. Ballast water discharge from vessels transiting through the GOA represents a potential impact pathway for benthic resources. Ballast water discharges are currently regulated under the USEPA Vessel General Permit (VGP) program. These requirements remain in effect while the USEPA and USCG continue to develop new national standards under VIDA, which was signed into law in 2018. Although these programs aim to reduce the risk of pollution and invasive species introductions, concerns remain about the effectiveness of current ballast water

treatment systems in eliminating harmful pathogens. Research by Studivan et al. (2022) has demonstrated that stony coral tissue loss disease (SCTLD), a major threat to reef ecosystems in the region, can be transmitted through waterborne exposure. Pathogens responsible for SCTLD have been shown to persist in ballast water for up to 120 hours and may remain infectious even after ultraviolet treatment (Studivan et al. 2022). These findings raise concern about the potential for ballast water discharges to introduce pathogens to sensitive coral habitats.

Operational discharges from drilling (i.e., muds and cuttings) discharged at the sea surface tend to disperse in the water column and be distributed at low concentrations (Continental Shelf Associates Inc. 2004a). In deep water, most cuttings discharged at the sea surface are likely to be deposited within 250 m (820 ft) of a well (Continental Shelf Associates Inc. 2006), although ecological changes have been observed within 300 m (984 ft) and up to 1-2 km (0.6-1.2 mi) for especially sensitive species (summarized in Cordes et al. 2016). Cuttings shunted to the seafloor form sediment piles with a generally smaller surface area than those formed from sea-surface discharge (Neff 2005). Mud and cuttings can bury and/or smother benthic habitat and associated organisms. Habitats and organisms most vulnerable are those in low-energy environments within a few hundred meters of a wellsite. Cuttings may form resistant mounds on which distinctive fauna characterized by mobile predators may develop (Lissner et al. 1991). The vulnerability of sessile organisms to impacts from drilling discharges is directly related to levels of suspended solids and the organisms' ability to clear particles from feeding and respiratory surfaces (Rogers 1990). Coverage with discharged sediments as low as 3 mm (0.12 in) can cause detectable impacts to infauna (Schaanning et al. 2008).

The chemical content of drilling muds and cuttings, and to a lesser extent produced waters, may contain hydrocarbons, trace metals including heavy metals, elemental sulphur, and radionuclides (Kendall and Rainey 1991; Trefry et al. 1995). Undiluted heavy metals and toxic compounds have the potential to be moderately toxic to benthic organisms (Continental Shelf Associates Inc. 2004b). Produced waters dilute rapidly with distance from the source; impacts are generally only observed within very close proximity to the source (Gittings et al. 1992; Neff 2005). The exposure of warm-water coral species to drilling fluid may result in reduced viability, morphological changes, altered feeding behavior, altered physiology, or disruption to the pattern of polyp expansion (summarized in Freiwald et al. 2004).

BOEM distances OCS oil- and gas-related well drilling activities from sensitive hard bottom benthic habitat, including protected corals, through stipulations attached to leases or mitigations attached as conditions of approval for permitted activities (**Table 4.4-2**). The distancing requirements separate the heaviest concentration of discharges from benthic habitat. For specific topographic features, variably-sized concentric zones are established surrounding the feature's "No Activity Zone", which requires that drill cuttings and drilling fluids are shunted to near the seafloor to avoid discharge on sensitive benthic habitat. With the application of these BOEM protective measures, the impacts to benthic communities and habitats, including protected corals, would be reduced because bottom-disturbing activity and associated discharges would be sufficiently distanced from sensitive benthic habitat to prevent most impacts. Without the application of BOEM mitigating measures, the

discharges and wastes could bury or smother benthic communities and habitats, including protected corals.

Offshore Habitat Modification/Space Use: Sessile benthic organisms commonly associated with OCS oil and gas structures (e.g., platforms, pipelines) are influenced by the presence of these structures. The ESA-listed coral species are not associated with OCS oil and gas structures or artificial reefs in the GOA; however, the presence of these structures have the potential to modify the benthic habitat and the overall community structure of which they are an integrated part. Microalgae and nearly all invertebrate taxa (i.e., corals, anemones, hydroids, sponges, bivalves, mollusks, and polychaetes) have been observed on artificial substrates and reefs (Macreadie et al. 2011). Communities that develop on artificial substrate are often different than those on natural reefs (Meyer-Kaiser et al. 2025). Over long distances, operating structures, exposed in-service or decommissioned-in-place pipelines, idle iron, and reefs may act as "stepping stones" across areas with little to no natural hard substrate that act to increase connectivity with biogeographical consequences (summarized in Cordes et al. 2016; Redford et al. 2021; Rouse et al. 2019). A change in a species' spatial distribution may have potential long-term effects related to dispersal and genetic connectivity to other populations of said species.

Although BOEM does not actively protect benthic communities currently established on anthropogenic structures (including OCS oil- and gas-related infrastructure) like BOEM protects sensitive benthic features on the seafloor, the removal of OCS oil and gas structures (e.g., platforms, pipelines) can have varied impacts on benthic communities. Infrastructure removal can potentially result in increased turbidity, suspended contaminated sediments, elevated underwater sound, and the potential for local point source pollution. At the same time, the site may be restored to natural conditions (Birchenough and Degraer 2020; Fowler et al. 2018). Occasionally, there is a delay between the decommissioning and removal of structures on the OCS (i.e., idle iron). As long as all pertinent regulatory requirements are followed (see **Table 4.4-2**), this potential delay is not expected to have any additional impacts to benthic communities and habitat.

A majority of the pipelines that are decommissioned on the OCS are decommissioned-in-place, meaning that the pipeline was left in place on the seafloor after it was flushed, filled, plugged, and the ends buried. These pipelines are susceptible to possible displacement when in the path of significant storm events (i.e., hurricanes, winter storms). Displaced pipelines, depending on their location and degree of displacement, have the potential to come in contact with and crush or bury sensitive benthic communities and habitats.

Offshore oil and gas structures are also a known vector for the movement of non-native and invasive species (Bax et al. 2003; Simons et al. 2016). In the GOA, the most common introduced benthic species are the cup coral *Tubastraea* sp., mussels, and a diademnid ascidian. Mussels have the greatest impact through fouling, clogging, competition with indigenous species, and disease transfer. *T. coccinea*, originally from the Pacific Ocean, is considered an invasive species in the GOA and prefers artificial to natural substrates; however, at this time, it does not appear to threaten native coral communities (Kolian et al. 2017).

There are no specific BOEM-applied OCS oil- and gas-related mitigating measures for benthic communities and habitats associated with offshore habitat modification/space use. However, distancing requirements related to mitigating bottom-disturbance impacts, as required in BOEM lease stipulations and post-lease mitigations (**Table 4.4-2**), would distance activities associated with offshore habitat modification/space use from sensitive benthic habitat and, therefore, could mitigate its potential impacts.

4.4.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOAR).

Unintended Releases into the Environment: Unintended releases into the environment of marine debris, and in particular plastic pollution, from vessels (including decomissioning vessels) and structures can be reduced through regulations such as the Marine Debris Research, Prevention, and Reduction Act, the Marine Plastic Pollution Research and Control Act, and the Marine Protection, Research, and Sanctuaries Act, and impacts from discharges and wastes can be reduced by regulatory requirements including the NPDES Permit and the MARPOL Annex V Treaty. Additionally, impacts to benthic communities and habitat may generally be mitigated through the preparedness of the National Contingency Plan.

While laws and regulations exist to prevent unauthorized discharge of pollutants into offshore waters (**Table 4.4-2**), accidental releases and spills into the environment from OCS oil- and gas-related activities, including decommissioning activities, may still be caused by large tropical storm events, faulty equipment, or human error. Accidental marine debris release has the potential to cause impacts to benthic communities, including protected corals, similar to those described earlier for bottom disturbance (e.g., crushing of hard substrates and structure-forming organisms including corals and sponges, burial of organisms, and scarring of the seafloor).

Most spills are small (<1,000 bbl), and a localized impact from one non-catastrophic accidental event would only impact a small portion of the overall resource population in the GOA (i.e., a small number of individual organisms). The vulnerability of benthic habitats to an accidental release of oil or other contaminants from a surface vessel, well, pipeline, etc. would depend on the combination of several components: spill location (surface or subsurface); spill volume; and applied spill-response methods (e.g., dispersant use). For any accidental spill, it is expected that a certain quantity of oil may eventually settle on the seafloor through a binding process with suspended sediment particles (adsorption) or after being consumed and excreted by phytoplankton (Passow et al. 2012; Valentine et al. 2014). For most oil spills, the proportion of oil that may reach the benthos is small; however, it is expected that the greatest amount of adsorbed oil particles would occur close to the spill, with the concentrations reducing over distance. If a large spill does occur close to a benthic habitat, some of the organisms may become smothered by settling particles and/or other sediments

and experience long-term exposure to hydrocarbons and/or oil-dispersant mixtures that could persist within the sediments (Fisher et al. 2014; Hsing et al. 2013; Valentine et al. 2014). Localized impacts may include reduced recruitment success, reduced growth, and reduced biological cover as a result of impaired recruitment (Kushmaro et al. 1997; Rogers 1990). Sublethal effects that may occur to benthic organisms exposed to oil or dispersants may include reduced feeding, reduced reproduction and growth, physical tissue damage, and altered behavior.

If an oil spill occurs at depth in deep water and the oil is ejected under pressure, some oil would rise to the surface, but some oil droplets may become entrained deep in the water column (Boehm and Fiest 1982), creating a subsurface plume (Adcroft et al. 2010). If this plume were to encounter benthic habitat and organisms, the impacts could be severe. Consequences may include mortality, loss of habitat, reduced biodiversity, reduced live bottom coverage, changes in community structure, and reduced reproductive success (Guzmán and Holst 1993; Negri and Heyward 2000; Reimer 1975; Silva et al. 2016). The extent and severity of impacts would depend on the location and weathering of the oil and the hydrographic characteristics of the area (Bright et al. 1978; Le Hénaff et al. 2012; McGrail 1982; Rezak et al. 1983). If dispersants are applied to a subsurface plume, any dispersed oil in the water column that comes into contact with corals may evoke short-term negative responses, including reduced feeding and photosynthesis or altered behavior (Cook and Knap 1983; Dodge et al. 1984; Ross and Hallock 2014; Wyers et al. 1986). While subsurface plumes of oil have been theoretically described/modeled and observed in laboratory settings (Baines and Leitch 1989; Socolofsky and Adams 2002; 2005), the only documented in-situ subsurface plume occurred during the *Deepwater Horizon* oil spill (Bracco et al. 2020; Diercks et al. 2010), which was a catastrophic, subsea spill. As catastrophic oil spills are not reasonably foreseeable, the potential risk of a sizable subsea plume is not expected and not part of the proposed action.

Response Activities: Benthic organisms are also vulnerable to spill cleanup/response activities. During a response operation, the risk of accidental impacts from bottom-disturbing equipment is increased. Unplanned emergency anchoring or accidental losses of equipment from response vessels could occur. Response-related equipment such as seafloor-anchored booms may be used and could inadvertently contact benthic habitats and organisms. Drilling muds may be pumped into a well to stop a loss of well control. It is possible that during this process some of this mud may be forced out of the well and deposited on the seafloor near the well site. If this occurs, the impacts would be severe for any organisms buried; however, the impact beyond the immediate area would be limited. The volume of most spills is relatively low (<1,000 bbl) (refer to Chapter 3, Ji and Schiff 2023), and the activities required for spill clean-up or retrieval of lost equipment are expected to be minimal and localized. As infrastructure (e.g., wells, platforms) must be distanced from sensitive, hard bottom habitats, as required in BOEM lease stipulations and post-lease mitigations (**Table 4.4-2**), bottom-disturbing response activities would likely be sufficiently distanced from sensitive benthic habitat to prevent impacts.

Strikes and Collisions: It is expected that shallow-water hard bottom benthic habitats that are potentially vulnerable to accidental strikes from vessel traffic from OCS oil- and gas-related

activities, including decommissioning activities, would occur only within the coastal zone and not on the OCS. The vulnerability of benthic organisms from accidental strikes and collisions on benthic communities and habitats, including protected corals, is largely the same as the effects discussed under routine OCS oil- and gas-related bottom disturbance and could include crushing, breaking, compaction, and smothering of benthic communities. Accidental effects from bottom-disturbing equipment are expected to be infrequent and highly localized.

4.4.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence benthic communities and habitats, including ESA-listed corals and designated coral critical habitat, in the GOA. These activities are grouped into the following IPF categories: bottom disturbance; discharges and wastes; and offshore habitat modification/space use. The content under each IPF heading below summarizes the more relevant detailed discussion of how non-OCS oil- and gas-related activities can affect benthic communities and habitats found in Chapter 4.3.2.2.1 of the GOM Oil and Gas SID.

Bottom Disturbance: The majority of non-OCS oil- and gas-related effects to benthic communities and habitats result from bottom-disturbing activities. These activities include artificial reef development, scuba diving, buoy placement (including renewable energy site assessment equipment), anchoring, fishing activity (trawling), and State oil and gas activities.

The primary anthropogenic activity that may contribute to non-OCS oil- and gas-related effects to benthic communities is fishing. Commercial bottom-tending fishing gear of any type (e.g., trawls, traps, bottom-set longlines, and gillnets) can damage benthic communities by dislodging or crushing organisms attached to the bottom; trawls represent the most serious threat in deep water (Hourigan 2014). Regarding recreational fishing, anchoring for fishing vessels is currently prohibited within the boundaries of the FGBNMS and within the McGrail Bank Coral HAPC. However, many important topographic features are found near established shipping fairways and anchorage areas and are well-known fishing areas. Vessel anchoring at a topographic feature or bank may result in crushing of hard substrates and structure-forming organisms (e.g., corals and sponges), burial of organisms, and scarring of the seafloor. The extent of effects from non-OCS oil- and gas-related anchoring activities on nonprotected benthic communities and habitats is unknown.

The placement of artificial reefs within the context of State artificial reef programs has the potential to cause bottom disturbance, including the crushing and/or burial of sessile organisms. However, as the purpose of artificial reef development is to create hard substrates and benthic habitat where it does not naturally exist, artificial reef development is not expected to significantly impact hard bottom benthic communities and habitats.

Buoys may be placed to collect meteorological or hydrographic data, support scuba diving operations, mark navigation hazards, or provide boat moorings to protect benthic resources, and may similarly crush or bury benthic communities and habitats. Buoy lines also have the potential to be snagged by passing vessels or carried by powerful storms, dragging anchors across the seafloor.

However, buoy placement may be temporary and most, if not all, buoys are regularly monitored and maintained. Anchoring and structure emplacement (e.g., pipelines) from ongoing Federal or State oil and gas activities could also affect benthic communities in the same way as described earlier under this proposed action.

Scuba diving activities may affect benthic communities and habitats through crushing or fracturing by divers or dive boat anchors, or removal of organisms. In some areas where such diving does occur (e.g., the FGBNMS), it is managed by other Federal agencies, with regulations and management practices developed to protect benthic resources (e.g., fixed moorings).

Discharges and Wastes: Primary sources of adverse impacts to benthic communities resulting from non-OCS oil- and gas-related discharges and wastes include fresh water, toxic chemicals, nutrients, vessel discharge, and anthropogenic debris from the Mississippi and Atchafalaya River Basins into north-central GOA waters. Most of these effects are likely to occur within the coastal zone. Discharges and wastes in the coastal zone can bury and/or smother benthic habitat and associated organisms, and the organisms can be exposed to toxins within the discharges. Benthic communities exposed to non-OCS oil- and gas-related discharges and wastes may suffer reduced survival, fecundity, and growth; reduced community abundance; and reduced species richness. Terrestrial floodwater containing fresh water, toxic chemicals, nutrients, and other anthropogenic debris from large hurricane events may impact mid-shelf and shelf edge topographic banks and features on the OCS.

Oil and gas activities within State waters occur offshore Texas, Louisiana, Mississippi, and Alabama. The potential effects to benthic communities and habitats from unintended releases into the environment resulting from State-permitted oil and gas activities include death as well as sublethal effects such as reduced feeding, reduced reproduction and growth, physical tissue damage, and altered behavior. These effects from State oil and gas activities are the same as those that could occur for OCS oil- and gas-related unintended releases to the environment.

Offshore Habitat Modification/Space Use: The introduction of invasive species associated with benthic hard bottom habitat have the potential to cause benthic habitat modification. Invasive lionfish (*Pterois volitans*) first arrived in the GOA in 2010 and currently inhabit the coasts of all five Gulf Coast States as well as artificial and natural reefs. Their density, feeding patterns, growth rate, and lack of predators have the potential to significantly affect benthic communities, potentially leading to habitat modification. The result would be a decrease in biodiversity and abundance of many of the smaller organisms that use the seafloor habitats found on topographic features. An ulcerative skin disease impacting lionfish was first observed in late 2017 and 2018 and has resulted in an overall density decline of the species (Harris et al. 2020b), which may mitigate their overall effect on benthic communities. The invasive regal demoiselle (*Neopomacentrus cyanomos*) has been recorded in the FGBNMS (Johnston et al. 2020). Potential effects from its spread are currently unknown; however, they are unlikely to have any unusual ecological advantages over native species (Robertson et al. 2016).

Artificial reefs may enhance biological productivity and facilitate the conservation and/or restoration of benthic organisms by restricting access to other bottom-disturbing activities such as bottom trawling (Macreadie et al. 2011). Microalgae and nearly all invertebrate taxa (e.g., corals, sponges, etc.) have been observed on artificial reefs (summarized in Macreadie et al. 2011). Over long distances, artificial reefs may act as "stepping stones" across areas with little to no natural hard substrate that act to increase connectivity with biogeographical consequences (summarized in Cordes et al. 2016).

Other Environmental Factors: Climate-related factors include ocean acidification, rise in water temperature, changes in water circulation patterns and chemistry, increased storm activity, sea-level rise, and habitat modification or loss. These changes may affect marine GOA ecosystems by increasing the vertical stratification of the water column, shifting prey distribution, impacting competition, and generally impacting species' ranges (Learmonth et al. 2006). Shallow benthic communities and habitats, including protected corals, may be damaged through bottom disturbance induced by storms (e.g., hurricanes), and by ocean acidification. All climate-related effects can have cascading effects on marine ecosystems because they may act additively or synergistically with other IPFs, including those introduced by OCS oil- and gas-related activities (Doney et al. 2012).

Diseases could also affect benthic communities and habitats. In August 2022, disease-like lesions were reported on seven stony coral species within the FGBNMS on the East and West Flower Garden Banks. During the Sanctuary's rapid response cruises, lesions and tissue loss were also observed associated with fish and invertebrate predation. Monitoring of disease progression and response to treatment is ongoing (Johnston et al. 2023). It is also unknown if this disease has spread to other benthic communities within the GOA. The effects from other IPFs (e.g., physiological), including those introduced by OCS oil- and gas-related activities, could make communities more susceptible to disease.

4.4.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a single proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct or indirect impacts to benthic communities and habitats, including protected corals, would occur as a result of the proposed action (i.e., a single proposed OCS oil and gas lease sale), and the impact of Alternative A on benthic communities and habitats, including protected corals, would be **none**. However, there are ongoing OCS oil- and gas-related activities associated with previous lease sales and non-OCS oil- and gas-related activities would continue to potentially affect benthic communities and habitats (including protected corals) under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would still potentially affect benthic communities and habitats

(including protected corals) through bottom disturbance, discharges and wastes, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions. The potential impacts are summarized above in **Chapter 4.4.2.1** and **4.4.2.2** of this Programmatic EIS and in greater detail in Chapter 4.3.2 of the GOM Oil and Gas SID.

Bottom disturbance from ongoing activities has the potential to impact benthic communities and habitat in similar ways as described in **Chapter 4.4.2.1**, including crushing of hard substrates and structure-forming organisms including corals and sponges, burial of organisms, scarring of the seafloor, and increased turbidity. Additionally, discharges and wastes from ongoing activities may cause localized effects to water quality and could bury or smother benthic communities and habitats as described in **Chapter 4.4.2.1**. However, BOEM requires protective measures (see **Table 4.4-2**), enforced by BSEE, through lease stipulations, post-lease mitigations, and through EFH consultation to minimize and avoid impacts from routine oil and gas activities to protect sensitive, slow-to-recover hard bottom habitats including ESA-listed corals and designated coral critical habitat.

As of March 31, 2025, there were an estimated 1,360 production structures (platforms) across the GOA, with a range of 0-62 new surface structures and a range of 0-1200 km (0-746 mi) of new pipeline estimated as a result of ongoing activities on previous OCS oil and gas lease sales (**Table 3.3-2**). The presence of oil and gas infrastructure has the potential to modify the local habitat, create hard bottom habitat where there was previously none, act as “stepping stones” for connectivity of species throughout the GOA, and create vectors for movement of invasive species, which could continue with ongoing activities. However, BOEM protective measures as described above (see **Table 4.4-2**) would distance activities associated with offshore habitat modification/space use from sensitive benthic habitat and, therefore, could mitigate potential impacts.

The vulnerability of benthic organisms from accidental events including accidental releases into the environment, response activities, and strikes and collisions on benthic communities and habitats, including protected corals, from ongoing oil and gas activities is largely the same as the effects discussed under routine OCS oil- and gas-related bottom disturbance (**Chapter 4.4.2.2**) and could include crushing, breaking, compaction, and smothering of benthic communities with ongoing activities.

Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.4.1** and in further detail in Chapter 4.3.2.1 of the GOM Oil and Gas SID. The impacts to benthic communities and habitats, including protected corals, from ongoing OCS oil and gas activities would range from **negligible to minor**. With the application of BOEM protective measures, no substantial effects to overall population levels are expected because bottom-disturbing activity is sufficiently distanced from sensitive benthic habitat to prevent most impacts, and soft-bottom habitat where activities mostly occur is not limited in the GOA.

***Non-OCS Oil- and Gas-Related Activities*:** Discharges and wastes, bottom disturbance, offshore habitat modification/space use, strikes and collisions, and other environmental factors associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect benthic communities and habitats under the No Action alternative, as described above. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. The primary activity that may contribute to non-OCS oil- and gas-related effects to benthic communities is fishing. Most notably, commercial bottom-tending fishing gear, especially bottom trawling, can damage benthic communities by dislodging or crushing organisms attached to the bottom. Impacts from fishing would be more influential on benthic habitats and communities in relatively shallow water than OCS oil and gas development as a result of a single proposed OCS and gas lease sale and would still occur without the presence of ongoing OCS oil- and gas-related activities.

Other reasonably foreseeable environmental concerns that could contribute to cumulative impacts to benthic communities and habitat, include ocean acidification, rise in water temperature, changes in water circulation patterns and chemistry, increased storm activity, sea-level rise, and habitat modification or loss. The potential impacts from these factors are discussed in **Chapter 4.4.2.3** and are expected to continue into the future, even if the No Action alternative were selected. While some effects are anticipated, the precise impacts of climate-related factors on the GOA cannot currently be predicted.

IPFs from non-OCS oil- and gas-related activities, in addition to other environmental factors, would occur on a much broader scale and from a greater range of activities compared to those from OCS oil- and gas-related activities. These IPFs and environmental factors have the potential to impact benthic communities and habitat, as discussed above in **Chapter 4.4.2.3**. Most notably, commercial bottom trawling fishing and climate-related factors have the potential to be much more influential on benthic communities and habitat than OCS oil and gas development, particularly in shallow water and would still occur without the presence of ongoing OCS oil- and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS oil and gas lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing, which could change the spatial distribution of the scenario activities, but not their overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B), and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table 4.4-3** and **Table 4.4-4**). Impacts are shown both with and without the BOEM protective measures applied, if a BOEM protective measure being considered in this Programmatic EIS is applicable to that IPF. The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.4-3. Impact Determinations for Routine and Accidental Impacts to Benthic Communities and Habitats from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Bottom Disturbance	Without Protective Measures	**Negligible** to **Major** in leased areas only	**None** in excluded areas; **Negligible** to **Major** in leased areas only	**None** in excluded areas; **Negligible** to **Major** in leased areas only
Bottom Disturbance	With Protective Measures	**Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Discharges and Wastes	Without Protective Measures	**Negligible** to **Major** in leased areas only	**None** in excluded areas; **Negligible** to **Major** in leased areas only	**None** in excluded areas; **Negligible** to **Major** in leased areas only
Discharges and Wastes	With Protective Measures	**Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Offshore Habitat Modification/Space Use	N/A	**Negligible** to **Beneficial** and/or **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible to Beneficial** and/or **Negligible to Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Beneficial** and/or **Negligible** to **Minor** in leased areas only
Unintended Releases into the Environment	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Response Activities	Without Protective Measures	**Negligible** to **Major**	**Negligible to Major**	**Negligible** to **Major**
Response Activities	With Protective Measures	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. The impacts to benthic communities and habitats, including protected corals, from ongoing OCS oil and gas activities would range from **negligible to minor**. With the application of BOEM protective measures, no substantial effects to overall population levels are expected because bottom-disturbing activity is sufficiently distanced from sensitive benthic habitat to prevent most impacts, and soft-bottom habitat where activities mostly occur is not limited in the GOA.

[1] Protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. Additional BOEM protective measures for benthic communities and habitats would be considered at the site-specific stage.

Table 4.4-4. Impact Determinations for Protected Corals for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Bottom Disturbance	Without Protective Measures	**None,** habitat not leased	**None**, habitat not leased	**None**, habitat not leased
Bottom Disturbance	With Protective Measures	**None**, habitat not leased	**None**, habitat not leased	**None**, habitat not leased
Discharges and Wastes	Without Protective Measures	**Negligible** to **Major** in leased areas only	**None**, habitat not leased	**None**, habitat not leased
Discharges and Wastes	With Protective Measures	**Negligible** to **Minor** in leased areas only	**None**, habitat not leased	**None**, habitat not leased
Offshore Habitat Modification/Space Use	N/A	**Negligible** in leased areas only	**None**, habitat not leased	**None**, habitat not leased
Unintended Releases into the Environment	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Response Activities	Without Protective Measures	**Negligible** to **Major**	**Negligible** to **Major**	**Negligible** to **Major**
Response Activities	With Protective Measures	**Negligible**	**Negligible**	**Negligible**
Strikes and Collisions	N/A	**N/A**, resource not present in the Impact Area	**N/A**, resource not present in the Impact Area	**N/A**, resource not present in the Impact Area

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. The impacts from ongoing OCS oil and gas activities to benthic communities and habitats, including protected corals, would range from **negligible to minor**. With the application of BOEM protective measures, no substantial effects to overall population levels are expected because bottom-disturbing activity is sufficiently distanced from sensitive benthic habitat to prevent most impacts, and soft-bottom habitat where activities mostly occur is not limited in the GOA.

[1] Protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. Additional BOEM protective measures for benthic communities and habitats would be considered at the site-specific stage.

Alternative B – Regionwide OCS Lease Sale

Bottom Disturbance: Alternative B considers a proposed regionwide OCS lease sale area. Within this geographic area, impacts from OCS oil- and gas-related bottom disturbance, including decommissioning activities, would affect benthic communities and habitats. Bottom disturbance has the potential to cause crushing, turbidity, and sedimentation to benthic communities and habitats. Based on the description of the potential impacts above and the expected amount of activity (both installation and decommissioning) that would cause bottom disturbance to benthic communities and habitats as described in **Table 3.3-2** and **Appendix C**, impacts from bottom disturbance to benthic communities and habitats is expected to be **negligible** to **major** due to the extensive damage that could occur to sensitive benthic habitats, including structure-forming invertebrates and these

communities' long recovery times. With the application of BOEM protective measures (i.e., avoidance and distancing requirements for bottom-disturbing activities), the impacts to benthic communities and habitats would be reduced to **negligible** to **minor** because bottom-disturbing activity would be sufficiently distanced from sensitive benthic habitat to prevent most impacts. Protected corals would not be affected by bottom disturbance under Alternative B because they are located within the FGBNMS. Whole and partial blocks within the boundaries of East Flower Garden Bank, West Flower Garden Bank, and Stetson Bank are not available for leasing under Alternative B. Impacts to protected corals from bottom disturbance would therefore be **none.**

Discharges and Wastes: Discharges and wastes can occur from any routine oil and gas activity, including decommissioning activities, except for helicopter operations (**Table 3.3-4**). Within this geographic area, the greatest impacts from discharges and wastes (e.g., burying and smothering) occur when a well is drilled and could affect benthic communities and habitats on the OCS, including protected corals, up to several thousand feet from the point of discharge (summarized in Cordes et al. 2016). Given the anticipated amount of installation and decommissioning activity described in **Table 3.3-2** and **Appendix C** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, discharges and wastes could result in **negligible** to **major** impacts due to the extensive damages that could occur to sensitive benthic habitats, including structure-forming invertebrates. With the application of BOEM protective measures (i.e., distancing and shunting requirements for routine discharges and wastes), the impacts to benthic communities and habitats, including protected corals, would be reduced to **negligible** to **minor** because bottom-disturbing activity would be sufficiently distanced from sensitive benthic habitat to prevent most impacts.

Offshore Habitat Modification/Space Use: Within this geographic area, impacts from offshore habitat modification/space use associated with routine oil and gas activity (**Table 3.3-4**) would affect benthic communities and habitat on the OCS. There are no BOEM-specific mitigating measures for benthic communities and habitats associated with offshore habitat modification/space use apart from distancing requirements related to mitigating bottom-disturbance impacts. Given the level of the installation and decommissioning activities described in **Table 3.3-2** and **Appendix C** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts from offshore habitat modification/space use to benthic communities and habitats would be positive (**negligible beneficial**) because infrastructure (platforms, pipelines) may support habitat function and/or specific faunal species by acting as a refuge, or acting as a stepping stone between habitats, and/or negative (**negligible** to **minor**) because of the potential for infrastructure (platforms, pipelines) presence to allow for highly localized modification of community structure, changing hydrography, and spread of invasive species. In addition, the impacts from offshore habitat modification/space use to protected corals would be undetectable and **negligible** because protected coral species are not associated with oil and gas structures, artificial reefs, or other related infrastructure in the GOA.

Unintended Releases into the Environment: Unintended releases into the environment could adversely affect benthic communities and habitats on the OCS, including protected corals.

Non-oil spills (e.g., chemical spills and synthetic-based fluid spills) would likely be relatively infrequent based on the occurrences of these accidental spills calculated over the past decade (**Tables B.3-3** and **B.3-4**). Based on the number and volume of accidental oil spills estimated for a single OCS lease sale (Ji and Schiff 2023), negative impacts to benthic communities and habitats, including protected corals, could range from undetectable for small spills to notable, localized impacts for larger spills. The impacts from unintended releases into the environment to benthic communities and habitats would be **negligible** to **minor**. Due to their relatively small numbers and restricted habitat, the impacts from unintended releases to the environment to protected corals would be **negligible** to **moderate**.

Response Activities: Within this geographic area, impacts from response activities could affect benthic habitat and communities on the OCS. Bottom disturbance from response activities has the potential to cause crushing, turbidity, and sedimentation to benthic communities and habitats, which is expected to be **negligible** to **major** due to the extensive damage that could occur to sensitive benthic habitats, including structure-forming invertebrates. However, the impacts from response activities to benthic communities and habitats would be **negligible** to **minor** with the adherence to distancing requirements as required in BOEM lease stipulations and post-lease mitigations, which should prevent or reduce most response impacts because the areas requiring bottom-disturbing intervention would likely already be sufficiently distanced from benthic habitats. The impacts from response activities to protected corals would similarly be **negligible** due to the even greater BOEM-distancing requirements awarded to the No Activity Zones within the FGBNMS, where these corals are found, and the restriction of leasing of whole and partial blocks within the Sanctuary under this alternative.

Strikes and Collisions: Within this geographic area, impacts from strikes and collisions from OCS oil- and gas-related activities, including decommissioning activities, would affect benthic habitat and communities on the OCS, excluding protected corals, which are not located within the potential impact area, and therefore would have no impacts. The impacts from accidental strikes and collisions to benthic communities and habitats would be **negligible** to **minor** because accidental effects from bottom-disturbing equipment and vessel strikes are expected to be infrequent and highly localized and limited to the coastal zone**.**

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall unmitigated impacts from IPFs associated with Alternative B on benthic communities and habitats, including protected corals, would be **negligible** to **major** due to the extensive damage that could occur to sensitive benthic habitats, including structure-forming invertebrates. The magnitude and severity of the potential effects could vary depending on numerous factors including, but not limited to, location, frequency, and duration of the activities and resource; and the distribution, condition, and scarcity of the resource, as well as habitat type and feature-specific characteristics (e.g., seafloor relief, rugosity [i.e., surface roughness], and associated community). Major impacts could occur if rare benthic communities, such as ESA-listed corals, were crushed or smothered through direct contact with bottom-disturbing activities, resulting in population-level impacts. Without review of proposed

activities as part of the mitigation process, it is not possible to predict when and where these impacts may occur. With the application of BOEM protective measures (i.e., avoidance, distancing, and shunting requirements), however, the impacts to benthic communities and habitats, including protected corals, would be reduced to **negligible** to **minor** because bottom-disturbing activity from drilling a well, placing infrastructure, and conducting response activities, as well as drilling discharges, would be sufficiently distanced from sensitive benthic habitat to prevent most impacts, and soft-bottom habitat where activities would mostly occur, is not limited in the GOA.

Alternative C –Targeted OCS Lease Sale Area

Excluding the whole and partial Topographic Features and Live Bottom (Pinnacle Trend) Stipulation blocks from leasing under Alternative C would provide even greater protection to sensitive benthic features because OCS oil- and gas-related activities would be further distanced. In addition, benthic communities and habitats located within the other areas excluded from leasing under Alternative C are not expected to experience impacts from routine OCS oil- and gas-related activities because, as discussed under Alternative B, areas of impact from routine OCS oil- and gas-related activities occur within limited areas surrounding said activity and these activities would not occur in excluded areas. Routine impacts would be limited to the areas leased under this alternative. The impacts from accidental events would be the same as described for Alternative B. However, potentially sensitive hard bottom benthic features and communities that are located outside of the whole and partial Topographic Features Stipulation, Live Bottom (Pinnacle Trend) Stipulation blocks, and all other areas excluded from leasing under Alternative C could potentially be impacted by such activities, as described in **Chapter 1.1.2.1** because they are not excluded from leasing under this alternative.

Therefore, based on the description of the IPFs above, the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the removal of whole and partial blocks subject to the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations, as well as the other areas removed from leasing under this alternative, the overall unmitigated impacts under Alternative C would still be **negligible** to **major**. This is due to the extensive damages that could occur to sensitive benthic habitats located in blocks not removed from leasing under this alternative if distancing and other protective measures are not applied. With the application of BOEM protective measures in areas that are not removed from leasing (i.e., avoidance, distancing, and shunting requirements), the impacts to benthic communities and habitats would be reduced to **negligible** to **minor** because bottom-disturbing activity from drilling a well, placing infrastructure, and conducting response activities, as well as drilling discharges, would be sufficiently distanced from sensitive benthic habitat to prevent most impacts.

Because ESA-listed corals and designated coral critical habitat considered in this analysis are found within the FGBNMS and because the corals' range and critical habitat would be removed from leasing with the exclusion of whole and partial Topographic Features Stipulation blocks under Alternative C, no OCS oil- and gas-related activities would occur within the areas where these corals are found. Therefore, based on the description of the IPFs above and the scenario projections for a

single OCS oil and gas lease sale provided in **Chapter 3**, the overall impact determinations from routine IPFs (i.e., bottom disturbance, discharges and wastes, and offshore habitat modification/space use) associated with Alternative C on ESA-listed corals and designated critical habitat would be **none**. Impact determinations for accidental events (i.e., unintended releases into the environment, response activities, and strikes and collisions) would be the same as described for Alternative B.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Excluding whole and partial Topographic Features and Live Bottom (Pinnacle Trend) Stipulation blocks and whole and partial blocks around the expanded FGBNMS (as of March 22, 2021) from leasing under Alternative D effectively provides the same protection for sensitive benthic features because all but one OCS block within the FGBNMS is a Topographic Features Stipulation Block and not leased under either Alternative C or D. Benthic communities and habitats located within the other areas excluded from leasing under Alternative D, including all areas within the whole and partial blocks of the Gulf of America Wind Leasing Call Area, are not expected to experience routine impacts from OCS oil- and gas-related activities under this alternative because activity would likely be limited to immediate areas around activity (leased areas). The impacts from accidental events would be the same as described for Alternative B. However, potentially sensitive hard bottom benthic features and communities that are located outside of the areas excluded from leasing under Alternative D could potentially be impacted by OCS oil- and gas-related activities, as described earlier, as they are not excluded from leasing under this alternative.

Therefore, based on the description of the IPFs above, the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, and the areas removed from leasing under this alternative, the overall unmitigated impacts under Alternative D would still be **negligible** to **major**. This is due to the extensive damages that could occur to sensitive benthic habitats, including structure-forming invertebrates located in blocks not excluded from leasing under this alternative if distancing and other protective measures are not applied. With the application of BOEM protective measures in areas that are not removed from leasing (i.e., avoidance, distancing, and shunting requirements), the impacts to benthic communities and habitats would be reduced to **negligible** to **minor** because bottom-disturbing activity from drilling a well, placing infrastructure, and conducting response activities, as well as drilling discharges, would be sufficiently distanced from sensitive benthic habitat to prevent most impacts.

As with Alternative C, ESA-listed corals and designated coral critical habitat considered in this analysis would not experience any impacts from routine IPFs under Alternative D because whole and partial Topographic Features Stipulation blocks and whole and partial blocks around the expanded FGBNMS (as of March 22, 2021) are excluded from leasing under Alternative D, the overall impact determination would be **none**. Impact determinations for accidental events (unintended releases into the environment, response activities, and strikes and collisions) would be the same as described for Alternative B.

4.4.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect benthic communities and habitats through bottom disturbance, discharges and wastes, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions as described above in **Chapters 4.4.2.1** and **4.4.2.2**. The impacts from ongoing OCS oil- and gas-related activities would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.4.1** and in further detail in Chapter 4.3.2.1 of the GOM Oil and Gas SID. These ongoing impacts to benthic communities and habitats, including protected corals, would be **negligible** to **minor**. Future lease sales would add undetectable to a small but measurable contribution to the past and present impacts depending on the benthic species, community or habitat. More structures were decommissioned than installed over the previous decade (see **Chapter 3.2.5**), and this trend is expected to continue into the foreseeable future. Additionally, new structures and associated wells are likely to occur in deeper water more often than in the past. Despite the changes to the operational footprint over time, BOEM would continue to require protective measures (see **Table 4.4-2**) through lease stipulations, post-lease mitigations, and through EFH consultation to minimize and avoid impacts to protect sensitive, slow-to-recover hard bottom habitats for any Oil and Gas Program related activities associated with future lease sales. These distancing mitigations, enforced by BSEE, ensure that bottom-disturbing activity is sufficiently distanced from sensitive benthic habitat, including ESA-listed corals and designated coral critical habitat, to prevent most impacts. Therefore, impacts from cumulative OCS oil and gas activities are expected to be similar to effects experiences from ongoing oil and gas activities.

Non-OCS Oil- and Gas-Related Activities: Reasonably foreseeable factors that could contribute to cumulative impacts to benthic communities and habitats include artificial reef development, scuba diving, buoy placement, anchoring, fishing (trawling), state oil and gas activities, and non-oil and gas discharges such as fresh water, toxic chemicals, and nutrients from terrestrial sources and vessel discharges and anthropogenic debris. Commercial fishing represents the primary non-OCS oil- and gas-related cumulative impact to benthic communities and habitat in shallow water and will continue to impact the resource in the future. Commercial bottom-tending fishing gear, especially bottom trawling, can damage benthic communities by dislodging or crushing organisms attached to the bottom.

Climate-related factors, which are reasonably foreseeable and could contribute to cumulative impacts to benthic communities and habitat include ocean acidification, rise in water temperature,

changes in water circulation patterns and chemistry, increased storm activity, sea-level rise, and habitat modification or loss. The potential impacts from these factors are discussed in **Chapter 4.4.2.3** and are expected to continue. Changes in climate-related factors could have cascading effects on benthic resources. For example, if storm frequency and intensity increase (Chapter 3.4.2 of the GOM Oil and Gas SID), the additional disturbance of sediment may increase impacts to water quality in nearshore and coastal areas, and at relatively shallow topographic features such as within the FGBNMS. Additionally, long-term trends in seawater temperature data obtained at East and West Flower Garden Banks within FGBNMS, collected between 1990 and 2023, show increasing surface and reef-cap temperatures (Eisenbach et al. 2025). Future bleaching events are likely to occur as ocean temperatures continue to rise. Reasonably foreseeable non-OCS oil- and gas-related activities, including other environmental factors, would occur on a much broader scale and from a greater range of sources compared to those from OCS oil- and gas-related activities.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion of activity when compared to the existing OCS Oil and Gas Program in the GOA (see **Table 3.3-2**). BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as not having a notable effect on benthic communities and habitats. The incremental contribution of impacts from one lease sale to those cumulative effects would not increase the level of impacts substantially. Therefore, the *incremental contribution* of a proposed Gulf of America OCS oil and gas lease sale to cumulative impacts on benthic communities and habitats, including protected corals, would be **negligible** when properly regulated and mitigated. An OCS oil and gas lease sale would not result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by benthic communities and habitats in the area of analysis.

The incremental contribution to cumulative impacts on benthic communities and habitat would not differ between action alternatives because with the application of the same BOEM protective measures described under Alternative B (see **Table 4.4-2**), no substantial effects to overall population levels would be expected. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Chapters 4.4.2.1** through **4.4.2.4** above. However, it should be noted that some activities, such as oil and gas extraction, may cease following decommissioning of facilities, potentially reducing impacts over time.

4.4.2.6 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on benthic communities and habitats, including the locations of benthic communities and habitats in the GOA, the toxicity of oil and dispersants to benthic organisms, the long-term effects of OCS oil- and gas-related infrastructure, the long-term effects

associated with climate-related factors, and the ecological effects and interactions between benthic communities and fish communities. BOEM has determined that such information is not essential to a reasoned choice among alternatives because a complete understanding of these communities and all environmental parameters affecting them is not necessary for a reasoned choice among alternatives. BOEM has used the best available scientific information to date and reasonably accepted scientific methodologies to extrapolate from existing information. Therefore, the incomplete or unavailable information, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

BOEM recognizes that there is incomplete or unavailable information related to topographic features and associated communities, including protected corals, in general and specifically in relation to routine activities, accidental events, and cumulative impacts. However, the available information is adequate to make a determination with respect to reasonably foreseeable IPFs associated with a proposed action. Since the 1970s, BOEM and its predecessor agencies have supported long-term monitoring of the East and West Flower Garden Banks within the FGBNMS for any impacts related to OCS oil- and gas-related activities. At the East and West Flower Garden Banks, corals have generally flourished (Johnston et al. 2022, and references therein) even as OCS oil- and gas-related development has occurred. BOEM used existing information and reasonably accepted scientific methodologies to extrapolate from available information, including the information collected from the long-term monitoring of the East and West Flower Garden Banks within the FGBNMS, in completing this analysis and formulating the conclusions presented here. BOEM has determined that the currently available body of evidence supports the preceding analyses. Therefore, BOEM has determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives.

4.5 Pelagic Communities and Habitats

The pelagic zone (i.e., habitat) encompasses the entire water column from the sea surface down to the seafloor. See Chapter 4.3.3.1 of the GOM Oil and Gas SID for a detailed description of the pelagic zone within the GOA. The analysis of pelagic communities and habitats focuses on planktonic (i.e., phytoplankton, zooplankton, ichthyoplankton) and *Sargassum* (*S. natans* and *S. fluitans*) communities. For the purposes of this analysis, plankton refers to phytoplankton, zooplankton, and ichthyoplankton combined, unless otherwise specified. Information on the larger biota that inhabit or use pelagic habitats is provided in **Chapters 4.6-4.9**. Further information about coastal communities and habitats and benthic communities and habitats, including protected corals, is provided in **Chapters 4.3** and **4.4**, respectively.

Under any of the alternatives, BOEM's analysis of Pelagic Communities and Habitats found the impacts associated with a proposed action to be **minor** or less (**Table 4.5-1**) across all IPFs. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale to cumulative impacts on pelagic communities and habitats under Alternative B, C, or D would be **negligible** when properly regulated. Therefore, to focus the analysis on the important impacts of the

Proposed Action, the detailed analysis of Pelagic Communities and Habitats has been moved to **Appendix M**.

Table 4.5-1. Impact Determinations for Routine and Accidental Impacts to Pelagic Communities and Habitats from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Air Emissions and Pollution	N/A	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Discharges and Wastes	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Bottom Disturbance	N/A	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Noise	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Lighting and Visual Impacts	N/A	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Offshore Habitat Modification/ Space Use	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Unintended Releases into the Environment	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	N/A	**Negligible**	**Negligible**	**Negligible**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. Considering the estimates of ongoing OCS oil- and gas-activities (see **Table 3.3-2**), the expansive area pelagic habitats and communities cover, and the mitigations applied by BOEM and other regulations (see **Table M.2-2**), impacts from ongoing OCS oil- and gas-activities would range from **negligible** to **minor**.

[1] No programmatic protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for pelagic communities and habitats would be considered at the site-specific stage.

4.6 FISHES AND INVERTEBRATES

The GOA has a taxonomically and ecologically diverse assemblage of fishes and invertebrates due to its unique geologic, oceanographic, and hydrographic features. This

assemblage consists of 1,541 fish species (including 51 shark and 42 ray and skate species), and over 13,000 species of invertebrates (Felder and Camp 2009; Ward and Tunnell Jr. 2017).

4.6.1 Affected Environment

GOA fishes are generally temperate (Sherman et al. 1991), although the presence of tropical species is increasing (Heck Jr. et al. 2015). Many fishes are year-round residents, while some species occur only seasonally in the GOA or in particular portions of the GOA (e.g., bluefin tuna [*Thunnus thynnus*]). The GOA is also home to several protected fishes and invertebrates (e.g., giant manta ray [*Manta birostris*] and oceanic whitetip shark [*Carcharhinus longimanus*]). Gulf sturgeon (*Acipenser oxyrinchus desotoi*) and smalltooth sawfish (*Pristis pectinata*) are unlikely to occur within the proposed OCS lease sale areas but do occur in coastal areas (smalltooth sawfish is primarily found off the coast of Florida). Nassau grouper (*Epinephelus striatus*) are considered rare or transient in the northwestern GOA. Queen conch (*Aliger gigas*) can be found within the FGBNMS and Florida Keys.

Fish and invertebrate habitats of the GOA include estuaries, SAV, mangroves, marshes, algal flats, oyster reefs, coral and coral reefs, hard bottoms (i.e., exposed bedrock or authigenic carbonate relict reef), sand, shell, mud/silt/clay, open water, and deepwater benthic habitats. Soft bottom habitats are ubiquitous along the Gulf of America OCS (~90%) whereas complex, hard bottom habitats that support diverse assemblages of fishes and invertebrates, including protected species and managed fisheries species, are less common (BOEM 2021a).

For more information on GOA fishes and invertebrates, see Chapter 4.3.4.1 of the GOM Oil and Gas SID (BOEM 2023b) and Chapter 3.5 of BOEM's Biological Environmental Background Report (BOEM 2021a). Impacts to habitat-forming invertebrates (e.g., oysters and corals) are described and assessed in **Chapters 4.3 and 4.4**. Additional information regarding fish and invertebrate eggs and larvae in the water column can be found in **Chapter 4.5**.

4.6.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil and gas-related activities (including decommissioning), with the potential to impact fishes and invertebrates. Non-OCS oil- and gas-related activities also have the potential to impact fishes and invertebrates (**Table 4.6-1**). These IPFs and their potential effects on fishes and invertebrates, including ESA-listed species, other managed fisheries species/stocks, and their prey, are discussed below and in greater detail in Chapter 4.3.4 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.3.4 of the GOM Oil and Gas SID.

Table 4.6-1. Impact-Producing Factors with the Potential to Impact Fishes and Invertebrates.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Discharges and Wastes	Unintended Releases into the Environment	Air Emissions and Pollution
Bottom Disturbance	Response Activities	Discharges and Wastes
Noise	Strikes and Collisions	Bottom Disturbance
Coastal Land Use/Modification	-	Noise
Lighting and Visual Impacts	-	Coastal Land Use/Modification
Offshore Habitat Modification/ Space Use	-	Lighting and Visual Impacts
-	-	Offshore Habitat Modification/ Space Use
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

Several existing regulatory programs and requirements reduce or minimize the environmental effects of these IPFs to fishes and invertebrates in the GOA. Regulatory requirements enforced by BOEM, BSEE, and other agencies are outlined in **Table 4.6-2** and further described in the *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025a). Lessees are required to perform OCS oil- and gas-related activities (including decommissioning) in accordance with all regulatory requirements; therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

Table 4.6-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Clean Water Act (NPDES Permits)	USEPA	Discharges and Wastes	Chapter 3.4.4
Marine Protection, Research, and Sanctuaries Act	USEPA	Discharges and Wastes	33 U.S.C. 1401 et seq.
Hard Bottom Habitat Avoidance Mitigations	BOEM/BSEE	Bottom Disturbance	BOEM NTL No. 2009-G39; BOEM NTL No. 2009-G40
National Marine Sanctuaries Act – Flower Garden Banks National Marine Sanctuary	NOAA	Discharges and Wastes; Bottom Disturbance; Noise; Unintended Releases into the Environment	15 CFR 922. L; 16 U.S.C. 1434(d)
Magnuson–Stevens Fishery Conservation and Management Act (EFH Consultation)	NOAA	Bottom Disturbance; Noise; Discharges and Wastes; Unintended Releases into the Environment	50 CFR 600

Regulatory Requirement or Protective Measure	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Pollution Prevention	BSEE	Unintended Releases into the Environment	30 CFR 250.300 (BSEE)
International Convention for the Prevention of Pollution by Ships (MARPOL 73/78), MARPOL Annex V Treaty	International Maritime Organization (IMO); USCG	Discharges and Wastes; Unintended Releases into the Environment	https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Inspections-Compliance-CG-5PC-/Commercial-Vessel-Compliance/Domestic-Compliance-Division/MARPOL/; 33 U.S.C. 1901-1915; 33 CFR 151. A; Chapter 2.9.1.7 of the GOM Oil and Gas SID
Ballast Water Management for Control of Nonindigenous Species in Waters of the United States	USCG	Discharges and Wastes	33 CFR 151, subpart A; Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4701-4751), as amended by the National Invasive Species Act of 1996
National Contingency Plan (CWA, Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan)	USCG; USEPA; State, Regional, and local governments	Unintended Releases into the Environment (accidental oil spill)	40 CFR 300, Section 311 Clean Water Act; Oil Pollution Act of 1990 (33 U.S.C. 2701), the National Response Framework, E.O.s 12580 and 12777, S.O. 3299
Marine Debris Research, Prevention, and Reduction Act	USEPA, USCG	Unintended Releases into the Environment (accidental marine debris)	33 U.S.C. 1901; OCS Report BOEM 2025-040; NMFS 2025 BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
Protected Species Stipulation	BOEM	Offshore Habitat Modification/Space Use	Chapters 6 and 7.5 of the GOM Oil and Gas SID

4.6.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Discharges and Wastes: Routine discharges and wastes associated with OCS oil- and gas-related activities include sanitary wastes, gray water, drilling muds and cuttings, produced waters (e.g., hydraulic fracturing wastewater), and other miscellaneous discharges (e.g., bilge, ballast, and fire water; deck drainage; runoff). Discharges and wastes may alter water quality through introduction of toxic compounds and heavy metals, turbidity, and sedimentation. Discharges sources are vessels (e.g., support, service/construction, seismic, and drilling), and infrastructure (e.g., structures). The USEPA regulates operational discharges through NPDES general permits in support of the CWA (**Appendix B.2.2**) and requirements under the Marine Protection, Research, and Sanctuaries Act (or the Ocean Dumping Act). Additionally, all vessels in U.S. and international waters are required to adhere to the International Maritime Organization's regulations under MARPOL limiting discharges, avoiding release of oily water, and prohibiting disposal of solid wastes. Ballast water may carry biological materials such as plants, animals, and microorganisms, which may introduce nonnative species. To prevent the spread of aquatic nuisance species, the USCG implements a Ballast Water Management Program that applies the provisions of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended by the National Invasive Species Act of 1996. BOEM places distancing mitigations (determined through EFH consultation under the Magnuson-Stevens Fishery Conservation and Management Act and enforced by BSEE) on bottom-disturbing activities to protect sensitive benthic habitats. These mitigations may also distance discharges and wastes from those habitats, thereby lessening potential impacts to the fishes and invertebrates using them. Additional mitigations (e.g., further distancing requirements) may also be required through consultation under NMSA for activities proposed near the FGBNMS, which could similarly lessen potential impacts from discharges and wastes to fishes and invertebrates there. Lessees are required to perform OCS oil- and gas-related activities in accordance with these regulatory and consultation requirements (**Table 4.6-2**).

Toxic compounds may be found in produced waters, drilling muds and cuttings, and their additives (e.g., radioisotopes, heavy metals, petroleum hydrocarbons, other organics, chrome or ferrochrome lignosulfonate, sodium hydroxide, chromate salts, surfactants, paraformaldehyde, and other biocides and chemicals) (Neff et al. 2011; USEPA 2022). Effluent waters and deck drainage may also contain biocides, detergents, solvents, metals, coagulants, corrosion inhibitors, and dispersants, among other chemicals (USEPA 2022). Exposure to these compounds may cause impacts to mobility, development, physiology, behavior, development, and reproductive success among fishes and invertebrates (Folkerts et al. 2020; Gissi et al. 2021; Neff et al. 2011). However, authorized discharges and wastes may be dispersed and diluted in the offshore environment. While dispersion and rate of dilution depend on several factors (e.g., discharge composition, discharge rate, and oceanographic conditions), most effects remain within 1,000 m (3,281 ft) of the source for drilling fluids and cuttings and within several hundred meters for produced waters (Beyer et al. 2020; USEPA 2022). Additionally, the USEPA regulates discharges and wastes (**Table 4.6-2**) to keep contaminants in operational discharges and wastes below harmful levels, which can reduce the likelihood and severity of negative impacts to fishes and invertebrates. Releases of discharges and wastes into the water column may still result in localized and temporary impacts to fishes and invertebrates, habitat degradation (e.g., through altered water quality), biodiversity loss, and community structure shifts. Suspended materials may clog invertebrate feeding structures, resulting

in injury or mortality (Abdul Wahab et al. 2017; Lissner et al. 1991). Increased turbidity can alter predation dynamics for fishes and invertebrates by either enhancing or decreasing predator feeding efficiency, potentially leading to changes in community structure or growth and condition of larvae (Benfield and Minello 1996; Chesney et al. 2000; De Robertis et al. 2003; Jönsson et al. 2013; Lunt and Smee 2014; 2020; Minello et al. 1987). Sedimentation can smother benthic species with little to no mobility, potentially resulting in injury or mortality. Highly mobile species are expected to be able to avoid large discharge plumes. Fishes and invertebrates, particularly eggs and larvae, may become impinged or entrained by seawater uptake equipment supporting offshore structures and vessels (e.g., cooling water), resulting in injury or mortality.

Bottom Disturbance: Bottom disturbance associated with OCS oil-and gas-related activities (e.g., anchoring; drilling; structure and pipeline installations, removals, and DIP) can directly impact fishes and invertebrates by crushing individuals with limited or no mobility and exposing infauna, making them more vulnerable to predation. Sediments suspended into the water column increase turbidity and cause sedimentation, resulting in potential effects similar to those discussed earlier under discharges and wastes. Fish eggs and larvae are unable to avoid sediment plumes, which may result in reduced oxygen uptake in eggs and hatching success (Gray et al. 2012), and physical or visual impairment of larvae during feeding (Axler et al. 2020). Physical impacts to sensitive habitats (e.g., natural hardbottoms and the water column) can also indirectly effect fishes and invertebrates by degrading habitats used to support a variety of life history stages (**Chapters 4.4** and **4.5)**. While structure installations and removals would result in bottom disturbance in most instances, DIP structures may also cause bottom disturbance if structures are toppled in place, or placed in a secondary location as an artificial reef. Pipeline installations and removals would also result in some degree of bottom disturbance in most instances, while pipelines DIP may only result in bottom disturbance near the pipeline ends. Any anchoring associated with installation and decommissioning activities (including for pipelines and structures) would result in bottom disturbance. BOEM places distancing mitigations (determined through EFH consultation and enforced by BSEE; **Table 4.6-2**) on bottom disturbing activities to protect sensitive, slow-to-recover hard bottom habitats. These mitigations reduce the potential for negative impacts to fishes and invertebrates associated with hard bottom habitats by disallowing destruction of hard bottom features and distancing turbidity and sedimentation effects. Additional mitigations (e.g., further distancing requirements) may also be required through consultation under the NMSA for activities proposed near the FGBNMS, further reducing the potential for impacts to hard bottom habitat. Bottom disturbance is not mitigated for soft bottoms, and damage to these habitats and associated fishes and invertebrates may still occur. However, soft bottom communities are far more common in the GOA and generally recover relatively quickly (3 months to 2.5 years) in comparison to hard bottom communities (8-10 or more years) (Brooks et al. 2006; Rogers and Garrison 2001; Tamsett et al. 2010; Wilber and Clarke 2007).

Noise: All OCS oil- and gas-related activities (e.g., vessel traffic, geophysical surveys, pile driving, installation and decommissioning activities) generate sound. Noise inputs can stimulate a behavioral response in fishes and invertebrates, mask biologically important signals, and cause temporary or permanent hearing loss or mortality in fishes (de Soto 2016; Popper et al. 2005;

Popper et al. 2014b). Noise impacts could be greater if they occur in important spawning habitat, occur during peak spawning periods, and/or result in reduced reproductive success.

Vessel traffic, classified as a continuous noise source, may cause behavioral changes, physiological stress, or acoustic masking among fishes and invertebrates (Celi et al. 2016; Filiciotto et al. 2014; Hudson et al. 2022; Popper et al. 2014b). However, some studies have shown minimal reactions or rapid recovery rates (Bruintjes et al. 2016; Nedelec et al. 2016; Rojas et al. 2021; Staaterman et al. 2020), indicating that some species may be less affected by vessel noise or may habituate to noisy environments. Other sources of continuous noise (e.g. structure operational noise, vibratory pile driving, and mechanical severance for structure decommissioning) could lead to masking or behavioral effects similar to those expected from vessel noise.

Generally, studies of impulsive sound, such as seismic airguns, pile driving, high-resolution geophysical survey equipment (e.g., bubble guns), and explosive removals, have shown physical injury to hearing structures is possible. Species without hearing specializations (e.g., ESA-listed giant manta rays and oceanic whitetip sharks) are less likely to sustain effects, and even those with some specializations are likely to recover within several days of exposure (Hastings et al. 2008; McCauley et al. 2008; McCauley and Kent 2012; Popper et al. 2005). Effects are expected to be short-term and occur very close to the source (i.e., within tens of meters; Popper et al. 2014b). Fish larvae may experience injury, reduced growth, or mortality if located within 10 m (33 ft) of an air gun blast (Turnpenny and Nedwell 1994). For adult fish, sound produced from seismic airguns has been found to result in only subtle, short-term behavioral changes with no evidence that fish are fleeing an area, ceasing feeding, or permanently abandoning habitat (Davidsen et al. 2019; Hubert et al. 2020; Meekan et al. 2021). Impact pile driving may cause injury or mortality in close proximity, or short-term stress, behavioral changes, and masking over greater distances for fishes (Popper et al. 2014a). Pile driving may cause behavioral impacts to invertebrates (e.g., alarm response among squid, valve closure among scallops), although effects are generally short-term (Cones et al. 2022; Jézéquel et al. 2022). High-resolution geophysical surveys conducted for site investigation and decommissioning site-clearance verification use some equipment types that are within the expected hearing range of most fishes and invertebrates. Impacts would likely only result to individuals that are within close proximity (most behavioral impacts within 100 m [328 ft]; injury within several meters) to the sound source (Crocker and Fratantonio 2016; Popper et al. 2014b). During explosive severance activities (e.g. structure decommissioning), the rapid oscillation of the pressure waveform can cause the swim bladder of many fishes (e.g., snappers, groupers, tilefishes, and jacks) to contract and overextend quickly, potentially leading to mortality. However, studies examining the effects of noise from explosive structure removal have found that the level of activity and resulting mortality does not substantially affect the stock levels of several managed fish species in the GOA (Gallaway et al. 2020; Gitschlag et al. 2001).

BOEM places distancing mitigations (determined through EFH consultation and enforced by BSEE; **Table 4.6-2**) on bottom-disturbing activities to protect sensitive benthic habitats, which may subsequently reduce noise impacts to fishes and invertebrates that utilize those habitats. NMSA consultations for activities that occur near the FGBNMS may also result in additional mitigations to

those already applied by BOEM and BSEE (e.g., further distancing requirements). These mitigations could minimize or avoid noise-related impacts to Sanctuary resources, such as protected species (e.g., giant manta ray) and rare fishes (e.g., marbled grouper), which may include masking of biologically important signals, behavioral changes (e.g., fleeing or freezing) during sensitive periods (e.g., spawning), physiological responses, or mortality.

Coastal Land Use/Modification: Coastal land disturbance from OCS oil- and gas-related activities includes navigation canal dredging, the construction of new onshore facilities (including decommissioning refurbishment or disposal sites) and pipeline landfalls, and vessel traffic. These activities could impact fishes and invertebrates in similar ways as described above for discharges and wastes (e.g., reduced water quality), bottom disturbance (e.g., crushing and increased turbidity), and noise (e.g., masking from vessel traffic). The amount of coastal construction or dredging associated with new OCS oil- and gas-related activities is relatively low as infrastructure is already largely in place (**Chapter 3**). However, dredging could still occur as a result of the proposed action and result in changes to habitat availability and quality, as well as injury and mortality to fishes and invertebrates in the area of impact. Coastal construction and vessel traffic can contribute to shoreline erosion and operational discharges and wastes, leading to localized habitat degradation and increases in turbidity and sedimentation. USACE, State, county, commercial, and private interests maintain federal channels and canals throughout the relevant onshore area. USACE also maintains all larger navigation channels in the area of interest.

Lighting: The OCS oil- and gas-related structures and equipment, such as structures, vessels, and onshore facilities, can emit artificial light into the marine environment that attracts mobile fishes and invertebrates. For example, Shaw et al. (2002) found that artificial lighting at night emitted from offshore structure in the northern GOA attracts and results in elevated levels of zooplankton and ichthyofauna, which, in turn, attracts post-larval and juvenile pelagic fishes and pre-settlement stages of soft bottom taxa. While the long-term effects of attraction of fishes and invertebrates are unclear, short-term effects may include altering community composition, concentrating predators near lit surface waters, and modifying schooling and predatory behaviors (Barker and Cowan Jr. 2018). Artificial lighting at night may disproportionately benefit certain predatory species that rely on visual cues for prey capture rather than predators that rely on other sensory cues (Martin et al. 2021). Decommissioning of offshore structures (e.g., structure) would remove their associated impacts from lighting on the OCS.

Offshore Habitat Modification/Space Use: The OCS oil- and gas-related activities can include the emplacement, and decommissioning of infrastructure on the Gulf of America OCS (e.g., structures, pipelines, and pipeline end manifolds). They also encourage the colonization of encrusting invertebrates that attracts higher trophic level organisms, including various life stages of fishes and invertebrates, which may result in community structure shifts, changes in predator/prey interactions, and potential changes to migratory patterns, distributions, abundance, and habitat use (Price et al. 2022; Snodgrass et al. 2020; van Elden et al. 2019). In addition, artificial substrates can assist in the spread of invasive species that can outcompete native species and alter predator/prey interactions. Fishing activity may increase at easily accessible OCS oil- and gas-related structures,

resulting in injury or mortality of fishes and invertebrates, particularly managed fisheries species known to use artificial structures (e.g., snappers, jacks, groupers, and tunas). Decommissioning by removal of structures and equipment can result in benthic disturbance, mortality of encrusted invertebrates, and localized community changes (e.g., reduced biodiversity). Additionally, decommissioning site-clearance trawling after structure removal may result in injury or mortality to fishes and invertebrates that are captured as bycatch in trawl nets. Platforms and other structures that are decommissioned-in-place would extend the effects of their emplacement longer-term. Lines in the water to support OCS oil- and gas-related activities (e.g., diver lines, anchor lines, ROV, and crane cables) may pose entanglement risk to larger fishes such as whale sharks and giant manta rays; however, the interaction would be highly unlikely, and BOEM's Marine Mammal In-water Line Precaution Protocol (determined through ESA consultation and enforced by BSEE; **Table 4.6-2**) may further reduce potential impacts from entanglement to large fishes.

4.6.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Unintended Releases into the Environment: BSEE requires that lessees take measures to prevent unauthorized discharge of pollutants into offshore waters (30 CFR 250.300). Additionally, the International Maritime Organization's regulations under MARPOL, the National Contingency Plan, and the Marine Debris Research, Prevention, and Reduction Act contain regulations and guidance to prevent, minimize, and/or respond to accidental pollution from ships (**Table 4.6-2**). However, unintended releases such as oil spills can still occur and adversely impact fishes and invertebrates. Exposed eggs and larvae may risk delayed development or abnormalities, resulting in decreased fitness and reduced survival rates (Fucik et al. 1995; Incardona et al. 2014; Mager et al. 2014). Damage to the central nervous system and impaired decisionmaking may also occur among juveniles (Schlenker et al. 2022). Impacts to mobile, adult fish would likely be sublethal as they can generally avoid adverse conditions, metabolize hydrocarbons, and excrete metabolites and parent compounds (Lee et al. 1972; Snyder et al. 2019). However, lasting sublethal effects from oil exposure can include sensory system impairment, constrained development, reduced reproductive success, decreased energy budgets, and reduced survival (Schlenker et al. 2022). Although vessel and structure operators are required to take preventative measures against the loss of marine trash and debris, accidental releases may still occur. Marine debris can degrade in the environment and become microdebris (i.e., small synthetic, semi-synthetic, or naturally-derived particles). Fishes and invertebrates can ingest this microdebris and experience pseudo-satiation or physical blockage (Lestrade and Hernandez 2023). Ingestion of microplastics, a type of microdebris, can result in emaciation and toxin exposure, leading to decreased growth, reproduction, and survival of fishes and invertebrates (Enyoh et al. 2020; Foley et al. 2018; Gad and Midway 2022; Waddell et al. 2020). Benthic, benthopelagic, and *Sargassum*-associated fishes (e.g., juvenile jacks and triggerfish) are particularly vulnerable to exposure and ingestion due to microdebris accumulation in seafloor

sediments and *Sargassum* habitat (Lestrade and Hernandez 2023). BOEM's distancing mitigations (determined through EFH consultation and enforced by BSEE; **Table 4.6-2**) on bottom-disturbing activities from hard bottom habitats may lessen impacts from accidental spills and debris to hard bottom-associated fishes and invertebrates. The NMSA consultations for activities near the FGBNMS may also result in additional mitigations to those already applied by BOEM (e.g., further distancing requirements).

Response Activities: Dispersants used in response to an accidental oil spill could increase the water solubility of petroleum hydrocarbons, increasing their bioavailability for uptake by fishes and invertebrates (Johann et al. 2021; Wolfe et al. 2001). This uptake could result in negative effects, including behavioral responses, delayed development, and mortality (Jasperse et al. 2018; Laramore et al. 2016). In-situ burning may result in less harmful overall effects to fishes and invertebrates due to its combustion of a large volume of oil (Johann et al. 2021). However, the toxicity of compounds resulting from in-situ burning may remain the same as an unweathered slick or be altered but depends on many factors including oil type, burn efficiency, and susceptibility of particular organisms (Fritt-Rasmussen et al. 2015; Johann et al. 2021). In-situ burning residue is unlikely to affect early life stages of invertebrates and fishes beneath the surface; however, sunken residue may result in negative effects for benthic biota (Buist et al. 1999). Fishes and invertebrates would generally be expected to be able to avoid mechanical spill-response techniques (e.g., booms), but trapping of organisms, particularly surface-dwelling organisms (e.g., pelagic eggs and larvae, and juvenile and adult fishes and invertebrates that inhabit *Sargassum* habitats or floating debris), could occur and result in injury or mortality (e.g., physical crushing by towed boom and/or increased oil contact).

Strikes and Collisions: Strikes and collisions from vessels associated with OCS oil- and gas-related routine activities are very unlikely to affect the majority of fishes and invertebrates of the GOA. However, there is a possibility for vessels to strike large, surface-feeding fish such as whale sharks *(Rhincodon typus*) that aggregate to feed during the summer in the north-central GOA (Chen 2017; Hoffmayer et al. 2007; McKinney et al. 2017). Pelagic fish and invertebrate early life stages (e.g., eggs, larvae, and juveniles) near the surface may also experience mortality from vessel strikes or may be temporarily displaced by vessel wake due to their limited mobility.

4.6.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence fishes and invertebrates in the GOA through air emissions; discharges and wastes; bottom disturbance; noise; coastal land use/modification; lighting; offshore habitat modification/space use; and other environmental factors. The content under each IPF subheading below summarizes the more relevant detailed discussion of how non-OCS oil- and gas-related activities can affect fishes and invertebrates found in Chapter 4.3.4.2.1 of the GOM Oil and Gas SID.

Air Emissions and Pollution: The potential sources of air emissions from non-OCS oil- and gas-related activities that may impact fishes and invertebrates include State oil and gas activities,

natural sources, commercial and recreational vessels (including fishing vessels), and military vessels and aircraft. The indirect absorption of these emissions in the GOA may lead to localized changes in water quality (e.g., acidification from CO_2 absorption), negatively affecting habitat suitability for fishes and invertebrates, including ESA-listed species.

Discharges and Wastes: Potential sources of non-OCS oil- and gas-related discharges and wastes, such as fresh water, wastewater, stormwater runoff, chemical wastes, nutrients (e.g., nitrogen and phosphorus), State oil and gas discharges, and other materials (e.g., plastics) may affect habitat suitability for fishes and invertebrates, including ESA-listed species, by causing changes in salinity, turbidity, and organic material load in coastal waters (Bianchi et al. 2010). Discharges can induce hypoxia and assist in the proliferation of toxic dinoflagellates, which can cause “red tide” events along the Gulf Coast and elsewhere, and lead to mass mortalities in fishes and invertebrates. Regulated vessel discharges (e.g., from shipping and fishing vessels) contribute to potential changes in water quality nearshore and offshore. Permitted discharges of bilge may result in the introduction of invasive species. Trash and debris pollution, and subsequent debris and microdebris ingestion, can harm fishes and invertebrates through emaciation and toxicity.

Bottom Disturbance: The potential sources of bottom disturbance from non-OCS oil- and gas-related activities that may impact fishes and invertebrates include vessel and buoy anchoring, moorings, military operations, artificial reef emplacement, dredging, trawling, mass wasting, ongoing and future State oil and gas activities, and renewable energy site assessment and characterization (e.g., geotechnical/sub-bottom sampling, and biological surveys). Potential effects to fishes and invertebrates, including ESA-listed species, are similar to those described above for OCS oil- and gas-related activities (e.g., physical crushing and increased turbidity).

Noise: The potential sources of underwater noise from non-OCS oil- and gas-related activities that may impact fishes and invertebrates include noise from natural (e.g., wind-driven waves and animal sounds) and anthropogenic sources (e.g., commercial shipping, commercial fishing, State oil and gas, and renewable energy activities [e.g., HRG survey equipment]). Noise from these sources could be continuous or pulsed, be quite ubiquitous, and result in negative effects to fishes and invertebrates, including ESA-listed species, similar to those described earlier (e.g., masking of biologically important signals, temporary or permanent hearing loss, and mortality).

Coastal Land Use/Modification: The potential sources of non-OCS oil- and gas-related coastal land use and modification that may impact fishes and invertebrates include dredging of navigation canals, coastal construction (e.g., State oil and gas facilities, pipeline landfalls, tourism, and residential infrastructure), and vessel traffic. Potential impacts to fishes and invertebrates, including ESA-listed species, are similar to those described earlier for OCS oil- and gas-related discharges and wastes (e.g., reduced water quality), bottom disturbance (e.g., crushing and increased turbidity), and noise (e.g., masking from vessel traffic). The alteration of coastal habitats also results in potential loss of important habitats for fishes and invertebrates (e.g., habitat that serves as nursery grounds).

Lighting: The potential sources of non-OCS oil- and gas-related artificial lighting that may impact fishes and invertebrates include vessels, private homes, fishing piers, restaurants, industry-related infrastructure, and State oil and gas structures. These sources all emit light at night into coastal waters, and may result in impacts similar to those described earlier for OCS oil- and gas-related activities (e.g., altering community composition, concentrating predators near lit surface waters, and modifying schooling and predatory behavior).

Offshore Habitat Modification/Space Use: The potential sources of offshore habitat modification from non-OCS oil- and gas-related activities that may impact fishes and invertebrates include structure emplacements (e.g., artificial reefs, military equipment, and navigational aids), and commercial and recreational fishing. Structure emplacement may result in effects as described earlier for OCS oil- and gas-related structures (e.g., community structure shifts, changes in predator/prey interactions, changes to migratory patterns, invasive species spread, and increased injury or mortality from recreational and commercial fishing). Though improvements in fishery management techniques and science have been able to improve stock levels for many commercially and recreationally valuable species, bycatch from these fishing activities can negatively impact other ecologically important species (i.e., through reductions in prey biomass). Additionally, commercial fishing gear can damage benthic habitats that support fishes and invertebrates, leading to effects as described earlier for bottom disturbance.

Other Environmental Factors: Range expansions of tropical fishes and resulting changes to biodiversity may occur in response to warming waters. These changes in biodiversity have the potential to alter the ecology of existing ecosystems, including food web and habitat interactions (Fodrie et al. 2010; Fujiwara et al. 2019; Purtlebaugh et al. 2020). Spawning and migration behaviors may change in response to changing environmental conditions, and so impact population abundance and recruitment success (Brulé et al. 2022; Muhling et al. 2011). Warming waters may continue to result in land loss and sea-level rise, altering habitat in coastal areas that many fishes and invertebrates use during some or all of their lives. Ocean acidification can hinder growth and weaken the shells of bivalves, and affect the growth and physiology of fishes at different life-history stages (Llopiz et al. 2014; Osborne et al. 2022).

4.6.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, the impacts would be **none** since no direct or indirect impacts to fishes and invertebrates would occur as a result of the proposed action (i.e., a single proposed OCS oil and gas lease sale). However, there are ongoing OCS oil- and gas-related activities associated with previous lease sales and non-OCS oil- and gas-related activities that would continue to potentially affect fishes and invertebrates under all of the alternatives, including the No Action.

***Ongoing OCS Oil- and Gas-Related Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would still potentially affect fishes and invertebrates, including ESA-listed species, through discharges and wastes, bottom disturbance, coastal land use/modification, light and visual impacts, noise, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions, as summarized above in **Chapter 4.6.2.1** and **4.6.2.2.**

Discharges and wastes from ongoing activities would result in altered water quality, introduced toxic compounds/metals, increased turbidity and sedimentation, and potential injury or mortality to entrained fishes and invertebrates. Lighting from ongoing activities may result in altered community composition and modified behaviors of fishes and invertebrates. Bottom disturbance from ongoing activities may result in physical crushing or smothering (e.g., through sedimentation) of benthic organisms, potentially exposing infauna and temporarily increasing turbidity. Bottom disturbance may also degrade habitats for fishes and invertebrates. Noise from ongoing activities may result in behavioral responses, masking, stress, temporary or permanent hearing loss, or mortality of fishes and invertebrates as described in **Chapter 4.6.2.1**. Coastal land use/modification from ongoing activities may result in discharges and wastes, bottom disturbance, and noise, the impacts of which are similar to those described in **Chapter 4.6.2.1**. Coastal modifications, such as dredging or coastal construction, would also have the potential to cause direct injury or mortality to fishes and invertebrates, and indirectly negatively impact habitat quality or availability. However, coastal infrastructure in the GOA region is already largely in place, and additional pipeline landfalls are unlikely. Offshore habitat modification/space use from ongoing activities may result in altered community structure, feeding dynamics, and migration. The installation and decommissioning of offshore structures may also result in bottom disturbance and site clearance trawling that can cause injury or mortality of fishes and invertebrates that are unable to avoid those activities. Larger fishes may also become entangled in lines used for offshore activities, although that is highly unlikely. Accidental spills and releases of debris can cause delayed development or abnormalities, reduced reproductive success, pseudo-satiation, and habitat degradation. Responses to those accidental releases may increase the bioavailability for uptake by fishes and invertebrates of hydrocarbons (e.g., through the use of dispersants) and other toxic compounds, or may cause physical impacts (e.g., through the use of booms) to fishes and invertebrates resulting in injury or mortality of sensitive early life stages. Finally, vessels may strike larger, surface-feeding fish or larvae concentrated at the surface, resulting in injury or mortality.

These IPFs from ongoing activities are subject to the same regulations and mitigations as described earlier (**Table 4.6-2**), lessening the potential for impacts to fishes, invertebrates, and their habitats. The ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.6.1** and in further detail in Chapter 4.3.4.1 of the GOM Oil and Gas SID. Considering applied regulations and mitigations (**Table 4.6-2**), the amount of activity from ongoing activities (**Table 3.3-2**), the mobility of many fishes and some invertebrates, and the basin-wide distribution of most fishes and invertebrates, impacts from ongoing OCS oil and gas activities would range from **negligible** to

moderate, with no population-level impacts expected. Impacts may range from undetectable to localized mortality of individuals.

***Non-OCS Oil- and Gas-Related Activities*:** Air emissions and pollution, discharges and wastes, bottom disturbance, light, noise, offshore habitat modification/space use, and coastal land use/modification, associated with past and present non-OCS oil- and gas-related activities, and other environmental factors, would continue to potentially affect fishes and invertebrates under the No Action alternative, as described above. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. Of these, the most notable adverse impacts to fishes and invertebrates of the GOA would include changes in habitat suitability from climate-related factors (e.g., warming waters). Additionally, in coastal areas that many fishes and invertebrates use as nursery habitat, both coastal construction and excessive nutrient load (leading to algal blooms and hypoxia) can greatly reduce habitat availability or suitability for fishes and invertebrates. Adverse impacts to fish and invertebrate stocks are also possible from recreational and commercial fishing (e.g., bycatch mortality), and require careful management. These non-OCS oil- and gas-related sources have more pronounced effects (e.g., population-level) on fishes and invertebrates than OCS oil and gas development as a result of a single proposed OCS oi and gas lease sale and would still occur to fishes and invertebrates without the presence of OCS oil- and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing, which could change the spatial distribution of the scenario activities but not their overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraint under Alternatives C and D (**Table 4.6-3**). Impacts are shown both with and without BOEM's protective measures applied, if it is applicable to that IPF. The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.6-3. Impact Determinations for Routine and Accidental Impacts to Fishes and Invertebrates from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	**BOEM's Protective Measure[1]**	**Alternative B**	**Alternative C**	**Alternative D**
Discharges and Wastes	N/A	**Negligible**	**Negligible**	**Negligible**
Bottom Disturbance	Without Protective Measures	**Moderate**	**Moderate**	**Moderate**
Bottom Disturbance	With Protective Measures	**Minor**	**Minor**	**Minor**
Noise	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Coastal Land Use/Modification	N/A	**Minor**	**Minor**	**Minor**
Lighting and Visual Impacts	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Offshore Habitat Modification/ Space Use	Without Protective Measures	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Offshore Habitat Modification/ Space Use	With Protective Measures	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Unintended Releases into the Environment	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	N/A	**Negligible**	**Negligible**	**Negligible**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. Considering applied regulations and mitigations (including the protection of sensitive benthic habitats; **Table 4.6-2**), the amount of activity from ongoing activities (**Table 3.3-2**), the mobility of many fishes and some invertebrates, and the basin-wide distribution of most fishes and invertebrates, impacts from ongoing OCS oil and gas activities would range from **negligible** to **moderate**, with no population-level impacts expected.

[1] Protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. Additional BOEM protective measures for fishes and invertebrates would be considered at the site-specific stage.

Alternative B – Regionwide OCS Lease Sale

Alternative B considers a proposed regionwide OCS lease sale area. Within this geographic area, impacts may affect a variety of fishes and invertebrates (estuarine, coastal, continental shelf, continental slope, and abyssal plain taxa), including ESA-listed species such as Nassau grouper, giant manta ray, oceanic whitetip shark, smalltooth sawfish, Gulf sturgeon, and queen conch. Impacts from the proposed action may extend to coastal areas (which are not part of the lease sale area) due to vessel transit, onshore support, and the connectivity of water bodies. Gulf sturgeon and smalltooth sawfish are unlikely to occur within the proposed OCS lease sale area but do occur in coastal areas. The majority of the EPA is excluded from leasing under this alternative, which greatly reduces or eliminates potential impacts to fishes and invertebrates in the northeastern GOA (i.e., along Florida). Portions of the FGBNMS are excluded from leasing under this alternative, which would reduce potential impacts to taxa that use or solely inhabit the Sanctuary. Giant manta rays are also found in the FGBNMS; however, while the leasing exclusion may offer them some protection, they also frequent and likely use other banks and hard bottom habitats for nursery habitat that are not excluded from leasing under this alternative (i.e., topographic features or pinnacles) (Childs 2001; Stewart et al. 2018). Queen conch may also be found on nearby banks not excluded from leasing, typically in waters less than 30 m (98 ft) but up to 75 m (246 ft) water depth (McCarthy 2007).

Discharges and Wastes: Discharges and wastes can occur from any routine oil and gas activity, including decommissioning, except for helicopter operations (**Table 3.3-4**). Given the level of

these activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to fishes and invertebrates, including ESA-listed species, are expected to be relatively undetectable and therefore **negligible**. No impacts to fishes and invertebrates would be expected at the stock level. Due to the likely rapid dispersal of discharges and suspended materials via current and wave action, applied USEPA regulations (**Table 4.6-2**), and basin-wide distribution of most fish and invertebrate populations, water quality would be expected to return to baseline conditions within a short period of time, leaving no measurable or detectable impacts to fishes or invertebrates. Additionally, impingement and entrainment of individuals at cooling water intake would not be expected to result in stock- or population-level impacts. Larger, more mobile individuals are less susceptible to impingement, and it is expected that mortalities of larvae and eggs resulting from entrainment would be undetectable at a population-level when compared to natural variation and mortality rates.

Bottom Disturbance: Given the level of routine oil and gas installation and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale, and **Appendix C**, that could lead to bottom disturbance, impacts from bottom disturbance to fishes and invertebrates, including ESA-listed species and the habitats on which they rely, are expected to be **moderate** if unmitigated and allowed to directly contact sensitive hard bottom habitats. Notable, localized adverse impacts to the extent and quality of habitat for species common to the project area and ESA-listed species could occur. However, BOEM mitigates impacts to hard bottom habitats, including pinnacles and topographic features, via applied distancing mitigations (**Table 4.6-2**). Further, NMSA consultations for activities occurring in the vicinity of the FGBNMS could result in additional distancing mitigations (**Table 4.6-2**). Mitigated impacts to fishes and invertebrates, including ESA-listed species, would therefore be highly localized, **minor**, and mainly affect soft-sediment communities that are generally expected to fully recover after disturbance within a relatively short period of time. No impacts to fishes and invertebrates would be expected at the stock level.

Noise: Noise from OCS oil- and gas-related activities (including decommissioning) may impact fishes and invertebrates, including ESA-listed species, depending on a variety of factors (e.g., source type and the species' hearing sensitivity). Impacts could range from undetectable to acute changes in behavior, recoverable injury, and/or mortality of individuals (not expected for protected species). Transient or temporary continuous sound sources (e.g., vessel traffic, vibratory pile driving, mechanical severance for structure decommissioning) may impact fish and invertebrate behavior or result in stress or masking as described earlier. However, those impacts would be localized and/or short in duration. Sources of more continuous noise (e.g., operational noise) may result in similar impacts over a longer time scale, however any impacts would remain highly localized, and some fishes and invertebrates may habituate to the noise input. Impacts from impulsive sound sources (e.g., explosive decommissioning) to invertebrates and fishes without hearing specializations would largely be undetectable and negligible. For more sensitive fishes (i.e., those with swim bladders and hearing specializations), impacts may result in injury or mortality. However, individuals would generally have to be very close to the sound source to undergo mortality, and injury to hearing structures would be temporary and recoverable. Given the level of

routine oil and gas vessel traffic, G&G survey activities, structure installations, and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale, and **Appendix C**, impacts from noise to fishes and invertebrates, including ESA-listed species, are expected to be **negligible** to **moderate**. No stock- or population-level impacts are expected. Although Alternative B would allow leasing in areas of the expanded FGBNMS, additional mitigations (**Table 4.6-2**) may be required through future NMSA consultations for activities proposed in the vicinity of the FGBNMS which may provide additional protection for FGBNMS fishes and invertebrates, including the ESA-listed species that utilize those banks.

Coastal Land Use/Modification: Given the level of routine oil and gas installation and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale, and **Appendix C**, that could lead to coastal land use/modification, any impacts to fishes and invertebrates, including ESA-listed species, are expected to be **minor**. No impacts to fishes and invertebrates would be expected at the stock level. Coastal industrial infrastructure (e.g., support and helicopter bases; refurbishment/disposal sites used for decommissioning) and navigation canals are already largely in place. However, the relative amount of expected additional vessel traffic (**Table 3.3-2**) and pipeline landfalls (**Chapter 3**) could result in highly localized impacts to estuarine fishes and invertebrates and the coastal habitats (**Chapter 4.3**) that support them via shoreline erosion, noise, discharges and wastes, and bottom disturbance.

Lighting: Given the level of routine oil and gas installation and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale, and **Appendix C**, that could lead to artificial light in the marine environment, any impacts to fishes and invertebrates, including ESA-listed species, are expected to be **negligible** to **minor**. No impacts to fishes and invertebrates would be expected at the stock level. Due to the relatively small amount of oil- and gas-related vessel traffic, its transient nature, and anticipated number of emplaced structures (**Table 3.3-4**) associated with a single proposed OCS oil and gas lease sale over a 40-year lifespan, artificial lighting at night input into the environment would likely result in either no measurable impacts or only localized changes to species richness or abundance. Decommissioning of offshore structures, either by removal or through DIP, would remove their associated lighting impacts on the OCS.

Offshore Habitat Modification/Space Use: Impacts from offshore habitat modification/space use would be **negligible** to **minor**. No impacts to fishes and invertebrates would be expected at the stock level. Emplaced OCS oil- and gas-related structures attract a variety of fish and invertebrates, resulting in potential effects as described previously. Considering the number of structures that could be installed and decommissioned as a result of a single proposed OCS oil and gas lease sale (**Table 3.3-2** and **Appendix C**), effects from structure emplacement and decommissioning to most fishes and invertebrates would be **minor** because changes to species richness or abundance would remain highly localized. If structures are DIP, they may further lessen impacts to the surrounding fish and invertebrate community as most would still be able to use the structure as artificial habitat. Impacts of decommissioning site clearance trawling would only affect localized assemblages of fishes and invertebrates. Impacts to ESA-listed fish, such as Nassau

grouper, giant manta rays, oceanic whitetip sharks, and queen conch, would be undetectable and **negligible**, as offshore oil- and gas-related structures are not known to attract these species. Entanglement of larger fishes would be very unlikely to occur and therefore unlikely to result in detectable impacts to fishes and invertebrates.

Unintended Releases into the Environment: Impacts from unintended releases into the environment to fishes and invertebrates, including ESA-listed species, are anticipated to be **negligible** to **moderate**. No impacts to fishes and invertebrates would be expected at the stock level. Due to the mitigating measures mentioned above (**Chapter 4.6.2.2**), impacts from trash and marine debris tied to a single proposed OCS oil and gas lease sale would be largely undetectable and negligible. The likely amount of marine debris accidentally released due to a single OCS oil and gas lease sale is expected to be small, but it would contribute to the cumulative impacts discussed below. Non-oil spills (e.g., chemical spills and synthetic-based fluid spills) would likely be relatively infrequent based on the occurrences of these accidental spills calculated over the past decade (**Tables B.3-3** and **B.3-4**). Impacts would likely be highly localized, and mobile fishes and invertebrates would be expected to largely avoid areas of impact. Based on the number and volume of accidental oil spills estimated for a single proposed OCS oil and gas lease sale (**Appendix B.3.1.1**), negative impacts to fishes and invertebrates could range from undetectable (**negligible**) to **moderate**, resulting in notable and measurable localized adverse impacts to habitat and fish and invertebrate abundance and richness. Risk of toxicity and the potential for mortality (either directly or indirectly) would be greatest at spill onset, decreasing over time via spill weathering and biodegradation. Mobile fishes and invertebrates would likely be able to escape impacts more readily than slow-moving, benthic taxa.

Response Activities: Impacts from response activities to fishes and invertebrates, including ESA-listed species, are expected to be **negligible** to **minor** because response activities would occur in a limited area and many mobile fishes and invertebrates would be able to avoid containment and cleanup methods. While it may be more difficult for fishes and invertebrates to avoid response activities in semi-enclosed areas (e.g., bays and estuaries), any impacts to habitat quality would still be highly localized and minor. No impacts to fishes and invertebrates would be expected at the stock level.

Strikes and Collisions: Impacts from strikes and collisions to fishes and invertebrates, including ESA-listed species, are expected to be largely undetectable and **negligible**. This is because of the anticipated small amount of service vessel traffic associated with a single proposed OCS oil and gas lease sale (**Table 3.3-2**) when compared with other non-OCS oil- and gas-related vessel traffic in the GOA and the added unlikelihood of ships contacting most fishes and invertebrates at the surface. No impacts to fishes and invertebrates would be expected at the stock level.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative B on fishes and invertebrates would be **moderate** without mitigating

measures. When mitigating measures are used (**Table 4.6-2**), particularly BOEM hard bottom distancing mitigations, impacts would be **minor** because the distancing of activities lessens the severity of or avoids negative impacts to fishes and invertebrates associated with these sensitive, slow to recover habitats.

Alternative C –Targeted OCS Lease Sale Area

Under Alternative C, the spatial distribution of activities would change from Alternative B but not the overall anticipated levels of activity. Removal of the Topographic Features Stipulation and Live Bottom (Pinnacle Trend) Stipulation blocks may have a small difference in impacts to fishes and invertebrates. It would result in even greater distancing of activities and resulting IPFs (e.g., turbidity, sedimentation, noise, light, habitat modification, and spills and spill response) to these hard bottom features due to the block restrictions. This could potentially provide greater protection for fish and invertebrate taxa, including ESA-listed species that use these habitats (e.g., giant manta rays and Nassau grouper). Removal of FGBNMS (under the Topographic Features Stipulation) may also lessen potential impacts to queen conch. Overall, however, the spatial redistribution of activity under Alternative C would not change the suite of IPFs and impact conclusions for fishes and invertebrates, including ESA-listed species, from those under Alternative B because of BOEM's distancing mitigations (**Table 4.6-2**) on activities in these areas during the activity review process. Further, any activities occurring in the vicinity of the expanded FGBNMS would likely require consultation under the NMSA and could result in additional mitigations to those already applied by BOEM (**Table 4.6-2**).

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale in **Chapter 3**, the overall impacts from IPFs associated with Alternative C on fishes and invertebrates would be **moderate** without mitigating measures. When mitigating measures are used (**Table 4.6-2**), particularly BOEM's hard bottom distancing mitigations, impacts would be **minor**.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

The spatial redistribution of activity under Alternative D would not change impact conclusions for fishes and invertebrates, including ESA-listed species, from those under Alternatives B and C. The exclusion of expanded FGBNMS blocks and blocks shoreward of the 20-m isobath may have implications for fishes and invertebrates. However, the expanded FGBNMS blocks are almost entirely included in BOEM's topographic features blocks (excluded under Alternative C) and subject to BOEM's hard bottom distancing mitigations (**Table 4.6-2**). Further, any activities occurring in the vicinity of the expanded FGBNMS may require consultation under the NMSA and could result in additional mitigations to those already applied by BOEM (**Table 4.6-2**). While the 20-m isobath exclusion may potentially reduce impacts specific to coastal and estuarine species by further distancing leasing to seaward of the 20-m isobath, the suite of IPFs would remain unchanged since activity levels also remain unchanged in all water-depth categories. The suite of IPFs and impact conclusions therefore remain unchanged from Alternatives B and C due to BOEM's mitigations and additional environmental consultations (e.g., NMSA).

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale in **Chapter 3**, the overall impacts from IPFs associated with Alternative D on fishes and invertebrates would be **moderate** without mitigating measures. When mitigating measures are used (**Table 4.6-2**), particularly BOEM's hard bottom distancing mitigations, impacts would be **minor**.

4.6.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which include ongoing OCS oil- and gas-related activities, could potentially affect fishes and invertebrates through discharges and wastes, bottom disturbance, light, noise, offshore habitat modification/space use, unintended releases into the environment, response activities, coastal land use/modification, and strikes and collisions, as detailed above in **Chapters 4.6.2.1** and **4.6.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.6.1** and in further detail in Chapter 4.3.4.1 of the GOM Oil and Gas SID. These ongoing impacts would be **negligible to moderate**. Future lease sales would add small but measurable impacts to the past and present impacts, and would similarly not be expected to result in any notable effects to overall population levels of fishes and invertebrates, including ESA-listed species. While it is expected that future lease sales could result in the installation of additional oil- and gas-related infrastructure over a broader geographic footprint on the OCS, it should be noted that wells and structures are being decommissioned and removed at a much higher rate than new installations over the past decade (**Chapter 3.2.5)**.The most notable impact to fishes and invertebrates from future oil and gas lease sales would likely stem from the installation of new infrastructure. This activity is expected to occur primarily in deepwater environments (depths >200 m [600 ft]) where the artificial reef effect is less pronounced due to greater water depth and, in the case of floating structures, the absence of significant structure throughout the water column to attract encrusting invertebrates and higher tropic-level species. The addition of large, standing or floating production structures may influence the migration of highly migratory pelagic species, such as tunas, which are known to be attracted to deepwater structures (Price et al. 2022) that likely provide sources of prey and refuge from predators (Gooding and Magnuson 1967). However, the extent of this attraction's impact on highly migratory species—whether beneficial or detrimental—remains unclear, as do the effects of decommissioning deepwater structures. The future decommissioning of deepwater standing structures, along with installations and decommissioning in shallow water, is expected to produce effects similar to those described in **Chapter 4.6.2.1**.

The existing regulatory requirements and protective measures described in **Table 4.6-2** would continue to apply to future OCS oil- and gas-related activities, helping to mitigate potential impacts to fishes and invertebrates. Considering the basin-wide distribution of most fishes and invertebrates, along with the mobility of many fishes and some invertebrates, the impacts from cumulative OCS oil and gas activities are expected to be similar to effects experienced from ongoing oil and gas activities, resulting in no notable effects on overall population levels of fishes and invertebrates, including ESA-listed species.

Non-OCS Oil- and Gas-Related Activities: Other IPFs or programmatic concerns which are reasonably foreseeable and could contribute to cumulative impacts to fishes and invertebrates include changes to environmental factors (e.g., warming waters, ocean acidification), construction, excessive nutrient loading in coastal areas, and recreational and commercial fishing. The potential impacts from these factors are discussed earlier and are expected to continue. Future non-OCS activities, particularly those related to discharges and wastes, bottom disturbances, noise pollution, coastal land use modifications, lighting, and alterations to offshore habitats, are likely to have notable effects on fish and invertebrate populations. Increased pollution from state oil and gas activities, recreational vessels, and commercial shipping could lead to deteriorating water quality manifested as acidification from CO_2 absorption, reduced salinity, and increased turbidity. All of which could affect habitat suitability for various fish and invertebrate species, including ESA-listed species. Additionally, cumulative bottom disturbances from activities like dredging and trawling may physically damage benthic habitats, causing mortality for non-target species and disrupting essential nursery grounds for fishes and invertebrates. Coastal land use and modifications from non-OCS activities, including infrastructure construction (e.g., for tourism, residential use, and military operations) and vessel traffic, may also result in alteration or loss of coastal habitats. Construction and wave-induced erosion from vessels can reduce the extent or quality of coastal habitat for fishes and invertebrates, and also increase turbidity and resulting sedimentation in coastal waterways. Moreover, lighting from coastal developments may affect marine organisms by changing community compositions, concentrating predators near illuminated waters, and modifying the behaviors of schooling and predatory species. Collectively, non-OCS activities are likely to have more pronounced cumulative effects on fish and invertebrate populations than the OCS Oil and Gas program.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion of activity when compared to the existing OCS Oil and Gas Program in the GOA (**Table 3.3-2**). BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as having a substantial effect on fishes and invertebrates, including ESA-listed species. The incremental contribution of impacts from one lease sale to those cumulative effects would not increase the level of cumulative impacts notably. Therefore, the *incremental contribution* of a proposed Gulf of America OCS oil and gas lease sale to cumulative impacts on fishes and invertebrates, including ESA-listed species, would be **negligible** to **minor** when properly regulated and mitigated (**Table 4.6-2**). Localized impacts to habitat extent and quality and the richness or abundance of species in an area may occur, but it is not anticipated that the overall fitness of fish

and invertebrate populations would be impacted. An OCS oil and gas lease sale would not be expected to result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by fishes and invertebrates in the area of analysis.

The cumulative effects on fishes and invertebrates, including ESA-listed species, would not differ among action alternatives. While the distribution of areas offered for leasing varies among alternatives, the total amount of activity would not, and the existing regulations and mitigations (**Table 4.6-2**) would decrease the likelihood of negative impacts on the sensitive habitats that fishes and invertebrates depend on. Cancellation of a proposed lease sale would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Chapters 4.6.2.1** through **4.6.2.4** above.

4.6.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on fishes and invertebrates, including ESA-listed species. The response of individuals, groups of conspecifics (members of the same species), and communities of fishes and invertebrates to anthropogenic sound are highly variable and species-specific; and little information is known for GOA-specific taxa, but inferences can be drawn from studies of similar taxa in other regions. Limited information is available regarding the long-term effects of PAH uptake (from oil exposure) on particular taxa, including chronic exposure for benthic species that burrow (e.g., tilefishes and flounders). However, since the *Deepwater Horizon* oil spill occurred in 2010, though there have been generally consistent findings of significant impacts from oil exposure to fishes and invertebrates at the individual or organismal level, fish and invertebrate populations have remained relatively stable despite the unparalleled perturbation (Patterson III et al. 2023; Swinea and Fodrie 2021). The effects of artificial light on fish behavior are difficult to isolate from other contributing factors in the offshore environment and may warrant further study, but the total volume of water illuminated by artificial lighting at night in the northern GOA is small compared to the available habitat, and no effects are expected to result in population level impacts at this time. Finally, the effects of ocean acidification to GOA fishes and invertebrates are complicated to determine and isolate from other sources, since the northern GOA receives large freshwater and nutrient influxes that enhance carbonate chemistry variability (Osborne et al. 2022). Although additional information on these IPFs may be relevant to the evaluation of impacts, BOEM has determined that such information is not essential to a reasoned choice among alternatives. BOEM used the best available science to determine the range of reasonably foreseeable impacts and applied accepted scientific methodologies to integrate existing information and extrapolate potential outcomes in completing this analysis and formulating the conclusions presented here.

4.7 BIRDS

Several bird groups use the U.S. Gulf of America environment, because the area serves multiple habitat and life staging purposes. Birds from six distinct taxonomic and ecological groups are represented within the GOA region, including passerines (i.e., Passeriformes), raptors (i.e., Falconiformes, Accipitriformes), seabirds (i.e., Charadriiformes, Pelecaniformes, Procellariiformes, Gaviiformes, Podicipediformes), waterfowl (i.e., Anseriformes, Gaviiformes), shorebirds (i.e., Charadriiformes), and wading or marsh birds (i.e., Ciconiiformes, Gruiformes).

Currently, nine federally listed protected bird species occur in the northern GOA: Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*); Mississippi sandhill crane (*Grus canadensis pulla*); piping plover (*Charadrius melodus*); rufa red knot (*Calidris canutus rufa*); roseate tern (*Sterna dougallii dougallii*); whooping crane (*Grus americana*); wood stork (*Mycteria americana*); eastern black rail (*Laterallus jamaicensis jamaicensis*); and black-capped petrel (*Pterodroma hasitata*). The FWS also lists species as candidate species when it has enough information on their biological status and threats to propose them as ESA-listed, but for which other higher priority listing activities preclude the development of a proposed listing regulation. These species do not receive statutory protection under the ESA. There are several candidate bird species identified preliminarily in the northern GOA (FWS 2023), including the golden-winged warbler (*Vermivora chrysoptera*) and the saltmarsh sparrow (*Ammospiza caudacuta*). For more information on these species, see Chapter 4.3.5.1 of the GOM Oil and Gas SID and Chapter 3.8 of BOEM's Biological Environmental Background Report (BOEM 2021a).

4.7.1 Affected Environment

Both resident and migratory bird species rely heavily on the marine (i.e., pelagic waters) and coastal habitats (i.e., beaches, mudflats, salt marshes, coastal wetlands, and embayments) found in the GOA region. Resident species are present throughout the year and do not migrate. Many passerines, or songbirds, breed and winter in the Gulf Coast States, and can be found in the coastal area and offshore during the trans-Gulf migration in the fall and spring. Other bird species, mainly seabirds, live primarily offshore, except during their breeding season. These pelagic birds, including shearwaters, storm-petrels, boobies, gannets, jaegers, gulls, and terns (Duncan and Havard 1980), rely specifically on offshore waters for food and rest at stop-over sites. The remaining species found in the GOA region are generally located within coastal and inshore habitats.

The GOA is an essential area for migratory birds, because three of the four major flyways (see Figure 4.3.5-1 of the GOM Oil and Gas SID) are within the GOA (the Central, Mississippi, and Atlantic Flyways). Areas of these flyways are used by hundreds of millions of migratory birds, many of whom converge within the diverse coastal and terrestrial habitats in the northern GOA, which is an important area for migratory species that travel in large numbers in the fall and spring (Russell 2005). Roughly 40 percent of all North American migrating waterfowl and shorebirds use the Mississippi Flyway (FWS 2013), which runs through the peninsula of southern Ontario to the mouth of the Mississippi River, followed by a comparably short distance across the GOA. During this highly

energetic period, stop-over sites are critical to migratory birds. These areas provide resting and feeding opportunities (Brown et al. 2001; McWilliams and Karasov 2005).

Species abundance in the GOA varies seasonally due to migration and breeding times. Abundance can also be driven by mesoscale features, such as the Mississippi River freshwater plume and dynamic oceanic fronts and eddies (Bost et al. 2009; Ribic et al. 1997; Scales et al. 2014) (see Chapter 3.0 of BOEM's Biological Environmental Background Report). Seabirds have a K-selected life history strategy, which means they are species that produce few offspring but invest high amounts of parental care. As such, seabird population levels can be impacted by natural climate cycles and anthropogenic activities (Paleczny 2012). For more information, including a detailed description of birds in the GOA, see Chapter 4.3.5.1 of the GOM Oil and Gas SID and Chapter 3.8 of BOEM's Biological Environmental Background Report (BOEM 2021a).

There is designated critical habitat for four of the protected species that occur in the GOA: Cape Sable seaside sparrow; Mississippi sandhill crane; piping plover; and whooping crane. A critical habitat rule has been proposed for the rufa red knot, including designations for coastal wintering areas of the Gulf Coast States (88 FR 22530).

Federally listed species are considered and analyzed in consultations with the FWS (see the 2018 FWS BiOp, as concurred to on March 28, 2025 and **Appendices G** and **H** of this Programmatic EIS). Seven of these species (i.e., the Mississippi sandhill crane, piping plover, rufa red knot, whooping crane, wood stork, eastern black rail, and the black-capped petrel) are found along the coast of Texas, Louisiana, Mississippi, and Alabama, where there are higher levels of OCS oil- and gas-related activities. Two of the listed species have ranges along the southwest coast of Florida (i.e., the Cape Sable seaside sparrow and roseate tern), where they are not likely to be impacted by BOEM-regulated activities.

4.7.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact birds. Non-OCS oil- and gas-related activities also have the potential to impact birds (see **Table 4.7-1**). These IPFs and their potential to affect birds are discussed below and in greater detail in Chapter 4.3.5.2 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.3.5.2 of the GOM Oil and Gas SID.

Table 4.7-1. Impact-Producing Factors with the Potential to Impact Birds.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Discharges and Wastes	Unintended Releases into the Environment	Discharges and Wastes
Noise	Response Activities	Noise
Coastal Land Use Modification	Strikes and Collisions	Coastal Land Use/Modification

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Lighting and Visual Impacts	-	Lighting and Visual Impacts
Offshore Habitat Modification/ Space Use	-	Offshore Habitat Modification/ Space Use
-	-	
-	-	
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

Several existing regulatory programs and protective measures reduce or minimize the environmental effects of these IPFs to birds in the GOA. Regulatory requirements enforced by BOEM, BSEE, and other agencies are outlined in **Table 4.7-2** and further described in the *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025a). Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with regulatory requirements; therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

Table 4.7-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
National Contingency Plan (Clean Water Act, Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan)	USEPA; USCG; State; Regional; and local government	Discharges and Wastes; Unintended Releases into the Environment	40 CFR 300. 311 Clean Water Act, Oil Pollution Act of 1990 (33 U.S.C. 2701), the National Response Framework, E.O.s 12580 and 12777, SO3299
Endangered Species Act	FWS	Any Impact-Producing Factor per new information through future consultations	2018 FWS BiOp, as amended March 28, 2025
Marine Debris Research, Prevention, and Reduction Act	USEPA, USCG	Unintended Releases into Environment	33 U.S.C. 1901, OCS Report BOEM 2025-040; NMFS 2025 BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
Coastal Zone Management Act (CZMA)	NOAA, States	Coastal Land Use/ Modification	16 U.S.C. 1251 and 15 CFR 930, OCS Report BOEM 2025-040 (BOEM 2025a)
CWA Section 404	USACE	Coastal Land Use/ Modification, Discharges and Wastes	33 U.S.C. 1251, OCS Report BOEM 2025-040 (BOEM 2025a)

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
CWA Section 402, the National Pollutant Discharge Elimination System (NPDES) for Regions 4 and 6	USEPA	Discharges and Wastes	**Chapter 3.4.2** of this Programmatic EIS and Chapters 2.2 and 5.11 of the GOM Oil and Gas SID
MARPOL Annex V Treaty	USCG	Discharges and Wastes	Chapter 2.9.1.7 of the GOM Oil and Gas SID
Marine Plastic Pollution Research and Control Act	USCG	Unintended Releases into the Environment	33 U.S.C. 1901, OCS Report BOEM 2025-040; NMFS 2025 BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
BSEE Pollution Prevention (30 CFR 250.300)	BSEE	Discharges and Wastes	30 CFR 250.300 (BSEE), Chapter 5.1.3 of the GOM Oil and Gas SID
Visual Flight Rules Near Noise-Sensitive Areas	FAA	Strikes and Collisions	FAA: AC No: 91-36D (Kaulia 2004)

[1] See Chapter 6 of the GOM Oil and Gas SID for conditions of approval commonly applied at the post-lease stage.

4.7.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Discharges and Wastes: Birds in the GOA can be exposed to operational discharges and wastes that include produced waters, drilling muds and cuttings, vessel discharges (including from vessels used in decommissioning activities), and routine air emissions. Oil sheens from produced waters may result in mortality if sheen contacts the birds' feathers, where it can compromise the structure, leading to starvation and hypothermia (Fraser et al. 2006; Wiese and Ryan 2003). (Fraser et al. 2006; Wiese and Ryan 2003). Discharges of drilling muds rapidly settle to the seafloor around the drill site, where there is potential to lead to temporary loss of benthic foraging habitat for deep-diving birds (Neff 2005). The release of routine OCS oil- and gas-related discharges and wastes are localized and temporary, and discharges are expected to disperse quickly. These routine OCS oil- and gas-related releases may result in small and temporary disturbances, which have the potential to affect individuals or small groups of birds, if present; however, population-level effects are not expected. Routine OCS oil- and gas-related discharges and wastes, including those from decommissioning activities, are regulated by BSEE, USEPA, and USCG, who protect against degradation of the marine environment. A description of these rules and regulations is provided in **Appendix B.2.2.4**. Lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with regulatory requirements that minimize or avoid

impacts to foraging habitat from discharges (e.g., ballast), trash, and other waste (e.g., NPDES, 30 CFR 250.300, and MARPOL 73/78; see **Table 4.7-2**). For more information on the impacts of OCS oil- and gas-related discharges and wastes to birds, see Chapter 4.3.5.2.2 of the GOM Oil and Gas SID and Chapter 4.8.2 of BOEM's Biological Environmental Background Report (BOEM 2021a).

Noise: Vessel and equipment noise make up most of the sounds produced by BOEM-regulated activities, including vessel (installation, support, and decommissioning) and aircraft traffic, surveys, drilling, trenching, production, and offshore and onshore construction. The severity of impact depends partly on the frequency range and sound intensity, as well as the hearing abilities of the species of interest. From these activities, anticipated impacts on birds exposed to only vessel and aircraft traffic sound sources could include localized disturbance, temporary displacement, and masking of bird vocalization and communication. Vessels and helicopters could cause disturbance to breeding birds and possibly decrease nesting success if the traffic occurs too close to a breeding colony. If disturbance were to occur, birds have shown the ability to return to pre-disturbance behavior within 5 minutes (Komenda-Zehnder et al. 2003). For more information on the impacts of OCS oil- and gas-related noise to birds, see Chapter 4.3.5.2.2 of the GOM Oil and Gas SID and Chapter 4.8.1 of BOEM's Biological Environmental Background Report (BOEM 2021a).

Coastal Land Use/Modification: Coastal land disturbance could temporarily or permanently reduce the availability of bird nesting and feeding habitats. As discussed in **Chapter 4.3**, new construction or expansion of onshore facilities, temporary or permanent roads, and pipeline landfalls can alter coastal and estuarine habitats. These activities could potentially impact bird species that rely on these habitats for nesting and feeding, leading to displacement. Construction-related disturbance could increase the temporary suspension of sediments in the coastal water column, temporally decreasing the local water quality. Decreased water quality and increased turbidity could compromise the quality of the prey and the birds' ability to locate prey within the construction area. Additionally, vessel traffic (including vessels from decommissioning activities) could contribute to shoreline erosion, leading to possible habitat degradation and localized, increased temporary turbidity. The removal of infrastructure can create disturbances similar to infrastructure installation; it can result in bottom disturbance creating turbidity in the water column, which may impact prey availability if the water conditions persist. The effects of these activities would be localized and temporary, and habitat loss is not expected. State and Federal permitting agencies discourage the placement and expansion of facilities in wetlands and mitigate impacts (e.g., the CWA, USACE's 404 permit, CZMA, and State permitting programs; **Table 4.7-2**), and lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with regulatory requirements that minimize or avoid impacts.

Lighting and Visual Impacts: Artificial lighting (e.g., structure lighting) is required on offshore oil and gas structures and other infrastructure for safety and operations which are not proposed for decommissioning. Potential effects of artificial lighting include species attraction, avoidance, changes in migration patterns, and/or changes in predator and/or prey interactions (Marangoni et al. 2022). Structures proposed for decommissioning would have very limited lighting and delayed decommissioning of these structures would provide no net positive or negative effect to

birds. Due to the distance from shore, artificial lighting on OCS platforms and infrastructure is expected to have no effect on any ESA-listed species whose habitat includes inland and nearshore coastal waters, beaches, barrier islands, and/or marsh. This includes species with inland and/or coastal migration routes (e.g., piping plovers, monarchs) (BOEM 2021a). As the FWS states, "The Service does not anticipate the proposed action will incidentally take any listed species under our jurisdiction" (https://www.boem.gov/regions/gulf-america-ocs-region/oil-and-gas-esa-consultations-and-protocols).

Attraction to artificial lighting could impose energetic costs to individual birds, as well as collision risk with structures, which could result in injury or mortality (Longcore and Rich 2004). Alternatively, artificial lighting can create foraging opportunities for birds. For example, gulls rest and forage at night on the sea surface under the structure lights, which are thought to attract their prey to the surface (Burke et al. 2012). Although there is evidence that some rufa red knots cross GOA open waters while migrating (Perkins 2023; Russell 2005), the response of rufa red knots to artificial lighting is not known (FWS 2014). Documented GOA crossing locations for the rufa red knot have minimal overlap with BOEM-regulated oil- and gas-related activity on the OCS (Perkins 2023; Russell 2005); therefore, it is anticipated that oil and gas structure lighting has no impact on the rufa red knot population.

The only ESA-listed species under FWS authority that would be expected to use the OCS and could be affected by OCS lighting and flaring is the black-capped petrel (88 FR 89611). Bright light sources are known to attract petrels, especially on nights with inclement weather (e.g., fog, rain). Inclement weather can obscure other light sources (e.g., stars, moon) which may hamper avian orientation and navigation. (Coleman et al. 2022; Poot et al. 2008; Russell 2005). Some have postulated that the loss of visual cues to the horizon may result in birds being reluctant to leave and to circulate within the cone of light surrounding structures (Russell 2005). Inexperienced black-capped petrel fledglings and juveniles are especially sensitive to artificial lighting, likely due their high dependence on visual cues for nocturnal navigation (88 FR 89611), but the closest known nesting area is in southern Haiti (Jodice et al. 2021), distant from BOEM and BSEE-regulated oil- and gas-related activity. Adult black-capped petrels do forage and migrate offshore and are known to occur on the OCS, feeding mostly at the surface at night (88 FR 89611). OCS lighting could result in petrel disorientation, collisions with wires and structures, and/or wasting of energy (e.g., circling a structure) (Simons et al. 2013; Van De Laar 2007). Alternatively, the presence of lighted structures could provide foraging opportunities with attraction of prey (Marangoni et al. 2022; Ronconi et al. 2015). Based on offshore observations, migrating or foraging adult petrels are most likely to occur in the eastern region of the GOA (east of approximately 88° west longitude), predominantly outside of the area of Bureau-regulated oil- and gas-related activity (Jodice et al. 2021). For example, none were observed on structures or flying above structures during a three-year BOEM observational study (Russell 2005).

Oil- and gas-related vessels, including decommissioning vessels, transiting onto and off the OCS create transient lighting within coastal habitat. Vessel lights are a source of artificial lighting above water and could also create a light field within the upper water column. Any effects to

ESA-listed species (e.g., disorientation, avoidance) would be localized and temporary within any one area. Oil- and gas-related vessels, including decommissioning vessels, are transiting into and out of established port areas using lighting similar in nature to other vessel types in the area (e.g., barges, fishing boats) and no impacts are expected.

Birds can be attracted to flares used on offshore structures (Montevecchi 2006; Poot et al. 2008; Ronconi et al. 2015; Russell 2005). Attraction has been documented during a nocturnal gas-flaring event that had an installed anti-collision lighting system (Day et al. 2005; Day et al. 2015). Attracted birds also displayed non-directional flight behaviors, suggesting that the birds were circling the gas flare. The response to the gas-flaring event varied among species, with long-tailed ducks being the most represented taxa among those attracted (Day et al. 2015).

There are several papers with conflicting accounts of the impacts of flaring in the OCS. Several early studies on the effects of gas flares on birds reported no mortality events or injury to birds (Hope Jones 1980; Sage 1979; Wallis 1981). Bourne (1979) estimated that annual mortality rates from interactions with gas flares are a few hundred birds per structure. However, one study suggests that incinerations from colliding with gas flares may be killing more birds than previously thought (Bjorge 1987). For more information on the impacts of OCS oil- and gas-related lighting to birds, see Chapter 4.8.7 of BOEM's Biological Environmental Background Report (BOEM 2021a).

Offshore Habitat Modification/Space Use: The placement of oil and gas structures and associated offshore equipment has the potential to affect birds in the GOA region. Offshore oil and gas structures create a structural presence in the GOA region that otherwise would not exist or serve as habitats for birds, resulting in potentially complex direct and indirect effects on birds. Infrastructure emplacement could cause temporary and long-term disturbance via avoidance or attraction (Baird 1990; Montevecchi 2006; Russell 2005; Tasker et al. 1986). Structures can serve as artificial reefs supporting biodiverse communities, including bird prey. Many species opportunistically use these spaces for roosting and resting sites (Burke et al. 2012). Delayed decommissioning of structures and wells, and pipeline decommissioning in-place, would provide no net positive or negative effect on birds, though could provide a beneficial localized foraging source for some birds. For more information on the impacts of OCS oil- and gas-related offshore habitat modification to birds, see Chapter 4.3.5.2.2 of the GOM Oil and Gas SID and Chapter 4.8.5 of BOEM's Biological Environmental Background Report (BOEM 2021a).

4.7.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Unintended Releases into the Environment: The effects of unintended releases (e.g., oil or chemicals) on birds depend on many variables, including spill location, spill size, spill composition,

weather events, oceanographic conditions, and time of year, as well as the behavior and physiology of the birds (Castege et al. 2007; Wiese and Jones 2001). Repeated exposure to spills could also be a factor in determining the level of impact on birds. Direct impacts to birds that encounter accidentally spilled oil could include tissue and organ damage from ingested or inhaled oil as well as interference with food detection, predator avoidance, homing of migratory species, disease resistance, growth rates, reproduction, and respiration. Birds could ingest and inhale spilled oil while feeding on oiled benthic, planktonic, or pelagic prey; grooming (i.e., preening) oiled plumage; or drinking hydrocarbons in water. The ingestion or inhalation to the extent of toxic oiling could cause bird mortality. Through the National Contingency Plan (40 CFR 300) and the Federal laws that underpin this regulation, there are mitigations and plans in place at the Federal, State, and local levels (e.g., from USCG, BSEE, States, NMFS, FWS, and NPS) that could decrease impacts to birds (ESA-listed or migratory) if present from oil spills (see **Table 4.7-2**). Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements.

Routine OCS oil- and gas-related activities, such as vessel operations (including decommissioning vessels) are required to be proactive against the loss of solid waste items by developing waste management plans, posting informational placards, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. However, it is still possible to have accidental release of trash and debris into the marine environment, which has documented impacts to birds. Birds could be impacted by plastic by mistakenly ingesting pieces when foraging or by trophic transfer (Carrillo et al. 2023; Grace et al. 2022; Moore 2008). Once ingested, these plastics are largely non-digestible and can cause blockages, internal damage, and a false sense of satiety (Grace et al. 2022; Wright et al. 2013). Additionally, chemicals can leach from plastics following ingestion, which creates an ecotoxicological concern (Tanaka et al. 2013; Tanaka et al. 2019). To date, there is a lack of data on distribution of plastic, accumulation in biota, and potential vulnerable species in the GOA region. Therefore, it is difficult to draw conclusions as to the extent of the problem and its impacts on bird populations. Mitigating measures can reduce the potential for trash and debris in the marine environment. The BSEE, USCG, and USEPA's regulations, and BOEM's guidance minimize unintended releases of trash and debris by oil and gas operators. The prohibition of discharging materials into the marine environment is outlined in the Marine Plastic Pollution Research and Control Act, MARPOL Annex V, and the Marine Debris Research, Prevention and Reduction Act (see **Table 4.7-2**). Lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with regulatory requirements. For more information on the impacts of OCS oil- and gas-related unintentional releases into the environment to birds, see Chapter 4.3.5.2.3 of the GOM Oil and Gas SID and Chapters 4.9.1.1 and 4.9.1.3 of BOEM's Biological Environmental Background Report (BOEM 2021a).

Response Activities: The effectiveness of the response, containment, and cleanup activities (offshore and shoreline) could influence the degree of impact that post-oil or chemical spills have on birds. Depending on the volume and spatial extent of a spill, the subsequent cleanup and response efforts in coastal habitats and beaches can be a large-scale activity. Oil-spill response and cleanup activities could affect birds' prey, their coastal habitats, and their reproductive abilities. Birds

may experience fewer foraging opportunities and lower quality food availability. Birds could also face habitat loss of foraging, nesting, breeding, wintering, and roosting grounds. Chemical dispersants have been shown to be toxic to birds and if used may lead to decreases in hatching success (Finch et al. 2012; Wooten et al. 2012). For more information on the impacts of OCS oil- and gas-related response activities to birds, see Chapter 4.3.5.2.3 of the GOM Oil and Gas SID and Chapter 4.9.1.2 of BOEM's Biological Environmental Background Report (BOEM 2021a).

Strikes and Collisions: Some birds follow ships as a foraging strategy, though this is more common with commercial and recreational fishing vessels. In the open ocean, vessel transits and operations for routine OCS oil- and gas-related activities, including decommissioning activities, can attract birds from long distances. Low-flying aircraft (e.g., helicopters) for OCS oil- and gas-related activities, including decommissioning activities, could disturb birds, including those resting or foraging on the water surface or those in flight. Birds can respond to flying aircraft by flushing into flight or rapidly changing their flight speed or direction. These behavioral responses to the aircraft could result in accidental strikes. However, the potential for bird collisions with aircraft decreases at speeds greater than 80 kn (93 mph) (Rotocraft Bird Strike Working Group 2019). Most helicopters fly at an average speed of 140 kn (161 mph). Additionally, the Federal Aviation Administration recommends that aircraft fly at least 610 m (2,000 ft) above the ground when passing over noise sensitive areas (i.e., national parks, national wildlife refuges, waterfowl protection areas, and wilderness areas), which decreases the chances of behavioral responses and subsequent collisions from the higher density of birds in those areas (Kaulia 2004); see **Table 4.7-2**). Lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with regulatory requirements. For more information on the impacts of OCS oil- and gas-related strikes and collisions to birds, see Chapter 4.3.5.2.3 of the GOM Oil and Gas SID and Chapter 4.9.1.4 of BOEM's Biological Environmental Background Report (BOEM 2021a).

4.7.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also could impact birds in the GOA region. These non-OCS oil- and gas-related activities are grouped into six IPF categories: discharges and wastes; noise; coastal land use/modification; lighting and visual impacts; offshore habitat modification/space use; and other IPFs (i.e., climate-related factors, anthropogenic activities, predation, and disease). The content under each IPF heading below summarizes the more relevant detailed discussion of how non-OCS oil- and gas-related activities could influence birds found in Chapter 4.3.5.1.2 of the GOM Oil and Gas SID.

Discharges and Wastes: The USEPA regulates certain discharges (e.g., bilge or ballast water from ships and industrial discharges into the coastal atmosphere). Agricultural nutrient and pesticide run-off also occur in the GOA. Pollutants are expected to be safely disposed of or diluted to below harmful levels to birds as water is not their preferred habitat. The discard of trash and debris from non-OCS oil- and gas-related sources (e.g., State oil- and gas-related activities, recreational fishing boats, and land-based sources) is prohibited. However, unknown quantities of plastics and other materials are discarded despite regulation and subsequently lost in the marine environment.

Nutrient contributions to the GOA via the Mississippi River watershed cause seasonal population explosions of phytoplankton, which decompose to create a hypoxic or anoxic “dead zone” over the continental shelf. Hypoxic zones can impact coastal waterbirds’ aquatic prey sources. However, no massive phytoplankton blooms have been reported to produce massive mortality to coastal and marine birds in the zone. Birds can move away from impacted areas to find sufficient food, and the effects from these blooms would be short term.

Noise: Noise has the potential to mask communication, displace birds from important breeding or foraging areas, disturb predator-prey interactions, and cause noise-induced threshold shifts (Crowell 2016). Birds are known to have a relatively restricted hearing range for airborne noise, with acute sensitivity occurring in the range of 1 to 5 kHz (Dooling and Popper 2007). Less is known about the auditory hearing range of birds underwater; however, some studies suggest their greatest hearing sensitivity underwater ranges from 1 to 3 kHz (Crowell et al. 2015; Hansen et al. 2017; McGrew 2019). Military activities, including training overflights, occur in designated areas offshore that also serve as seabird habitat. The U.S. Air Force and U.S. Navy conduct most military operations in the GOA in areas federally designated for training, research, testing, and evaluation activities. A study found that weapons testing noises had no significant effects on bald eagle activity or reproduction (Brown et al. 1999). Aircraft noise can also affect birds, but studies have shown that bird exposure to frequent, low-level military jet aircraft and simulated mid- to high-altitude sonic booms resulted in some short-term behavioral responses with little effect on reproductive success (Ellis et al. 1991).

Coastal Land Use/Modification: Ongoing and projected wetland loss results in the loss of essential habitats for coastal and marine birds. Wetlands serve as vital breeding and nesting grounds for adult birds and rearing grounds for juveniles. These habitats provide drinking water and feeding, resting, shelter, and community opportunities for several species of birds. As discussed in Chapter 4.3.1.1 of the GOM Oil and Gas SID, historical wetland loss due to Mississippi River hydromodification would be improved by wetland creation from Atchafalaya River sediments and coastal restoration and hurricane protection programs. Habitat (e.g., wetland) loss, alteration, and fragmentation associated with building, factory, and road construction are mitigated by USACE and State wetland permitting regulations to keep from harming sensitive bird habitat. Non-consumptive recreation that could impact birds includes beach use during bird-watching activities, riding in all-terrain vehicles, and walking and jogging with pets. All forms of beach use may cause birds to become stressed and fly away, with varying degrees of response for individual species.

Lighting and Visual Impacts: Lighting could impact birds and, in the GOA region, State oil and gas structures provide sources of artificial lighting in State waters. Attraction to artificial lighting could impose energetic costs to individual birds as well as collision risk with the structures, which could result in injury or mortality. Artificial lighting at night can disorient birds, especially offshore migrators. Poor weather conditions (e.g., fog, precipitation, and low cloud cover) could further increase birds’ attraction to lighting, especially at dusk or during a full moon (Miles et al. 2010; Rodríguez and Rodríguez 2009).

Offshore Habitat Modification/Space Use: Non-consumptive recreation that could impact birds includes recreational boating, which may cause birds to become stressed and fly away, with varying degrees of response for different species. Ongoing State oil- and gas-related activities include the presence of structures in waters that are traveled by migrants in the spring and fall, which could lead to collisions and nocturnal circulations. Additionally, reasonably foreseeable renewable energy activities in the OCS of the GOA include those associated with site characterization and site assessment. These specific activities are not likely to cause effects to birds per a separate programmatic FWS consultation (see the 2018 FWS BiOp, as amended March 28, 2025 and **Appendices G and H** of this Programmatic EIS).

Strikes and Collisions: Potential impacts of strikes and collisions from vessels and aircraft from non-OCS oil- and gas-related activities (e.g., commercial and fishing vessel traffic) are similar to those described above for OCS oil- and gas-related activity and could include disturbance, flushing, erratic flight, and accidental strikes.

Other Environmental Factors: Other IPFs or programmatic concerns which are reasonably foreseeable and could contribute to cumulative impacts to birds, include climate-related factors, predation, and disease. The potential impacts from these factors are expected to continue.

Though climate-related impacts on birds are difficult to predict, they may influence birds' ecology through changes in habitat ranges (Jodice et al. 2021; Mustin et al. 2007) increased risk of predation and competition, exposure to different prey and parasites, shifts in seasonal events (e.g., breeding and migration) forcing life cycles out of synchrony with prey sources, changes to local food webs, and/or habitat alterations (Butler and Taylor 2005; Liebezeit et al. 2012; Tillmann and Siemann 2011; Wauchope et al. 2017; Wormworth and Mallon 2006). Climate may impact a wide range of aspects of a bird's ecology, and the question remains as to whether specific species can shift to new habitat ranges (Mustin et al. 2007) as range contractions are expected to occur more frequently than range expansions. Ocean acidification can also alter food web dynamics. Ocean acidification alters pH levels, which can affect sensitive planktonic species at the organismal level up to a population-level response due to food web dynamic changes, which could lead to impacts on marine and coastal bird prey. Biodiversity is vital to the ecosystems that support all bird life (McDaniel and Borton 2002). The frequency and intensity of hurricanes may increase, which could possibly worsen damage to important breeding and wintering habitats in the northern GOA (NOAA 2023b).

Birds are vulnerable to predation from cats, which typically occurs on their nesting grounds. There are currently no regional estimates for annual mortality rates from predation of domestic cats. National estimated annual mortality from predation by free-ranging domestic cats is 1.3-4.0 billion birds per year (Loss et al. 2013).

Emerging infectious diseases are a threat to native bird species and a substantial cause of nearshore and coastal bird mortality (Newman et al. 2007). Diseases, such as the West Nile virus, can have widespread and long-term effects on landbird populations (George et al. 2015; LaDeau et

al. 2007). Majority of the studies are continental level estimates; however, estimates can be qualitatively extrapolated to other species as well as the northern GOA, where West Nile virus and potentially other infectious diseases would be expected to have severe impacts on avian populations.

4.7.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct or indirect impacts to birds would occur as a result of the proposed action (i.e., a single proposed OCS oil and gas lease sale) and the impacts would be **none**. However, there are ongoing OCS oil- and gas-related activities (shown in **Table 3.3-2**) associated with previous lease sales, and non-OCS oil- and gas-related would continue to potentially affect birds under all of the alternatives, including the No Action.

Ongoing OCS Oil and Gas Activities Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) could still have potential direct and/or indirect impacts to birds. The potential impacts are summarized above in **Chapter 4.7.2.2** and in greater detail in Chapter 4.4.3 of the GOM Oil and Gas SID.

The potential for ongoing OCS oil and gas activity (**Table 4.7-3**) impacts on birds is highly variable and influenced by a wide array of factors (e.g., biological and oceanographic), depending on the specific circumstances of a given situation. Birds directly exposed to operational discharges and wastes could experience compromised health from oil sheens in the discharge. However, most discharges and wastes dissipate quickly and result in small and temporary disturbances, which have the potential to affect individuals, if present; however, population-level effects are not expected. In addition, discharges must be in accordance with regulatory requirements (see **Table 4.7-2**) which minimize or avoid impacts to birds. Vessel and helicopter noise could cause disturbance to breeding birds and possibly decrease nesting success if the traffic occurs too close to a breeding colony, however, the severity of impact would depend on the frequency range and sound intensity within the hearing ability of the bird. Coastal land disturbance could reduce nesting and feeding habitats and artificial lighting could cause species attraction, avoidance, changes in migration patterns, and/or changes in predator and/or prey interactions. The effects of unintended releases (e.g., oil or chemicals) on birds depend on many variables, including spill location, spill size, spill composition, weather events, oceanographic conditions, and time of year, as well as the behavior and physiology of the birds (Castege et al. 2007; Wiese and Jones 2001). Repeated exposure to spills could also be a factor in determining the level of impact on birds. Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.7.1** and in further detail in Chapter 4.3.5.1 of the GOM Oil and Gas SID. Considering the estimates of ongoing OCS oil and gas activities (**Table 3.3-2**) and wide-ranging movements and distributions of birds in the OCS far from shore, impacts from ongoing

OCS oil and gas activities would range from **negligible** to **moderate**, with no substantial effects to overall population levels.

***Non-OCS Oil- and Gas-Related Activities*:** Discharges and wastes, noise, light and visual impacts, offshore habitat modification/space use, coastal land use modification, and strikes and collisions associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect birds under the No Action alternative, as described above. Coastal construction or alteration could result in wetland loss that could reduce habitat for coastal and marine birds. Land runoff as well as plastic wastes can degrade bird foraging areas and habitat. Strikes and collisions with commercial and recreational vessels or aircraft could result in injury or death and noise from aircraft can disturb nesting birds. Although collisions between birds and aircraft can occur at any time, the majority of collisions mainly occur at low altitudes during take-off and landing onshore. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. Other environmental factors including ocean acidification, changes to habitat and ranges, predation and competition, parasites, seasonal patterns, predation from cats, and emerging infectious diseases would continue to effect birds. While some effects are anticipated, the precise impacts of climate-related factors on the GOA region cannot currently be predicted or parsed out from every global activity. Ongoing and projected wetland loss results in the loss of essential habitats for coastal and marine birds. Wetlands serve as vital breeding and nesting grounds for adult birds and rearing grounds for juveniles. These habitats provide drinking water and feeding, resting, shelter, and community opportunities for several species of birds. Wetland loss is expected to continue and would be expected to persist into the future, even if the No Action alternative were selected.

IPFs from non-OCS oil- and gas-related activities, in addition to environmental factors, would occur on a much broader scale and from a greater range of activities compared to those from OCS oil- and gas-related activities. These IPFs and environmental factors have the potential to impact bird health and populations, as discussed above. Most notably, coastal land use/modification, discharges and wastes, strikes and collisions, and other environmental factors from non-OCS oil- and gas-related sources would be much more influential on birds than OCS oil and gas development as a result of OCS oil- and gas-related activities, and would still occur without the presence of ongoing OCS oil- and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing, which could change the spatial distribution of the scenario activities, but not their overall activity levels. Therefore, this alternative analysis focuses on the potential environmental impacts of a proposed regionwide lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraint under Alternatives C and D (**Table 4.7-3**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.7-3. Impact Determinations for Routine and Accidental Impacts to Birds from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Discharges and Wastes	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Noise	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Coastal Land Use/ Modification	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Lighting and Visual Impacts	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Offshore Habitat Modification/ Space Use	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Unintended Releases into the Environment (marine debris)	N/A	**Negligible**	**Negligible**	**Negligible**
Unintended Releases into the Environment (oil spills)	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is none. Considering the estimates of ongoing OCS oil and gas activities (Table 3.3-2) and wide-ranging movements and distributions of birds in the OCS far from shore, impacts from ongoing OCS oil and gas activities would range from negligible to moderate, with no substantial effects to overall population levels.

[1] No programmatic protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for birds would be considered at the site-specific stage.

Alternative B – Regionwide OCS Lease Sale

Alternative B considers a proposed regionwide OCS lease sale area. Within this geographic area, impacts may affect a variety of birds, including ESA-listed species, such as the Mississippi sandhill crane, piping plover, rufa red knot, whooping crane, wood stork, eastern black rail, and the black-capped petrel. While estuarine and coastal areas are not included within the proposed lease sale area, impacts from the proposed action may extend to coastal areas due to activities such as vessel transit and onshore support structure emplacement. These activities are unlikely to impact

critical habitat locations because the use of existing ports, structures, or both would largely confine anticipated impacts to previously disturbed areas.

Discharges and Wastes: Discharges and wastes can occur from any routine OCS oil- and gas-related activity (including decommissioning activity) except for helicopter operations (**Table 3.3-4**). Within this geographic area, impacts from discharges and wastes could affect bird foraging habitat and feather structure. Given the level of these installation and decommissioning activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts are expected to be **negligible** to **minor** because discharges and wastes are anticipated to be highly localized and dissipate quickly. In addition, lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with regulatory requirements that minimize or avoid impacts to foraging habitat from discharges (e.g., ballast), trash, and other waste (e.g., NPDES, 30 CFR § 250.300, and MARPOL 73/78; see **Table 4.7-2**). Considering the distribution of bird populations throughout the GOA, any effects are not expected to reach a level that would have population-level effects to bird communities or effects on bird habitat function or use.

Noise: Within this geographic area, impacts from noise could affect birds by causing localized disturbances, temporary displacement, and masking of vocalizations and communication. Effects from anthropogenic-derived noise would be species- and life stage-specific and depend on exposure levels. Given the level of routine OCS oil- and gas-related activities, including decommissioning activities, described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale that could lead to elevated noise levels (e.g., G&G surveys, structure installation, pipeline installation and decommissioning, structure removal with explosives, and vessel trips and helicopter operations [including those for decommissioning]), these impacts are expected to be **negligible** to **minor** because noise would be localized for a short amount of time, potentially resulting in short-term impacts to individuals or small groups of birds.

Coastal Land Use/Modification: Within this geographic area, impacts from coastal land use/modification could affect bird species that rely on these habitats for nesting and feeding, leading to displacement. The impacts are expected to be **negligible** to **minor**, as onshore industrial infrastructure is already largely in place (including support and helicopter bases) and any new onshore construction or decommissioning would likely occur in already industrialized locations. However, the relative amount of added vessel traffic (service, installation, and decommissioning) (described in **Table 3.3-2** and **Appendix C**) could result in adverse localized impacts to bird nesting and foraging habitat quality and extent from erosion if it were to occur in an area of concern. In addition, State and Federal permitting agencies discourage the placement and expansion of facilities in wetlands and mitigate impacts (e.g., CWA, USACE's 404 permit, CZMA, and State permitting programs; see **Table 4.7-2**), and lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with regulatory requirements that minimize or avoid impacts.

Lighting and Visual Impacts: Within this geographic area, impacts from structure and vessel (including decommissioning vessels) lighting could affect birds by disorienting them on their migration pathways and increasing collision risk. Given the level of routine OCS oil- and gas-related installation and decommissioning activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale that could lead to artificial lighting (e.g., structures; vessels), any impacts are expected to be **negligible** to **minor** because any effects (e.g., disorientation, displacement, and/or potential collisions) are expected to vary by location and occur within areas already used by the OCS oil and gas industry. In addition, the projected number of installed production structures is less than the number that is projected to be removed (**Table 3.3-2**), which is expected to result in a net reduction in the overall amount of artificial lighting on the OCS related to oil and gas activities. Any effects are not anticipated to reach a level that would have population-level effects to birds. As the FWS states in a letter dated March 28, 2025, "Regarding new listings, critical habitats, and proposed rules, the Service concurs with the Bureaus' determinations that the routine activities associated with the proposed action in the 2018 BiOp are not likely to adversely affect the black-capped petrel and not likely to destroy or adversely modify the proposed critical habitats for the rufa red knot and the green sea turtle" (https://www.boem.gov/regions/gulf-america-ocs-region/oil-and-gas-esa-consultations-and-protocols).

Offshore Habitat Modification/Space Use: Within this geographic area, impacts from offshore habitat modification/space use could affect birds within proximity to the emplaced structures on the OCS (e.g., platforms). Offshore habitat modification/space use has the potential to create habitat that would otherwise not exist and alter normal migration patterns and predator/prey interactions. The impacts from offshore habitat modification/space use are **negligible** to **minor** because any effects are expected to vary by location and occur within areas already used by the OCS oil and gas industry. Further, it is projected that the number of installed production structures would be less than the number that are projected to be removed (**Table 3.3-2**). Any effects are not anticipated to reach a level that would have population-level effects to bird communities or significantly affect bird habitat function or use.

Unintended Releases into the Environment: Within this geographic area, impacts from unintended releases into the environment could affect birds through exposure to oil spills, causing injury, reduced mobility, increased susceptibility to predation, decreased feeding ability, fitness consequences, increased vulnerability to disease, decreased health, decreased reproductive fitness, and/or death. Non-oil spills (e.g., chemical spills, synthetic-based fluid spills) would likely be relatively infrequent based on the occurrences of these accidental spills calculated over the past decade (**Tables B.3-3** and **B.3-4**). Based on the number and volume of accidental oil spills estimated for a single OCS oil and gas lease sale (Ji and Schiff 2023), negative impacts to birds could range from undetectable for small spills to notable, direct impacts for larger spills. Therefore, the impacts from unintended releases are **negligible** to **moderate** depending on the type, frequency, duration, and geographic extent of the release. Through the National Contingency Plan (40 CFR 300) and the Federal laws that underpin this regulation, there are mitigations and plans in place at the Federal, State, and local levels (e.g., from USCG, BSEE, States, NMFS, FWS, and NPS) that decrease impacts to birds from oil spills (**Table 4.7-2**). Lessees are required to perform

OCS oil- and gas-related activities in accordance with regulatory requirements. Impacts from trash and marine debris tied to a single OCS oil and gas lease sale (including installation and decommissioning operations) would be largely undetectable and **negligible**, especially given the regulations in place to reduce and eliminate marine trash and debris, and lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with regulatory requirements (**Table 4.7-2**).

Response Activities: Within this geographic area, impacts from response activities could affect birds in the vicinity of spill response activities. These response activities (e.g., increased vessel traffic, use of dispersants, and remediation activities) could result in impacts such as decreased reproductive success, fitness, and displacement from nesting or foregoing locations. Given that oil spills and subsequent response activities would be temporary and/or localized to the habitat and species common to the area, and the spill response plans and safety protocols (e.g., National Contingency Plans) in which lessees are required to perform OCS oil- and gas-related activities in accordance (**Table 4.7-2**), any impacts are expected to be **negligible** to **minor** depending on the type of response, and the frequency, duration, and geographic extent of the event.

Strikes and Collisions: Within this geographic area, impacts from strikes and collisions could affect birds attracted to vessels (including decommissioning vessels) to forage for prey. Additionally, low-flying aircraft (e.g., helicopters, including those used in decommissioning) could disturb birds and result in accidental strikes, but avoidance aerial strategies are likely in-place to avoid such interactions. The potential for bird collisions with aircraft decreases at speeds greater than 80 kn (93 mph) (Efroymson et al. 2000; Rotocraft Bird Strike Working Group 2019), and most helicopters fly at an average speed of 140 kn (161 mph). Some impacts to birds may be reduced through the FAA recommendations for aircraft height above sensitive areas (Kaulia 2004) (see **Table 4.7-2**). Lessees are required to perform any tactical measures in accordance with other regulatory requirements when conducting OCS oil- and gas-related activities, including decommissioning activities. Therefore, the reasonably foreseeable impacts to birds from strikes and collisions are expected to be **negligible** to **minor**, especially given the flight speed recommendations suggested by the FAA.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative B on birds are **negligible** to **moderate**, potentially due to large spills. There are no existing BOEM mitigations for birds that would potentially diminish these impacts; however, as discussed above, lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with regulatory requirements, and those requirements, which can reduce impacts to birds, are considered in this impact analysis.

Alternative C –Targeted OCS Lease Sale Area

Alternative C represents a geographical constraint on available acreage for leasing, which would cause a change in the spatial distribution of activities compared to Alternative B, but not their

overall activity levels. Most impacts to birds from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternative C because, as discussed under Alternative B, areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding the activity. Routine impacts would be limited to the areas leased under this alternative. The impacts from accidental events would be the same as described for Alternative B, including vessel and aircraft strikes though unlikely, which could occur in excluded areas because vessels and aircraft could still transit the excluded areas. This potential spatial redistribution of activity does not affect impact levels to birds because of their abundance and basin-wide distribution across the northern GOA. The areas that are part of the geographical constraint (i.e., approximately 28.7 million acres removed from potential leasing) do not contain unique bird habitats or communities that differ from the remaining areas, leaving impact determinations unchanged for Alternative C. In addition, the IPFs from routine activities are not changed from Alternative B.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternatives C on birds would be **negligible** to **moderate**, potentially due to large spills in leased areas given the distribution of birds across the entire northern GOA. Any effects are expected to be localized and are not anticipated to reach a level that would have population-level effects to birds or detectable effects on GOA region bird habitat function or use. In addition, lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements (**Table 4.7-2**), which can help reduce impacts to birds.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D represents a geographical constraint on available acreage for leasing, which would cause a change in the spatial distribution of activities compared to Alternative B or C, but not their overall activity levels. Most impacts to birds from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternative D because, as discussed under Alternative B, areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding the activity. Routine impacts would be limited to the areas leased under this alternative. The impacts from accidental events would be the same as described for Alternative B, including vessel and aircraft strikes though unlikely, which could occur in excluded areas because vessels and aircraft could still transit the excluded areas. This potential spatial redistribution of activity does not affect impact levels to birds because of their wide distribution across the northern GOA. The areas that are part of the geographical constraint do not contain unique birds that differ from the remaining areas, leaving impact determinations unchanged for Alternative D. In addition, the IPFs from routine activities are unchanged from Alternative B.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative D to birds would be **negligible** to **moderate**, potentially due to large spills in leased areas given the distribution of birds across the entire northern GOA. Any effects are

expected to be localized and are not anticipated to reach a level that would have population-level effects to birds or detectable effects on GOA region bird habitat function or use. In addition, lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements (**Table 4.7-2**), which can help reduce impacts to birds.

4.7.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect birds through discharges and wastes, light and visual impacts, noise, offshore habitat modification/space use, coastal land use modification, unintended releases into the environment, response activities, and strikes and collisions as described above in **Chapters 4.7.2.1** and **4.7.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.7.1** and in further detail in Chapter 4.3.5.1 of the GOM Oil and Gas SID. These ongoing impacts would be **negligible** to **moderate**. Future lease sales would add small yet undetectable impacts to the past and present impacts. The potential for future OCS oil and gas activity (**Table 4.7-3**) impacts on birds is highly variable and influenced by a wide array of factors (e.g., biological and oceanographic), depending on the specific circumstances of a given situation. Also, OCS oil- and gas-related operations rarely occur in dense aggregations, especially with respect to drilling operations, and most birds would be expected to move in and out of previously leased blocks and areas of ongoing oil and gas activity relatively quickly for prey availability. Birds throughout the GOA region have wide-ranging movements, behaviors, and distributions. Regulatory requirements and protective measures (**Table 4.7-2**) currently reduce potential impacts to birds and are expected to be applied in the future. Therefore, impacts from cumulative OCS oil- and gas-related activities are expected to be similar to effects experienced from ongoing oil- and gas-related activities, with no notable effects to overall population levels. However, wells and structures are being decommissioned and removed at much higher rates than installations over the past decade (see **Chapter 3.2.5**), a trend expected to continue for the foreseeable future. While future lease sales may extend impacts, the types of impacts would remain similar though future OCS oil- and gas-related activities might expand the geographic footprint of affected areas as new lease blocks are developed. As production in some areas ends and facilities are decommissioned, potential impacts would cease at those locations, and new lease sales would shift operational activities to different areas. The impacts from these activities would extend several decades into the future based on the project activity scenarios outlined in **Table 3.3-2**, though the precise impacts at any specific location would vary and depend on a wide array of factors.

Non-OCS Oil- and Gas-Related Activities: Cumulative non-OCS oil- and gas-related activities could potentially affect birds through discharges and wastes, noise, light and visual impacts, offshore habitat modification/space use, coastal land use modification, and strikes and collisions, as described above. Coastal construction, land use, and alteration along with runoff and plastic pollution could continue into the future and result in wetland loss and habitat degradation which could impact bird's natural cycles of breeding and feeding. Disturbance by aircraft could still continue, as well as the potential for strikes with aircraft and to a lesser degree with vessels on the water. Climate-related factors can influence or act synergistically with other IPFs on birds, depending on many factors. Climate related wetland loss is also expected to continue into the future, potentially impacting bird habitat. Potential cumulative impacts would be highly variable and depend on many natural and anthropogenic factors. Further, birds in the Gulf of America OCS have wide-ranging movements, behavior, and distribution. Overall, non-OCS oil- and gas-related activities are expected to impact birds more than OCS oil- and gas-related activities cumulatively when considering the broader geographic and temporal scope, and higher quantity of non-OCS oil- and gas-related activities compared to the much smaller scale of OCS oil- and gas-related activities in the GOA.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of the alternative, would represent only a small portion of activity (0.3 - 1.8%) when compared to the existing OCS Oil and Gas Program in the GOA (**Table 3.3-2**). Considering the wide-ranging movements, behaviors, and distributions of birds in the GOA, in addition to applicable regulatory requirements and protective measures (**Table 4.7-2**), BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as not having a substantial effect on birds. The incremental contribution of impacts from one lease sale would not result in a notable increase in the magnitude of cumulative impacts overall. Therefore, the *incremental contribution* of a proposed Gulf of America OCS oil and gas lease sale to cumulative impacts on birds, including protected birds, would be **negligible** when properly regulated. Based on the analysis above, an OCS oil and gas lease sale would not be expected to result in, or have a notable or measurable contribution to, any new or ongoing significant cumulative impacts not already being experienced by birds in the area of analysis.

The incremental contribution would not differ between action alternatives when considering the wide range of bird movements, behaviors, and distributions in the GOA. The potential spatial redistribution of activity between alternatives does not affect impact levels to birds because of their wide distribution across the northern GOA and the areas that are part of the geographical constraint for each alternative do not contain unique birds that differ from the remaining areas. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Chapters 4.7.2.1** through **4.7.2.4** above. However, it should be noted that some activities, such as oil and gas extraction, may cease following decommissioning of facilities, potentially reducing impacts over time.

4.7.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on birds or ESA-listed birds. Few studies have evaluated the impacts of artificial lighting along the coast on birds. Climate-related factors and ocean acidification are also expected to impact marine and coastal birds through habitat and food web alterations; however, the extent of these impacts is not known. Additionally, the distribution and impacts of marine debris produced from land versus offshore on marine birds is largely understudied in the GOA region. BOEM has used the best available scientific information to date and reasonably accepted scientific methodologies to extrapolate from existing information. Therefore, the incomplete or unavailable information, while relevant, is not necessary to make a reasoned choice among alternatives. Further, this information would not likely change the impact conclusions reached in this analysis.

4.8 MARINE MAMMALS

The GOA's marine mammals include members of the taxonomic order Cetacea, including suborders Mysticeti (i.e., baleen whales) and Odontoceti (i.e., toothed whales), as well as the order Sirenia (i.e., manatee). Twenty-one species of cetaceans and one species of Sirenia regularly occur in the GOA and are identified in the NMFS Stock Assessment Reports (Hayes et al. 2024). Dolphins in Barataria Basin in Louisiana were confirmed to be genetically differentiated from those in adjacent coastal waters (Speakman et al. 2022). Further, genetically distinct stocks of bottlenose dolphins were identified along the Texas coast, with a high degree of genetic differentiation among adjacent stocks (Garrison et al. 2024a). The sperm whale and the Rice’s whale (formerly the GOM Bryde’s whale) regularly occur in the GOA and are listed as endangered under the ESA. The West Indian manatee, in which the Florida manatee is a subspecies, is listed as threatened under the ESA and has designated critical habitat in Florida (41 FR 41914); the Florida manatee is currently proposed to be listed as threatened and the Antillean manatee as endangered, which would replace the current threatened species listing of the West Indian manatee (90 FR 3131). On September 24, 2024, FWS proposed critical habitat revisions for the Florida manatee (89 FR 78134). The Florida manatee has been documented all along the Gulf Coast in nearshore waters, typically less than 4 m (13 ft) deep and within 1,000 m (328 ft) of the shore (Slone et al. 2022). The Marine Mammal Protection Act (MMPA) protects all marine mammals, regardless of ESA status. NMFS is charged with protecting all cetaceans, while manatees are under the jurisdiction of the FWS.

4.8.1 Affected Environment

Most marine mammal distributions vary widely across the northern GOA with little known about each species' breeding and calving grounds, as well as any general patterns of Gulf-wide movement. Several species (e.g., Rice's whale, sperm whale, and bottlenose dolphin) have presumed year-round resident populations in the GOA (Harrison et al. 2023; Hayes et al. 2024). The distribution and abundance of cetaceans within the northern GOA is strongly influenced by various mesoscale oceanographic circulation patterns and other factors influencing feeding behaviors. Little is known generally about other factors that may influence marine mammal distribution in the northern

GOA. Multiple distinct hotspots of cetacean strandings in the north-central GOA (e.g., Alabama) have been identified, and bottlenose dolphins are the most reported (Russell et al. 2022). These hotspots may be areas of increased documented strandings due to bathymetry, geography, human population density, or sources of mortality, such as increased fisheries presence.

An evolutionarily divergent lineage of baleen whale (i.e., Rice's whale) was identified based on genetic data (86 FR 47022 ; Rosel et al. 2021). The majority of Rice's whale detections are limited to the northeastern GOA along the continental shelf between roughly 100- and 400-m (328- and 1,312-ft) depth (Garrison et al. 2024b; NOAA Fisheries 2025). However, as NMFS pointed out in their comment letter "Commercial Leasing Wind Power Development on the Outer Continental Shelf of the Gulf of Mexico" on the draft environmental assessment for *Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Outer Continental Shelf of the Gulf of Mexico* (BOEM 2023c) and updated in the 2025 NMFS BiOp (NMFS 2025b), Rice's whales have been observed in the central and western GOA The NMFS 2025 BiOp represents NMFS's most recent assessment of the Rice's whale range and NMFS's current assessment of potential impacts to the species and recommendations. Accordingly, the NMFS 2025 BiOp supersedes these NMFS comments from 2022 and all other preceding assessments and recommendations. There have been acoustic detections of Rice's whale calls in the northwestern and northcentral GOA with no observed seasonality (Soldevilla et al. 2022; Soldevilla et al. 2024). There may be fewer or more sporadically spaced Rice's whales in the northwestern GOA compared to the northeastern GOA (Soldevilla et al. 2022), though regular occurrence of Rice's whale calls were detected near two northwestern GOA sites (Soldevilla et al. 2024). During vessel surveys conducted from 2003 to 2019, Rice's whales were observed primarily in the northeastern GOA near the 220-m (722-ft) isobath (Rappucci et al. 2023). During 2017 and 2018 surveys, sperm whale sightings contrasted and occurred primarily in the central and western northern GOA and were less frequent in the northeastern Gulf (Rappucci et al. 2023). Rice's whales have also been sporadically observed in the western GOA. For example, one confirmed Rice's whale was observed in the northwestern GOA near the shelf break off the coast of Texas during a summer 2017 survey (Rappucci et al. 2023). Also, two Rice's whales were observed in the western GOA, 55 nautical miles off the coast of Corpus Christi, Texas, during an aerial survey in April 2024 (NOAA Fisheries 2024). A habitat suitability model developed by Farmer et al. (2022) and a density surface model developed by (Garrison et al. 2024b) indicated suitable Rice's whale habitat along the GOA continental shelf break. Still today, predicted densities and occurrence of Rice's whales remain highest in their northeastern GOA habitat (Farmer et al. 2022; Garrison et al. 2024b). More information on the Rice's whale range can be found in Chapter 6.2.3 of the 2025 NMFS BiOp (NMFS 2025b), which contains NMFS' most recent analysis and was used by BOEM for its analyses in this Programmatic EIS. Rice's whales are likely selective predators, mostly foraging on high-energy content prey, particularly *Ariomma bondi*, a schooling fish (Kiszka et al. 2023). Rice's whales appear to forage during the day near the seafloor (150- to 250-m [492- to 820-ft] depth) on the upper continental slope of their northeastern GOA habitat where *A. bondi* also appears to primarily occur. Kok et al. (2023) found that two suction-tagged Rice's whales mainly engaged in lunge-feeding near the seafloor, and partially in the water column and at the sea surface. Kok et al. (2023) also found that bottom foraging occurred primarily during the day with prolonged surface resting at night. Rice's whale critical habitat is currently proposed by NMFS (88 FR 47453) in

the northern GOA from the 100-m (328-ft) to the 400-m (1,312-ft) isobath (88 FR 47453). On October 27, 2023, NOAA Fisheries denied a petition to establish vessel-related mitigating measures aimed at protecting Rice's whales in the GOA, citing the need to conduct much-needed research to inform any future regulatory decisions and to prioritize developing a recovery plan for the species, consistent with Section 4(f) of the ESA (NMFS 2023a).

More information on the general descriptions of marine mammals can be found in Chapter 6 of the 2025 NMFS BiOp (NMFS 2025a); Chapter 3.7 of BOEM's Biological Environmental Background Report (BOEM 2021a); and Chapter 4.3.6.1 of the GOM Oil and Gas SID.

4.8.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact marine mammals. Non-OCS oil- and gas-related activities also have the potential to impact marine mammals (**Table 4.8-1**). These IPFs and their potential to affect marine mammals are discussed below and in greater detail in Chapter 4.3.6.2 of the GOM Oil and Gas SID. Offshore habitat modification/space use and bottom disturbance were initially scoped out in the GOM Oil and Gas SID but have since been determined to potentially impact marine mammals and are included in this analysis. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can be found in Chapter 4.3.6.2 of the GOM Oil and Gas SID.

Table 4.8-1. Impact-Producing Factors with the Potential to Impact Marine Mammals.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Noise	Unintended Releases into the Environment	Noise
Offshore Habitat Modification/ Space Use	Response Activities	Discharges and Wastes
Bottom Disturbance	Strikes and Collisions	Coastal Land Use/Modification
-	-	Offshore Habitat Modification/ Space Use
-	-	Bottom Disturbance
-	-	Strikes and Collisions
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

Several existing regulatory programs and protective measures reduce or prevent the environmental effects of these IPFs to marine mammals in the GOA. Regulatory requirements enforced by BOEM, BSEE, and other agencies are outlined in **Table 4.8-2** and are further described in the *Gulf of America OCS Regulatory Framework* technical report (BOEM 2020a). The protective measures and regulatory requirements listed in **Table 4.8-2** reduce or prevent impacts to marine mammals by reducing noise exposure; requiring protections in coastal areas; requiring avoidance distances from sensitive benthos; requiring precautions for lines in the water; requiring safety

measures for accidental oil spills and spill response; requiring protected species observers; reducing or eliminating accidental trash and debris; and requiring precautions aimed at preventing or reducing, and reporting vessel strikes.

Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with all regulatory requirements, including existing and future consultation requirements under the ESA, MMPA, and other statutes. Therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations. Compliance with existing and future consultation requirements – by BOEM as well as individual operators and lessees, as required – may result in additional mitigating measures or updates to the existing measures described throughout this chapter. For example, a plan approval would be conditioned on compliance with the applicable Reasonable and Prudent Measures and Terms and Conditions of the most recent Biological Opinion issued by NMFS at the time of the site-specific review (**Appendix G.3**). This includes adaptively managing the mitigation, monitoring, and reporting requirements (2025 NMFS BiOp and associated attachments and appendices, and/or COAs) imposed by the Bureaus on plans and permits, and as coordinated with NMFS and industry. Any future BiOp amendments or COAs shall be a requirement and binding on subsequent BOEM authorizations. Through adaptive management, BOEM would incorporate new or updated measures resulting from ongoing or future consultations into post-lease plan reviews and authorizations, as appropriate (Chapter 6 of the GOM Oil and Gas SID).

Table 4.8-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure[1]	**Enforcing Agency**	**Impact-Producing Factor(s) Reduced/Avoided**	**Supporting References and Sections**
Protected Species Stipulation	BOEM	Offshore Habitat Modification/Space Use, Unintended Releases into the Environment, Noise, Strikes and Collisions	Chapters 6 and 7.5 of the GOM Oil and Gas SID
OCSLA	BOEM, BSEE	Offshore Habitat Modification/Space Use	43 U.S.C. 1331; OCS Report BOEM 2025-040 (BOEM 2025a)
CZMA	NOAA, States	Coastal Land Use/ Modification	16 U.S.C. 1251 and 15 CFR part 930; OCS Report BOEM 2025-040 (BOEM 2025a)

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
ESA	FWS, NOAA, NMFS, BOEM, BSEE	Offshore Habitat Modification/Space Use, Noise, Unintended Releases into the Environment, Strikes and Collisions	2018 FWS BiOp (no Terms and Conditions required for the Florida manatee), as amended March 28, 2025; OCS Report BOEM 2025-040; NMFS 2025 BiOp (NMFS 2025a) and associated Attachments (NMFS 2025b) including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA), A.8 Explosive-Severance Scenario Mitigation Protocol, and A.9 Pile Driving Monitoring and Reporting Requirements Protocol
National Marine Sanctuaries Act – Flower Garden Banks National Marine Sanctuary, including NMSA 304(d)	NOAA, ONMS	Noise, Bottom Disturbance	15 CFR 922. L; 16 U.S.C. 1434(d)
CWA Section 404	USACE	Coastal Land Use/ Modification, Discharges and Wastes	33 U.S.C. 1251, OCS Report BOEM 2025-040 (BOEM 2025a)
Marine Plastic Pollution Research and Control Act	USCG	Unintended Releases into the Environment (accidental marine debris)	33 U.S.C. 1901; OCS Report BOEM 2025-040; NMFS 2025 BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
National Contingency Plan (CWA, Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan)	USCG; USEPA; State, regional, and local governments	Unintended Releases into the Environment (accidental oil spill and spill response)	40 CFR 300. 311 of the Clean Water Act; Oil Pollution Act of 1990 (33 U.S.C. 2701), National Response Framework, E.O.s 12580 and 12777, S.O. 3299

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Marine Debris Research, Prevention, and Reduction Act	USEPA, USCG	Unintended Releases into the Environment (accidental marine debris)	33 U.S.C. 1901; OCS Report BOEM 2025-040, NMFS 2025 BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
Hard Bottom Habitat Avoidance Mitigations	BOEM, BSEE	Bottom Disturbance, Offshore Habitat Modification/Space Use	BOEM NTL No. 2009-G39; BOEM NTL No. 2009-G40; Chapters 6, 7.6, and 7.9 of the GOM Oil and Gas SID
Topographic Features and Live Bottom Stipulations	BOEM, BSEE	Bottom Disturbance, Offshore Habitat Modification/Space Use	Chapters 6, 7.6, and 7.9 of the GOM Oil and Gas SID
Marine Mammal Protection Act	NOAA/NMFS	Offshore Habitat Modification/Space Use, Noise, Unintended Releases into the Environment, Strikes and Collisions	16 U.S.C. 1361 et seq.; 50 CFR 217.S

[1] See Chapter 6 of the GOM Oil and Gas SID for conditions of approval commonly applied at the post-lease stage.

4.8.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Noise: The potential for noise impacts on marine mammals is highly variable and depend on the specific circumstances of a given situation (Nowacek et al. 2007; Richardson et al. 1995; Southall et al. 2007; Southall et al. 2019; Southall et al. 2021b). How a sound from a specific source propagates through a particular environment depends on a variety of factors, including the physical environment (e.g., salinity, temperature, bathymetry, seafloor type, and tow depth), sound source characteristics (e.g., source level, directionality, source type, and duration), frequency (i.e., higher frequencies dissipate faster and lower frequencies may travel farther depending on water depth), and intensity (i.e., decibel level) (Nowacek et al. 2007; Richardson et al. 1995; Southall et al. 2007; Southall et al. 2019; Southall et al. 2021b).

Depending on the level of exposure, the context, and the type of sound, potential impacts of underwater sound from OCS oil- and gas-related activities (such as explosive severance methods for decommissioning) on marine mammals may include non-auditory and auditory injury, permanent or temporary hearing loss, behavioral changes, acoustic masking, or increases in physiological stress (Götz et al. 2009). Most observations of marine mammal reactions to oil- and gas-related noise have been limited to short-term behavioral responses, which include temporary cessation of feeding, resting, or social interactions (Nowacek et al. 2007). Mounting evidence indicates that noise

in the marine environment could interfere with an animal's ability to detect, interpret, and/or respond to biologically relevant sounds, a phenomenon called acoustic masking (Clark et al. 2009; Parks 2012).

Because mysticetes (e.g., Rice's whales) produce calls that span a low-frequency range (20 Hz to 30 kHz) with their best hearing abilities presumably falling into this range as well, they would be most likely to experience impacts from the low-frequency sounds produced by seismic surveys (Richardson et al. 1995). In contrast, odontocetes (e.g., sperm whales) produce calls and hear best at mid- to high-frequencies (Richardson et al. 1995) and appear less vulnerable to low-frequency sound sources than mysticetes. Because most of the energy from airguns is radiated at frequencies below 200 Hz, low-frequency cetaceans would most likely hear the acoustic source because it falls within their hearing range. High-frequency cetaceans have auditory bandwidths that partially overlap with the frequencies of maximum airgun output. There is evidence that some whales' closest points of approach to airgun arrays during seismic operations are substantially farther during full-power operations than during silence, indicating that there may be some avoidance response to the full-power operations (Barkaszi and Kelly 2019).

The potential effects of underwater sound from an active acoustic source could result in auditory injury, temporary hearing loss, permanent hearing loss, behavioral disturbance, stress, masking, and nonauditory physical or physiological effects (Nowacek et al. 2007; Richardson et al. 1995; Southall et al. 2007; Southall et al. 2019; Southall et al. 2021a; Southall et al. 2021b). The degree of the potential impact depends on the species' hearing frequency, sound characteristics, received level, distance of the animal from the sound source, and duration of the sound exposure. Ruppel et al. (2022) concluded that most HRG sources, even without mitigation, are unlikely to result in substantial behavioral disturbances of marine mammals. The Incidental Take Regulation (ITR) (50 CFR 217, subpart S) under the MMPA authorizes the incidental take of marine mammals from oil- and gas-related G&G activities and facilitates issuance of subsequent letters of authorization for individual G&G applicants. Further, BOEM-permitted activities implement mitigating measures for sound below 180 kHz during G&G survey activity that include distancing requirements, the use of protected species observers, and source shutdown protocols (**Table 4.8-2**). Marine mammal exposure thresholds have been published for assessing the effect of sound exposure on marine mammal hearing (NMFS 2024b). Although the potential for adverse reactions to sound may vary considerably between individuals and species, sound exposure thresholds are useful to estimate when adverse reactions may be likely to occur in some measurable way that has potential importance (Ruppel et al. 2022).

The cavitation of vessel propellors produces low-frequency, nearly continuous sound (Haver et al. 2021; Parsons et al. 2021). These ranges overlap with some marine mammal vocalizations and hearing ranges, though transitory vessel and equipment noise is not expected to have substantial effects on marine mammals (Erbe et al. 2019). The dominant noise source from vessels is from propeller operation, including cavitation, singing, and propulsion, with the intensity of this noise largely related to ship size and speed. BOEM implements mitigation measures (**Table 4.8-2**)

that require speed reductions in certain situations, which would also limit continuous noise levels related to propeller cavitation.

For marine mammals, pile driving could result in auditory injury, temporary threshold shift, behavioral disturbance, and masking, depending on several factors (Graham et al. 2017; Würsig et al. 2000). The most commonly reported behavioral effect of pile-driving activity on marine mammals has been short-term avoidance or displacement from the pile-driving site (Benhemma-Le Gall et al. 2021; Brandt et al. 2011; Dähne et al. 2013). Low frequency cetaceans are more likely to experience acoustic masking of communication signals from pile-driving than other species due to the overlapping frequency content of their vocalizations with the acoustic energy from pile-driving. Given that pile-driving occurs intermittently, with some quiet periods between pile-strikes, it is unlikely that complete masking would occur with impact pile driving. BOEM-permitted activities implement mitigating measures for impact pile-driving that require visual monitoring for marine mammals and pre-clearance, soft start, and shutdown procedures (**Table 4.8-2**).

Potential effects of explosive severance during structure decommissioning on marine mammals include mortality, injury, hearing effects, and behavioral effects (Richardson et al. 1995). The extent of injury largely depends on the intensity of the shock wave and the size and depth of the animal (Craig Jr. 2001; Yelverton et al. 1973). The use of explosive severance has decreased in recent years and structures are more often removed via mechanical cutting. Where practicable, mechanical severance avoids the potential harm caused by the use of explosives to marine mammals (Bull and Love 2019). Mechanical cutting activities associated with OCS oil and gas conductor removal produces underwater sound pressure levels that contribute to the existing underwater ambient acoustic environment; however, they are generally below the thresholds for the onset of marine mammal temporary or permanent hearing impairment (Fowler et al. 2022). BOEM-permitted activities implement mitigating measures for explosive decommissioning, requiring marine mammal pre- and post-surveys, passive acoustic monitoring (PAM), and impact zones around detonation sites (**Table 4.8-2**). Chapter 4.7.1 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.6.2.2 of the GOM Oil and Gas SID (BOEM 2023b) contain additional information on potential noise impacts from OCS oil- and gas-related activities to marine mammals.

Offshore Habitat Modification/Space Use: Construction, operation, and decommissioning activities on the OCS may be temporary or long term. Because lessees are required to perform OCS oil- and gas-related activities (including decommissioning) in accordance with regulatory requirements, long-term habitat modification is expected to be avoided. The removal of infrastructure can create disturbances similar to those of infrastructure installation; it can result in bottom disturbance that creates turbidity in the water column, which may impact prey availability and foraging efforts for some marine mammals if the water conditions persist. The effects of these activities would be localized and temporary, and habitat loss is not expected. In the course of construction, operation, and decommissioning activities, marine mammals can be exposed to entanglement and entrapment risks, such as from lines in the water (e.g., diver lines), possibly leading to injury or mortality. Also, the placement or removal of infrastructure can create long-term

alterations to the existing seascapes (i.e., the physical habitat) including seabed, water column, and/or sea-surface habitats (Shams et al. 2023). These modifications, from activities such as decommissioning via structure removal, infrastructure and/or pipeline emplacement, G&G surveys, pile driving, and drilling, would likely be localized. Delayed decommissioning of structures and wells, and pipeline decommissioning in-place, would provide no net positive or negative effect on marine mammals, though could provide a beneficial localized foraging source for some marine mammals. Mitigating measures can reduce the risk of entanglement and entrapment, monitor for marine mammals, and avoid sensitive benthic habitats to prevent or reduce potential impacts from the emplacement or decommissioning of infrastructure (**Table 4.8-2**).

Bottom Disturbance: Bottom-disturbing activities could destroy benthic habitat (e.g., hard bottom and/or SAV) (Continental Shelf Associates Inc. 2006; Neff 2005) that some marine mammals, such as Rice's whales or sperm whales, may depend on for feeding. However, the likelihood of any substantial portion of any marine mammal population foraging repeatedly around structures while disturbances are occurring would be extremely low, given species distribution. Routine structure-removal activities, such as support vessel and barge anchoring, pre-severing operations (jetting around legs of the structure), severing operations (explosive and non-explosive severing of the structure), post-severing operations (standard or sectioned lift and load of structure), site clearance activities (trawling), and reefing of portions of the removed structure, could all contribute to localized bottom disturbance. Sediment disturbance would occur on a limited area of seafloor over a period of less than a week to about a month for the most extensive removal projects (MMS 2005). Drilling would be localized and impacts are not expected to occur outside of the immediate area. In addition, bottom disturbance from infrastructure emplacement, pipeline trenching, and structure removal would be localized and temporary, and loss of live or hard bottom habitat is not expected. The benthic habitats used by the Florida manatee are in coastal, inland waters, which would not be within typical locations for OCS oil- and gas-related activities.

The majority of the benthos in the GOA is ubiquitous soft bottom sediments. Rarer hard bottom and live bottom habitats have a more limited distribution. BOEM-permitted activities, including decommissioning, implement mitigating measures to avoid sensitive benthic resources (e.g., topographic features and live bottoms), distancing OCS oil- and gas-related bottom-disturbing activities from sensitive habitat that may be used by some marine mammals (**Table 4.8-2**). Therefore, potential impacts from bottom disturbance are expected to be limited to a very abundant, soft sediment, habitat type, and any bottom areas affected would not constitute unique or unusual habitat (**Chapter 4.4**).

4.8.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOAR).

Unintended Releases into the Environment: Entanglement in marine debris, including what could come from decommissioning activities or vessels, could lead to injury, infection, reduced mobility, increased susceptibility to predation, decreased feeding ability, fitness consequences, and mortality (e.g., drowning) of marine mammals (Gall and Thompson 2015). Marine debris ingestion could lead to intestinal blockage, which could impact feeding ability and lead to injury or death (Gall and Thompson 2015). There are little data on marine debris specifically from OCS oil- and gas-related activities in the GOA (**Chapter 4.8.3**); therefore, it is difficult to determine the extent of the problem and its impacts on marine mammal populations. Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with regulatory requirements and therefore BSEE, USCG, and USEPA regulations, and mitigation would be applied and followed by OCS oil and gas operators, which would prevent or minimize unintended releases of marine debris (see **Table 4.8-2**).

Unintended releases of chemicals or oil into the marine environment may result in negative effects to marine mammals in the immediate area from exposures at harmful concentrations before the spill is contained and/or dissipates. If the discharge contained persistent and bioaccumulating pollutants, longer-term effects are possible over a broader area through dietary exposure and bioaccumulation. See **Chapter 4.2** for additional information on potential water quality impacts.

Potential impacts of an oil spill depend on a variety of factors, such as spill magnitude, frequency, timing, location, and the meteorological and oceanographic conditions at the time (National Research Council 2003b). The impacts of an oil spill on marine mammals could depend on many external variables, such as oil characteristics; time of year; response efforts (e.g., burning, dispersant); and types of habitats, as well as the behavior and physiology of the marine mammals themselves (Johnson and Ziccardi 2006; Sullivan et al. 2019; Ziccardi et al. 2015). Further, timing and location would also contribute to determining which species may be affected and the scale of the effect.

Several factors increase the probability of oil exposure to an individual marine mammal, including (1) marine mammals often travel long distances in the GOA, increasing the geographic areas of potential impact; (2) marine mammals are relatively long-lived and have many years during which they may be exposed (natural seeps or otherwise); and (3) some spills would be larger, increasing the area of potential impact. It is impossible to know precisely which cetacean species, population, or individuals would be impacted, to what magnitude, or in what numbers because each species has unique and/or a lack of distribution patterns in the GOA and because of difficulties attributed to predicting when and where oil spills could occur. Potential impacts to marine mammals from an oil spill are expected to increase with spill size. Marine mammals may actively avoid poor environmental conditions. Though cetaceans can detect oil, they may not always avoid it (Frasier et al. 2024; Gubbay and Earll 2000; Schwacke et al. 2014). In most cases, the majority of oil is found at the water's surface during a spill. Due to the relatively short time spent at the water's surface overall depending on species and time of day, it is unlikely that marine mammals would spend prolonged periods of time in close proximity to the majority of the oil in a spill and/or associated response activities if deployed.

Marine mammals could be affected by oil spills through various pathways: direct surface contact; inhalation of volatile components; or ingestion (by direct ingestion or by the ingestion of contaminated prey). These pathways could affect marine mammals by leading to decreased health, reproductive fitness, and longevity; increased vulnerability to disease; and possibly mortality. The oil from a spill can adversely affect marine mammals by causing soft-tissue irritation, fouling of baleen plates, respiratory stress from the inhalation of toxic fumes, food reduction or contamination, direct ingestion of oil and/or tar, and temporary displacement from preferred habitats. There is evidence that some species of marine mammals can metabolize hydrocarbons (Engelhardt 1983; Lee and Anderson 2005). However, the extent to which species metabolize and eliminate hydrocarbons, and the specific gene biomarker pathways used are unclear (Ruberg et al. 2021). The long-term impacts to marine mammal populations are generally poorly understood (**Chapter 4.8.3**). An oil spill may physiologically stress an animal (Geraci and St. Aubin 1980), making it more vulnerable to disease, parasitism, environmental contaminants, and/or predation. Oil spills may also affect feeding behavior, especially in the case of baleen whales (e.g., Rice's whales) with fouled baleen plates (Geraci and St. Aubin 1990). In any case, an oil spill could negatively impact a marine mammal population or stock.

Most oil spills are <50 bbl and are expected to disperse quickly in the open ocean. However, a spill >10,000 bbl was documented off the Louisiana coast in November 2023; the investigation is currently ongoing (**Appendix B.3.1**). It is unlikely a small spill would cause mortality or life-threatening injury of individual marine mammals or the long-term displacement of marine mammals from preferred feeding, breeding, or calving areas. Cetaceans may not avoid larger oil spills and could experience long-lasting impacts, including reduced reproduction, increased disease, and death (Michel 2021). These impacts were documented in cetaceans that were resident in semi-enclosed, heavily oiled (i.e., >20,000 bbl) waterbodies. The difficulty in determining impacts to marine mammals is due to the lack of accurate stock assessments to establish a baseline with influences from other long-standing anthropogenic continuous sources to stocks while incorporating into proper modeling techniques (Michel 2021). Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements, such as the National Contingency Plans (**Table 4.8-2**), which provide effective control and containment, and would be expected to limit the volume and area of exposure. Chapters 4.7.8.1 and 4.7.8.3 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.6.2.3 of the GOM Oil and Gas SID contain additional information on potential impacts from OCS oil- and gas-related unintended releases into the environment to marine mammals.

Response Activities: Spill-response activities that may impact marine mammals include increased vessel traffic, the use of dispersants, and remediation activities (e.g., controlled burns, skimmers, boom, etc.). The increased human presence in the water after an oil spill (e.g., vessels) would likely add to changes in behavior and/or distribution, thereby potentially stressing affected marine mammals further, possibly making them more vulnerable to various physiologic and toxic effects of spilled oil.

Little is known about the impacts of oil dispersants on cetaceans (**Chapter 4.8.3**), except that removing oil from the surface would reduce the risk of oil contact and render it less likely to adhere to the skin or other body surfaces (Neff 1990). However, it is difficult to determine how these exposures relate to the actual exposures in the GOA since there is no known accurate method to measure the amount of whale exposure to dispersants (Wise et al. 2014). Dispersants may be irritants to tissues and sensitive membranes (National Research Council 2005) and could cause non-lethal injury, such as tissue irritation, inhalation, long-term exposure through bioaccumulation, and potential shifts in distribution from some habitats.

Skimmers could capture and/or entrain individuals. In both skimming and controlled (i.e., in situ) burning activities, the use of trained observers is common. The low probability of marine mammals being in the vicinity of an OCS oil- and gas-related oil-spill response activity due to their wide-ranging distribution reduces the likelihood of impacts to marine mammals. Through the National Contingency Plan (40 CFR 300) and the Federal laws that underpin this regulation, there are mitigations and plans in place at the Federal, State, and local levels (e.g., from USCG, BSEE, States, NMFS, FWS, and NPS) that decrease impacts to marine mammals during response activities (**Table 4.8-2**). These plans increase surveillance and the detection of animals, thus reducing potential impacts through avoidance measures. Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements. Chapter 4.7.8.2 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.6.2.3 of the GOM Oil and Gas SID (BOEM 2023b) contain additional information on potential impacts from OCS oil- and gas-related response activities to marine mammals. **Appendix B.3.2** of this Programmatic EIS provides more detail on oil spill response duties and responsibilities.

Strikes and Collisions: All marine mammals are vulnerable to accidental vessel strike. However, some marine mammal species may be more vulnerable than others to possible vessel strike, including primarily slow-moving species or those that spend extended periods of time at the surface, and deep-diving species while on the surface (Vanderlaan and Taggart 2007). For example, Rice's whales may spend up to 88 percent of their time at night, and 70 percent of their time overall, within 15 m (39 ft) of the ocean surface (Soldevilla et al. 2017), making them particularly vulnerable to collisions with large vessels (Stevens et al. 2024). Deep-diving sperm whales are also vulnerable to vessel strikes because they require several minutes at the surface to recover from extended, deep dives (Fais et al. 2016; Vanderlaan and Taggart 2007). Several factors affect the risk and severity of vessel strike to marine mammals, including species type, speed, health, and behavior of the animal and the path, speed, size, and number of vessels (Laist et al. 2001; Martin et al. 2016; Vanderlaan and Taggart 2007). Reports of vessel strikes by OCS oil- and gas- related vessels are quite rare.

Chapter 8.4.2 of the 2025 NMFS BiOp (NMFS 2025b), details NMFS' analysis of the effects of vessel strikes on ESA-listed whales. BOEM used this information in the following analysis of the potential impacts of vessel strikes. NMFS found that vessel strikes were one of the biggest risks from the GOAR oil and gas program to ESA-listed whales and found that risk resulted in jeopardy for the Rice's whale (NMFS 2025b). In the 2025 NMFS BiOp, NMFS included a reasonable and prudent alternative (RPA) that, in its expert determination, reduces that risk to Rice's whale to prevent

jeopardy (NMFS 2025b). NMFS's assessment of the potential risks to the Rice's whale from oil and gas activities in the GOA and the measures outlined by NMFS to avoid jeopardy to the species contained in the 2025 NMFS BiOp supersede all previous NMFS recommendations regarding the Rice's whale, including its February 9, 2022 comments on "Commercial Leasing Wind Power Development on the Outer Continental Shelf of the Gulf of Mexico". Accidental vessel strike could result in marine mammal injury or mortality, or no apparent effects (Laist et al. 2001; Pace 2011; Van Waerebeek et al. 2007; Vanderlaan and Taggart 2007). Vessel speed and size are of note when assessing strike risk (Garrison et al. 2025; Stevens et al. 2024). Most severe and lethal whale injuries involve large ships (>80 m [262 ft]) at higher speeds: 89 percent of ship strike records show that vessels were moving >14 kn (16 mph); most strikes occurred over or near the continental shelf; and the whales were usually not seen beforehand or seen too late to be avoided (Laist et al. 2001; Van Waerebeek et al. 2007). Most reports of vessels striking marine mammals involve large whales, though strikes with smaller species also have occurred (Van Waerebeek et al. 2007). All of the larger vessel types (average length overall >80 m [262 ft]) identified as potentially conducting BOEM-regulated oil and gas activities on the OCS, including decommissioning activities, are expected to be typically operating either below or at the lower range of speeds noted to result in the majority of large whale ship strikes. Further, seismic operations with towed gear generally are conducted at relatively slower speeds of 4–6 kn (4.6–7 mph), with a maximum speed <8 kn (9 mph). BOEM-permitted activities, including decommissioning activities, implement mitigating measures for vessel strikes during activity (**Table 4.8-2**), which would prevent or substantially reduce marine mammal interactions with transiting vessels. Chapter 4.7.8.4 and Chapter 4.3.6.2.3 of the GOM Oil and Gas SID (BOEM 2021a) also contains additional information.

4.8.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence marine mammals in the GOA through noise, discharges and wastes, coastal land use/modification, offshore habitat modification/space use, bottom disturbance, strikes and collisions, and other environmental factors.

Noise: Over the last few decades, low-frequency ambient ocean noise has increased substantially due to a steady increase in shipping as vessels become more numerous and of larger tonnage (Hildebrand 2009; McKenna et al. 2012; National Research Council 2003a). In Mississippi Canyon and DeSoto Canyon, primary sound sources recorded in frequencies between 10 Hz and 96 kHz comprised seismic surveys, shipping, storms, and marine mammal vocalizations (Amaral et al. 2022). Elevated ocean noise levels can interfere with communication (i.e., acoustic masking) (Clark et al. 2009; Erbe et al. 2016) and increase stress in marine mammals, which may lead to lower reproductive output and increased susceptibility to disease (Kight and Swaddle 2011). The biological significance of behavioral responses to underwater noise and the population consequences of those responses are not fully understood (National Research Council 2005; Southall et al. 2007; Southall et al. 2019; Southall et al. 2021b). Chapter 3.7.5.1 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.6.2.1 of the Gulf Oil and Gas SID contain additional information on potential cumulative noise impacts on marine mammals.

Discharges and Wastes: Discharges and wastes have the potential to modify suitable habitat for marine mammals (Morton 2003). Major sources in the OCS that can interact with marine mammals include derelict fishing gear and ghost nets. Marine debris affects marine habitats and marine life worldwide, primarily through entanglement or ingestion (e.g., choking) (Gall and Thompson 2015). Entanglement in marine debris can lead to injury, infection, reduced mobility, increased susceptibility to predation, decreased feeding ability, fitness consequences, and mortality of marine mammals (NMFS 2024a). Marine debris ingestion can lead to intestinal blockage, which could impact feeding ability and lead to injury or death (Gall and Thompson 2015). Harmful algal blooms, including brown and red tides, occur almost every year in GOA waters. These blooms could kill, displace, or cause respiratory or reproductive issues in marine mammals (Fire et al. 2008). Bottlenose dolphins and manatees are most at risk from nearshore discharges and wastes. Because other marine mammals are not commonly found in coastal waters, they are less likely to be impacted by nearshore pollution. Manatees are exposed to herbicides by ingesting aquatic vegetation containing concentrations of pollutants (O'Shea et al. 1984). The propensity of manatees to aggregate at industrial and municipal outfalls also may expose them to high concentrations of contaminants (Stavros et al. 2008). Microplastics and macroplastics have been shown to affect marine mammals directly and indirectly (Alava et al. 2023). Plastics have been found inside deceased marine mammals (Gregory 2009). Prey species also affect the influence of pollution, such as microplastics, on marine mammals. Biomagnification in fish results in the generally higher contaminant levels in fish-eating marine mammals (Gray 2002). Chapters 3.7.5.2 and 3.7.5.3 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.6.2.1 of the GOM Oil and Gas SID (BOEM 2023b) contain additional information on potential cumulative impacts from discharges and wastes on marine mammals.

Coastal Land Use/Modification: An increase in built infrastructure (e.g., residential areas, industrial centers, ports, hotels, resorts, marinas, docks, seawalls, bridges, and roads) may affect habitat used by coastal marine mammals (e.g., coastal dolphins and manatees). Coastal construction can degrade or destroy coastal habitats and degrade water quality by increased sedimentation and pollutant runoff, affecting coastal marine mammals if ingested. For example, dolphins have been shown to stop feeding though continue socializing in habitat degraded by coastal bridge construction (Weaver 2021).

Offshore Habitat Modification/Space Use: Physical features, including canyons, used by marine mammals could be degraded indirectly by various anthropogenic activities. Anthropogenic events can cause the loss of core and/or preferred habitat if habitat becomes unsuitable (Morton 2003). In addition, active fishing line and gear, which is managed by NMFS, can pose entanglement and ingestion risks to marine mammals (Jog et al. 2022; Wells et al. 1998). Entanglement can decrease the individual's swimming ability, disrupt feeding, cause life-threatening injuries, or result in death. NOAA NMFS (2022; 2023b; 2024a) publishes national reports on large whale entanglements confirmed in the U.S.; from 2019-2022, there were no documented large whale entanglements in the GOA. Fisheries bycatch of marine mammals has also occurred in the Gulf, such as from pelagic longline fisheries and shrimp trawl fisheries (Benaka et al. 2016).

Bottom Disturbance: Various bottom-disturbing anthropogenic activities can degrade or destroy benthic features used by some marine mammals for foraging and/or habitat. Such activities can result in the loss of foraging grounds and/or preferred habitat. For example, anchors and trawling disturb the seafloor and sediments in the area where they are dropped or emplaced. Further, anchoring can cause physical crushing and compaction beneath the anchor and chains or lines.

Strikes and Collisions: Vessel strikes from non-OCS oil- and gas-related activities (e.g., recreational, shipping, and fishing vessel transit) are known to cause injuries and fatalities for several large whale species (Constantine et al. 2015; Crum et al. 2019; Laist et al. 2001). Vessel speed and size influence the strike risk (Garrison et al. 2025). Deep-diving whales (e.g., sperm whales) may be more vulnerable to vessel strikes because of the longer surface period required to recover from extended deep dives (Fais et al. 2016; Vanderlaan and Taggart 2007). Also, Rice's whales spend the majority of their time within 15 m (39 ft) of the ocean's surface (Soldevilla et al. 2017), making them vulnerable to strike from large vessels (Stevens et al. 2024). Manatees are slow-moving and are often struck by smaller boats (FWS 2001). Most documented vessel strikes to manatees are from recreational and fishing vessels. Chapter 3.7.5.4 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.6.2.1 of the GOM Oil and Gas SID contain additional information on potential cumulative impacts of strikes and collisions on marine mammals.

Other Environmental Factors: Climate-related factors can influence or act synergistically with other IPFs on marine mammals, depending on many factors, including the geographic location and season. Several uncertainties exist about how these factors can impact marine mammals (Evans and Bjørge 2013; Silber et al. 2017), though range shifts (e.g., in response to shifting prey distribution or expansion of breeding grounds), timing of important biological activities (e.g., breeding), and regional abundance changes may influence impacts (Learmonth et al. 2006). Warming waters can affect the timing of annual events such as plankton blooms, migration, and reproduction in some species, potentially disrupting predator-prey relationships, with cascading effects throughout the food web (Ullah et al. 2018). There is also research suggesting that ocean acidification from rising carbon dioxide levels could potentially decrease sound absorption in oceans, thereby causing amplified levels of ambient noise (Gazioğlu et al. 2015). Further, increased sea-surface temperatures likely enhance the magnitude and frequency of harmful algal blooms and their associated toxins (O'Neil et al. 2012). Lettrich et al. (2023) found that marine mammals in the GOA, such as bottlenose dolphins and Rice's whales, could be at risk from habitat degradation, prey availability changes, and increased human activities exacerbated by climate-related factors.

4.8.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct or

indirect impacts to marine mammals would occur as a result of the proposed action (i.e., a proposed oil and gas lease sale) and impacts would be **none**. However, ongoing OCS oil- and gas-related activities associated with past lease sales, and other non-OCS oil- and gas-related activities would continue to potentially affect marine mammals under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.32**) would still potentially affect marine mammals through noise, offshore habitat modification/space use, bottom disturbance, unintended releases into the environment, response activities, and strikes and collisions as summarized above in **Chapters 4.8.2.1** and **4.8.2.2** and in greater detail in Chapter 4.3.6 of the GOM Oil and Gas SID.

The potential for ongoing OCS oil- and gas-related activity (**Table 3.3-2**) impacts on marine mammals is highly variable and influenced by a wide array of factors (e.g., biological and oceanographic), depending on the specific circumstances of a given situation. Most observations of marine mammal reactions to oil- and gas-related noise have been limited to short-term behavioral responses, which could include temporary cessation of feeding, resting, or social interactions (Nowacek et al. 2007). For noises from G&G sources less than 180 kHz, explosive decommissioning severance, and pile driving, BOEM applies mitigations (**Table 4.8-2**) that require distancing, impact zones, and the use of protected species observers to minimize or prevent impacts to marine mammals. Reports of oil- and gas-related vessel strike on marine mammals in the GOA have been quite rare. All of the larger vessel types (average length overall >80 m [262 ft]) identified as potentially conducting BOEM-regulated oil and gas activities on the OCS are expected to be typically operating either below or at the lower range of speeds noted to result in the majority of large whale ship strikes. BOEM applies mitigations (**Table 4.8-2**) that require monitoring for marine mammals during transit, maintaining a separation distance while underway if marine mammals are detected, and reporting, to prevent or substantially reduce potential vessel interactions with marine mammals. Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). This baseline is described in **Chapter 4.8.1** and in further detail in Chapter 4.3.6.1 of the GOM Oil and Gas SID. Considering the estimates of ongoing OCS oil and gas activities (**Table 3.3-2**), wide-ranging movements and distributions of marine mammals in the Gulf, and mitigations applied (**Table 4.8-2**), impacts from ongoing OCS oil and gas activities would range from **negligible** to **moderate**, with no substantial effects to overall population levels. In the unlikely event of an accidental vessel strike on an ESA-listed whale, the determination could be **major**.

***Non-OCS Oil- and Gas-Related Activities*:** Bottom disturbance, noise, offshore habitat modification/space use, unintended releases into the environment, response activities, strikes and collisions, and other environmental factors associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect marine mammals under the No Action alternative, as described above. The potential for ongoing non-OCS oil- and gas-related activity impacts on marine mammals is highly variable and influenced by a wide array of factors. Non-OCS oil- and gas-related vessels comprise a large portion of ongoing vessel traffic in the GOA. Vessel strikes from non-OCS oil- and gas-related activities have caused injuries and fatalities for several

large whale species (Constantine et al. 2015; Crum et al. 2019; Laist et al. 2001). Most severe and lethal whale injuries involved large ships (>80 m [262 ft]) at higher speeds, and most strikes occurred over or near the continental shelf (Laist et al. 2001; Van Waerebeek et al. 2007). In addition, noise is emitted throughout the GOA from a wide variety of ongoing non-OCS oil- and gas-related activities. Elevated ocean noise levels from ongoing non-OCS oil- and gas-related activities can interfere with marine mammal communication (Clark et al. 2009; Erbe et al. 2016) and increase stress in marine mammals (Kight and Swaddle 2011). Low-frequency ambient ocean noise has increased with an increase in shipping vessels over the past few decades (Hildebrand 2009; McKenna et al. 2012; National Research Council 2003a). Other reasonably foreseeable environmental concerns that could contribute to ongoing impacts to marine mammals include ocean acidification, range shifts, biological timing, and changes to sea surface temperature. The potential impacts from these factors are discussed in **Chapter 4.8.2.3** and are expected to continue into the future, even if the No Action alternative were selected. While some effects are anticipated, the precise impacts of climate-related factors on the GOA cannot currently be predicted or parsed out from every global activity.

IPFs from non-OCS oil- and gas-related activities, in addition to other environmental factors, would occur on a much broader scale and from a greater range of activities compared to those from OCS oil- and gas-related activities. These IPFs and environmental factors have the potential to impact marine mammal health and populations, as discussed above in **Chapter 4.8.2.3**. Most notably, noise and strikes and collisions from non-OCS oil- and gas-related sources would be much more influential on marine mammals than OCS oil and gas development, and would still occur without the presence of ongoing OCS oil- and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS oil and gas lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing, which could change the spatial distribution of the scenario activities, but not their overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table 4.8-3**). Impacts are shown both with and without the mitigating effects of BOEM's protective measure(s) being considered in this Programmatic EIS, if applicable to that IPF. The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.8-3. Impact Determinations for Routine and Accidental Impacts to Marine Mammals from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure(s)[1]	Alternative B	Alternative C	Alternative D
Noise	Without Protective Measures	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**

Impact-Producing Factor	BOEM's Protective Measure(s)[1]	Alternative B	Alternative C	Alternative D
Noise	With Protective Measures	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Offshore Habitat Modification/ Space Use	Without Protective Measures	**Negligible** to **Moderate**	**None** in excluded areas; **Negligible** to **Moderate** in leased areas only	**None** in excluded areas; **Negligible** to **Moderate** in leased areas only
Offshore Habitat Modification/ Space Use	With Protective Measures	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Bottom Disturbance	Without Protective Measures	**Negligible** to **Minor**	**None** in excluded areas; **Negligible to Minor** in leased areas only	**None** in excluded areas; **Negligible to Minor** in leased areas only
Bottom Disturbance	With Protective Measures	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Unintended Releases into the Environment (marine debris)	Without Protective Measures	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Unintended Releases into the Environment (marine debris)	With Protective Measures	**Negligible**	**Negligible**	**Negligible**
Unintended Releases into the Environment (oil spills)	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	Without Protective Measures	**Negligible** to **Major**	**Negligible** to **Major**	**Negligible** to **Major**
Strikes and Collisions	With Protective Measures	**Negligible** to **Moderate**[2]	**Negligible** to **Moderate**[2]	**Negligible** to **Moderate**[2]

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. Considering the estimates of ongoing OCS oil and gas activities (**Table 3.3-2**), wide-ranging movements and distributions of marine mammals in the Gulf, and mitigations applied (**Table 4.8-2**), impacts from ongoing OCS oil and gas activities would range from **negligible** to **moderate**, with no substantial effects to overall population levels. In the unlikely event of an accidental vessel strike on an ESA-listed whale, the determination could be **major**.

[1] Protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. Additional BOEM protective measures for marine mammals would be considered at the site-specific stage in compliance with existing and future regulatory and consultation requirements.

[2] In the unlikely event of a strike on an ESA listed whale, the determination could be **major**.

Alternative B – Regionwide OCS Lease Sale

Noise: Alternative B considers a proposed regionwide OCS lease sale area. Within this geographic area, **noise** can occur from any routine OCS oil- and gas-related activity, including

decommissioning (**Table 3.3-4**). Given the level of these installation and decommissioning activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to marine mammals could occur in the vicinity of a sound source (e.g., G&G survey and explosive decommissioning severance). Noise has the potential to cause lethal or nonlethal injury, temporary hearing impairment, permanent hearing impairment, behavioral effects, and/or stress, or no apparent response. The impacts would be **negligible** to **moderate** when mitigating measures (**Table 4.8-2**) are not used because marine mammals would not be observed during OCS oil- and gas-related activities, including decommissioning, and could be exposed to noise at levels that could cause lethal or nonlethal injury (e.g., temporary or permanent hearing impairment), behavioral effects, and/or stress. When mitigating measures are used, impacts are expected to be **negligible** to **minor**. Applicable mitigating measures like the Protected Species Stipulation; and the 2025 NMFS BiOp terms and conditions and protocols (see **Table 4.8-2**) would prevent or substantially reduce marine mammal noise exposure such as by requiring visual and acoustic monitoring (e.g., marine mammal clearance). A.8 Explosive-Severance Scenario Mitigation Protocol would prevent or substantially reduce marine mammal noise exposure from explosive severance by requiring monitoring in impact zones around detonation sites and waiting periods (i.e., detonation delay). A.1 Operational National Mitigation Protocols for Geophysical Surveys (**Table 4.8-2**) would prevent or substantially reduce marine mammal noise exposure from seismic surveys by requiring visual and acoustic monitoring (e.g., pre-start clearance observation) and seismic survey protocols (e.g., seismic source ramp-up intended to warn marine mammals and shutdown upon detection). Additionally, A.9 Pile Driving Monitoring and Reporting Requirements Protocol would prevent or reduce marine mammal noise exposure from pile-driving activities by requiring visual monitoring by protected species observers before the start of activity, soft starts, and shutdowns.

Offshore Habitat Modification/Space Use: Offshore habitat modification/space use can occur from any routine OCS oil- and gas-related activity (including decommissioning) except for G&G survey activity, service vessel trips, and helicopter operations (**Table 3.3-4**). Given the level of these installation and decommissioning activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to marine mammals could occur in the vicinity of routine OCS oil- and gas-related construction, operation, and decommissioning activities. Offshore habitat modification/space use has the potential to cause behavioral effects, decreased feeding ability, reduced mobility, stress, injury, or death. The impacts would be **negligible** to **moderate** when mitigating measures (**Table 4.8-2**) are not used because some marine mammals would be exposed to disturbance from construction, operation, and decommissioning activities, including lines in the water with entanglement risk, which could cause reduced mobility, stress, injury, or death. Impacts are expected to be **negligible** when mitigating measures are utilized because there would be no measurable or detectable impacts on marine mammals. Applicable mitigating measures, such as the Protected Species Stipulation; 2025 NMFS BiOp protocols including A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, and A.8 Explosive-Severance Scenario Mitigation; as well as NTL No. 2009-G39; Topographic Features Stipulation; and Live Bottom Stipulation (**Table 4.8-2**) would prevent or substantially reduce marine mammal interactions with construction, operation, and decommissioning activities by

requiring lines in the water to be taut, which would prevent or substantially reduce entanglement risk, requiring monitoring, requiring reporting requirements, and requiring avoidance distances from sensitive benthos that some marine mammals may use. Additionally, A.9 Pile Driving Monitoring and Reporting Requirements Protocol would prevent or reduce marine mammal interactions with pile-driving activities by requiring visual monitoring by protected species observers prior to the start of activity, soft starts, and shutdowns.

Bottom Disturbance: Bottom Disturbance can occur from any routine OCS oil- and gas-related activity (including decommissioning), except for service vessel trips and helicopter operations (**Table 3.3-4**). Given the level of these installation and decommissioning activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to marine mammals in the vicinity of bottom-disturbing activities (i.e., drilling, anchoring, and structure and pipeline installation and removal) are expected to be relatively undetectable. Bottom disturbance has the potential to displace some marine mammals from foraging grounds and/or preferred habitat. The impact would be **negligible** to **minor** when mitigating measures (**Table 4.8-2**) are not used, since some marine mammals would experience reduced foraging and/or preferred habitat. Impacts are expected to be **negligible** when mitigating measures are used because there would be no measurable or detectable impacts on marine mammals since sensitive benthos would be avoided. Applicable mitigating measures, such as the Topographic Features Stipulation and Live Bottom Stipulation (**Table 4.8-2**) would prevent or substantially reduce marine mammal interactions with bottom-disturbing activities, including decommissioning, by requiring avoidance distances from sensitive benthic habitats (e.g., live bottoms) that some marine mammals may use for foraging and/or as habitat.

Unintended Releases into the Environment: Unintended releases into the environment from accidental marine debris can occur from any routine OCS oil- and gas-related activity, including decommissioning (**Table 3.3-4**). Given the level of these installation and decommissioning activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to marine mammals could occur in the immediate vicinity of the accidental marine debris. Accidental marine debris entanglement, entrapment, or ingestion can lead to stress, infection, decreased health, reduced mobility, injury, and/or death. The impact from accidental marine debris is **negligible** to **moderate** when mitigating measures (**Table 4.8-2**) are not used because marine mammals would be more vulnerable to impacts from accidental marine debris without protective protocols in place aimed at preventing accidental marine debris. The impacts from accidental marine debris to marine mammals would be **negligible** when mitigating measures are used because there would be no measurable or detectable impacts on marine mammals since accidental marine debris would be prevented or substantially reduced. Applicable mitigating measures, such as the Protected Species Stipulation; and 2025 NMFS BiOp A.2 Marine Debris Protocol (**Table 4.8-2**) would prevent or substantially reduce accidental marine debris, including accidental marine debris from decommissioning activities, thereby preventing or substantially reducing marine mammal risk from entanglement, entrapment, or ingestion.

Unintended releases into the environment from accidental oil spills can occur from any routine OCS oil- and gas-related activity (**Table 3.3-4**). Given that the effects of an accidental spill would depend on the volume of the spill and the time before it is actively removed as part of a spill response or naturally weathers (**Chapter 3.5.1.1**), impacts to marine mammals could occur in the vicinity of an accidental oil spill in the OCS. Unintended releases into the environment from accidental spills could cause injury, infection, reduced mobility, increased susceptibility to predation, decreased feeding ability, fitness consequences, increased vulnerability to disease, decreased health, decreased reproductive fitness, and/or death, depending on the spill size and other factors. Potential impacts are expected to increase with spill size. Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements, such as the National Contingency Plans (**Table 4.8-2**), which provide effective control and containment, and would be expected to limit the volume and area of exposure. Thus, given the number and volume of accidental oil spills estimated for a single OCS oil and gas lease sale (Ji and Schiff 2023) and the wide-ranging movements and distribution of marine mammals, the impacts from unintended releases into the environment from accidental oil spills to marine mammals would be **negligible** to **moderate**.

Response Activities: Response activities can occur from any routine OCS oil- and gas-related activity except for G&G survey activity and helicopter operations (**Table 3.3-4**). Given that the scale and effects of response activities would depend on the volume of the spill (**Chapter 3.5.1.1**), impacts to marine mammals could occur in the vicinity of spill-response activities on the OCS. Response activities, including increased vessel traffic, the use of dispersants, and remediation activities, could cause changes in behavior and/or distribution, thereby potentially stressing affected marine mammals further, possibly making them more vulnerable to various physiological and toxic effects of spilled oil. The scale of response activities (e.g., vessel and dispersant use) and the potential impacts to marine mammals are expected to increase with spill size. Thus, given the likely non-catastrophic spill size, if it were to occur (Ji and Schiff 2023, Chapter 3), subsequent response activities expected to occur in a limited area, the wide-ranging movements and distribution of marine mammals, and the spill response plans and safety protocols (e.g., National Contingency Plans) in which lessees are required to perform OCS oil- and gas-related activities in accordance (**Table 4.8-2**), the impacts from response activities to marine mammals would be **negligible** to **minor**.

Strikes and collisions: Strikes and collisions can occur from the routine OCS oil- and gas-related activity of G&G survey activity, production structures removed using explosives, other structure removal, and service-vessel, installation vessel, and decommissioning vessel trips (**Table 3.3-4**). Given the level of this installation and decommissioning activity described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to marine mammals could occur in the immediate vicinity of transiting vessels. If a vessel strike were to occur, the outcome could range from no apparent injury to mortality of the struck individual. Although vessel strikes to marine mammals are rare in the GOA, the impact of mortality from vessel strike could be major due to the potential for population-level effects on particularly vulnerable species, such as the Rice's whale. The impact is **negligible** to **major** when mitigating measures (**Table 4.8-2**) are not utilized since marine mammals would be

more vulnerable to vessel strikes without speed restrictions, separation distances, and the use of protected species observers, potentially causing injury or death. Applicable mitigating measures, such as The Protected Species Stipulation; and 2025 NMFS BiOp protocols including A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols and A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA) (**Table 4.8-2**), require monitoring for marine mammals during transit and maintaining a separation distance while underway if marine mammals are detected. These requirements prevent or reduce the potential for vessel strikes or collisions and obligate operators to report them. With the application of mitigating measures, the impacts from accidental strikes and collisions to marine mammals would range from **negligible** to **moderate** for most marine mammals, but they could be **major** for ESA-listed- whales in the unlikely event of a strike(s) that resulted in population-level effects to the extent the viability of the population was diminished.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative B on marine mammals could be **negligible** to **major** without applicable measures in place to protect marine mammals from harmful levels of noise; lines in the water; bottom disturbance; accidental marine debris entanglement, entrapment, or ingestion; accidental vessel strikes; accidental oil-spill contact; and spill-response activities. Considering the level of routine oil and gas installation and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale, and **Appendices B and C**, that could potentially lead to impacts, and when mitigating measures (including the Topographic Features and Live Bottom Stipulations; NTL No. 2009-G39; Protected Species Stipulation; and 2025 NMFS BiOp protocols including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA), A.8 Explosive-Severance Scenario Mitigation Protocol, and A.9 Pile Driving Monitoring and Reporting Requirements Protocol, are used, this impact would be **negligible** to **moderate** because exposures to the IPFs would be substantially reduced or prevented. Given the proposed critical habitat for the Rice's whale (88 FR 47453), additional mitigations through ESA consultation may be applied as necessary as part of a lease sale or during post-lease reviews, after consultation with NMFS.

Alternative C –Targeted OCS Lease Sale Area

Alternative C represents a geographical constraint on available acreage for leasing, which would cause a change in the spatial distribution of activities compared to Alternative B, but not the types of activities or overall activity levels. Most impacts to marine mammals from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternative C because, as discussed under Alternative B, areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding activity, and these activities

would not occur in excluded areas. Impacts from most routine activities would be limited to the areas leased under this alternative. One exception is noise, which could potentially travel from the sound source into excluded areas, resulting in impacts to marine mammals. The impacts from accidental events would be the same as described for Alternative B, including strikes from vessel traffic, which can occur throughout the GOA from port to lease activity. In addition, oil spills and response activities could occur in the excluded areas. However, this potential spatial redistribution of activity does not affect impact levels for marine mammals because they are widely distributed throughout the GOA.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative C on marine mammals would be **negligible** to **major** if applicable measures are not in place to mitigate IPF impacts (e.g., vessel strike, noise injury, entanglement in lines, bottom disturbance, accidental oil spill contact, spill remediation interactions, or accidental marine debris entanglement, entrapment, or ingestion) to marine mammals. When mitigating measures, including the Topographic Features and Live Bottom Stipulations; NTL No. 2009-G39; Protected Species Stipulation; 2025 NMFS BiOp protocols including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA), A.8 Explosive-Severance Scenario Mitigation Protocol, and A.9 Pile Driving Monitoring and Reporting Requirements Protocol are used, this impact would be **negligible** to **moderate** because exposures to the IPFs would be substantially reduced or prevented.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D represents a further geographical constraint on available acreage for leasing, which would cause a change in the spatial distribution of activities compared to Alternatives B and C, but not the types of activities or overall activity levels. Most impacts to marine mammals from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternative D because, as discussed under Alternative B, areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding activity, and these activities would not occur in excluded areas. Impacts from most routine activities would be limited to the areas leased under this alternative. One exception is noise, which could potentially travel from the sound source into excluded areas, resulting in impacts to marine mammals. The impacts from accidental events would be the same as described for Alternative B, including strikes from vessel traffic, which can occur throughout the GOA from port to lease activity. In addition, oil spills and response activities could occur in the excluded areas. However, this potential spatial redistribution of activity, which could increase vessel traffic through the 100- to 400-m (328- to 1,312-ft) isobath, does not affect impact levels to marine mammals because they are widely distributed throughout the GOA, and given the application of mitigating measures (i.e., A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols and A.6 Vessel Transit within the Rice's

Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA)), (**Table 4.8-2**) which would substantially reduce or prevent potential vessel interactions.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternatives D on marine mammals would be **negligible** to **major** if applicable measures are not in place to mitigate IPF impacts (e.g., vessel strike, noise injury, entanglement in lines, bottom disturbance, accidental oil spill contact, spill remediation interactions, or accidental marine debris entanglement, entrapment, or ingestion) to marine mammals. When mitigating measures, including the Topographic Features and Live Bottom Stipulations; NTL No. 2009-G39; Protected Species Stipulation; and 2025 NMFS BiOp protocols including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA), A.8 Explosive-Severance Scenario Mitigation Protocol, and A.9 Pile Driving Monitoring and Reporting Requirements Protocol are used, this impact would be **negligible** to **moderate** because exposures to the IPFs would be substantially reduced or prevented.

4.8.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which include ongoing and future OCS oil- and gas-related activities, could potentially affect marine mammals through bottom disturbance, noise, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions as described above in **Chapters 4.8.2.1** and **4.8.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.8.1** and in further detail in Chapter 4.3.6.1 of the GOM Oil and Gas SID. These ongoing impacts would be **negligible** to **moderate**. In the unlikely event of an accidental vessel strike on an ESA-listed whale, the determination could be **major** since this could result in substantial population-level effects. Future lease sales would add undetectable to substantial impacts to the past and present impacts. However, wells and structures are being decommissioned and removed at much higher rates than installations over the past decade (see **Chapter 3.2.5**), a trend expected to continue for the foreseeable future. While future lease sales may extend impacts, the types of impacts would remain similar though future OCS oil- and gas-related activities might expand the geographic footprint of affected areas as new lease blocks are

developed. As production in some areas ends and facilities are decommissioned, potential impacts would cease at those locations, and new lease sales would shift operational activities to different areas. The impacts from these activities would extend several decades into the future based on the project activity scenarios outlined in **Table 3.3-2**, though the precise impacts at any specific location would vary and depend on a wide array of factors.

Also, OCS oil- and gas-related operations rarely occur in dense aggregations, especially with respect to drilling operations, and most marine mammal species would be expected to move in and out of previously leased blocks and areas of ongoing oil and gas activity. Marine mammals throughout the GOA have wide-ranging movements, behaviors, and distributions. Regulatory requirements and protective measures (**Table 4.8-2**) currently prevent or minimize potential impacts to marine mammals; such requirements and protocols are expected to be considered for application to future OCS oil- and gas-related activities. Therefore, impacts from cumulative OCS oil and gas activities are expected to be similar to effects experienced from ongoing oil and gas activities, with no notable effects to overall population levels.

Non-OCS Oil- and Gas-Related Activities: Cumulative non-OCS oil- and gas-related activities could potentially affect marine mammals through bottom disturbance, noise, offshore habitat modification/space use, strikes and collisions, and environmental factors, as described above in **Chapter 4.8.2.3**. Climate-related factors can influence other IPFs on marine mammals, depending on many factors. Uncertainties exist about how these factors can impact marine mammals (Evans and Bjørge 2013; Silber et al. 2017), though range shifts, timing of biological activities, and regional abundance changes may influence impacts (Learmonth et al. 2006). Lettrich et al. (2023) found that marine mammals in the Gulf could be at risk from habitat degradation, prey availability changes, and increased human activities exacerbated by climate-related factors. Potential cumulative impacts would be highly variable and depend on a wide array of factors. Further, marine mammals in the GOA have wide-ranging movements, behavior, and distribution. Overall, non-OCS oil- and gas-related activities are expected to impact marine mammals more than OCS oil- and gas-related activities cumulatively when considering the broader geographic and temporal scope, and higher quantity of non-OCS oil- and gas-related activities compared to the much smaller scale of OCS oil- and gas-related activities in the Gulf.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion (0.3-1.8%) of activity when compared to the existing OCS Oil and Gas Program in the GOAR (**Table 3.3-2**). Considering the wide-ranging movements, behaviors, and distributions of marine mammals in the GOA, in addition to applicable regulatory requirements and protective measures (**Table 4.8-2**), BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as having a substantial effect on marine mammals. The incremental contribution of impacts from one lease sale to those cumulative effects would not increase the level of impacts substantially. Therefore, the *incremental contribution* of a proposed Gulf of America OCS oil and gas lease sale to cumulative impacts on marine mammals would be **negligible** when properly regulated and mitigated. An OCS oil and gas lease sale would not be expected to result in a notable increase to

any ongoing or reasonably foreseeable cumulative impacts experienced by most marine mammals in the area of analysis. When taking into consideration the breadth of science that has analyzed the impacts of anthropogenic activities to marine mammal populations, impacts from other anthropogenic activities and factors as discussed above appear to be more conclusively influential on marine mammals than the proposed OCS oil- and gas-related activities, and would still occur in the absence of activities resulting from the single proposed OCS oil and gas lease sale. One potential exception could be for the small, vulnerable population of Rice's whale found mainly in the northeastern GOA. The additional vessel trips associated with the proposed action may pose a small, potentially substantial contribution to cumulative impacts of vessel strike to the Rice's whale. Because most OCS oil-and gas-related vessels are expected to operate out of ports in the WPA and CPA, minimal to no vessel transits through the EPA (primary Rice's whale habitat) are expected to occur. Given the sheer number of vessels projected to transit throughout the Action Area from all OCS oil- and gas-related and non-OCS oil- and gas-related activities during the period of analysis (e.g., see Figures 4 and 5 in Stevens et al. 2024), the incremental increase in risk is quite small but should be acknowledged. Required mitigating measures prevent or substantially reduce the potential for strike, but should one accidental strike occur, the impact could have population-level impacts for the Rice's whale, which would be a **major** impact to the Rice's whale.

The incremental contribution to cumulative impacts on marine mammals would be similar between action alternatives because the primary mechanisms affecting marine mammals (e.g., noise, strikes and collisions) would be similar across all alternatives, differing only in spatial distribution based on lease blocks offered. Further, the incremental contribution to cumulative impacts would not differ between action alternatives when considering the wide range of marine mammal movements, behaviors, and distributions in the GOA, in addition to the applicable regulatory requirements and protective measures imposed (**Table 4.8-2**). Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Chapters 4.8.2.1** through **4.8.2.4** above. However, it should be noted that some activities, such as oil and gas extraction, may cease following decommissioning of facilities, potentially reducing impacts over time.

4.8.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on marine mammals. Such information includes impacts from climate-related factors, marine debris, accidental oil spills, and spill-response activities on marine mammals in the GOA, which can be difficult to quantify. There is also incomplete information on the full extent of the Rice's whale range, spatial density, and population abundance in the GOA, though BOEM utilized NMFS's 2025 BiOp (NMFS 2025b) assessment of the Rice's whale in its impacts analysis above. The 2025 NMFS BiOp (NMFS 2025b) states, "There is insufficient information available to properly examine population trends for the Rice's whale." BOEM has determined that such information is not essential to a reasoned choice among alternatives because none of the

available scientific publications reveal reasonably foreseeable significant adverse impacts to marine mammals not otherwise considered in this Programmatic EIS. BOEM's subject-matter experts have used publicly available scientifically credible evidence presented herein and applied accepted scientific methodologies to integrate existing information qualitatively and quantitatively (if available) and extrapolated potential outcomes in completing this analysis and formulating any conclusions. Therefore, the incomplete or unavailable information, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

4.9 SEA TURTLES

Five species of sea turtles occur in the GOA: the loggerhead turtle; green sea turtle; hawksbill sea turtle; Kemp's ridley sea turtle; and leatherback sea turtle. Of these, the Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead sea turtle and the North Atlantic DPS of green sea turtle are ESA-listed as threatened (79 FR 39856). The hawksbill turtle, Kemp's ridley turtle, leatherback turtle, and breeding populations of green sea turtle in Florida are ESA-listed as endangered. The FWS and NMFS share jurisdiction for sea turtles. The FWS has jurisdiction for sea turtles in the terrestrial environment, including monitoring and managing sea turtles (i.e., nesting turtles, eggs, and hatchlings) on beaches. NMFS has jurisdiction for sea turtles in the marine environment for activities that affect sea turtles and their habitats offshore.

4.9.1 Affected Environment

Of the five sea turtle species, some use the GOA for the majority of their life cycle, such as the Kemp's ridley, while other species, such as leatherback and green sea turtles, may use the waters of the GOA for migrating and foraging. It is assumed that all species are broadly distributed, and many sea turtle species have wide-ranging migrations both within and outside of the GOA. Recent tagging and tracking studies have provided additional information on sea turtle habitat use in the northern GOA. Evans et al. (2021) evaluated satellite telemetry of female leatherback sea turtles over a 15-year period and found that portions of the GOA (i.e., the Florida Panhandle area, south Louisiana, and the Bay of Campeche) were used as residential areas for nesting females rather than migratory or pass-through regions. Gredzens and Shaver (2020) estimated that up to 82 percent of adult female Kemp's ridley sea turtles may use the northern GOA, particularly waters shoreward of the 100-m (328-ft) isobath, as their primary foraging area post-nesting. In 2022, Kemp's ridley hatchlings were discovered on the Chandeleur Islands, confirming nesting for the first time in 75 years (DOI 2022). The presence of green sea turtle nests have also been confirmed on the Chandeleur Islands (Baker et al. 2025). Juvenile green sea turtles use coastal Texas inland bays in the fall and summer before migrating south to Mexico and the Mexico-Texas border (Metz et al. 2020). Green sea turtles nesting on southwest Florida mainland beaches use areas off Cape Sable (Everglades) and the Marquesas Key as inter-nesting and foraging habitats (Lamont et al. 2023; Sloan et al. 2022). Lamont and Hart (2023) found that green turtles spent more time in the top two meters of the water column than Kemp's ridleys or loggerheads. Time at surface was greater for all species of study (loggerhead, Kemp's ridley, and green) in summer but did not differ between BOEM's EPA and CPA, except for Kemp's ridleys, which spent more time at the surface in the WPA

than the EPA (Lamont and Hart 2023). Floating *Sargassum* patches in the CPA and WPA are used by juvenile sea turtles as habitat and for foraging (**Chapter 4.5**). *Sargassum* is federally designated under the ESA as critical habitat for loggerhead turtles (79 FR 39856). Critical habitat is currently proposed by the FWS (88 FR 46376) and NMFS (88 FR 46572) for the green sea turtle in the GOA. NMFS proposed areas from the mean high water line to the 20-m (66-ft) depth in Florida and Texas and within *Sargassum* habitat in the EPA, CPA, and WPA (88 FR 46572). FWS proposed nesting beaches in the Florida mainland, Boca Grande and Marquesas Keys, and the Dry Tortugas (88 FR 46376).

4.9.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact sea turtles. Non-OCS oil- and gas-related activities also have the potential to impact sea turtles. These IPFs and their potential to affect sea turtles are discussed below and in greater detail in Chapter 4.3.7.2 of the GOM Oil and Gas SID. Bottom disturbance was initially scoped out in the GOM Oil and Gas SID but has since been determined to potentially impact sea turtles and is included in this analysis. Supporting rationale for the IPFs that were not analyzed in detail in this Programmatic EIS can be found in Chapter 4.3.7 of the GOM Oil and Gas SID.

Table 4.9-1. Impact-Producing Factors with the Potential to Impact Sea Turtles.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Noise	Unintended Releases into the Environment	Noise
Offshore Habitat Modification/Space Use	Response Activities	Discharges and Wastes
Bottom Disturbance	Strikes and Collisions	Coastal Land Use/Modification
Lighting and Visual Impacts	-	Lighting and Visual Impacts
-	-	Offshore Habitat Modification/ Space Use
-	-	Bottom Disturbance
-	-	Strikes and Collisions
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

Several existing regulatory programs and protective measures reduce or avoid the environmental effects of these IPFs to sea turtles in the GOA. Regulatory requirements enforced by BOEM, BSEE, and other agencies are outlined in **Table 4.9-2** and further described in the *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025a). The protective measures and regulatory requirements listed in **Table 4.9-2** reduce impacts to sea turtles by reducing noise exposure, requiring avoidance distances from sensitive benthos, requiring precautions for lines in the water, requiring safety measures for accidental oil spills and spill response, reducing or

eliminating accidental trash and debris, and requiring precautions aimed at preventing or reducing and reporting vessel strikes.

Lessees are required to perform OCS oil- and gas-related activities, including decommissioning activities, in accordance with all regulatory requirements, including existing and future consultation requirements under the ESA and other statutes. Therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations. Compliance with existing and future consultation requirements – by BOEM as well as individual operators and lessees, as required – may result in additional mitigating measures or updates to the existing measures described throughout this chapter. For example, a plan approval would be conditioned on compliance with the applicable Reasonable and Prudent Measures and Terms and Conditions of the most recent BiOp issued by the NMFS at the time of the site-specific review (**Appendix G.3**). This includes adaptively managing the mitigation, monitoring, and reporting requirements (2025 BiOp and associated Attachments and Appendices, and/or COAs) imposed by the Bureaus on plans and permits, and as coordinated with NMFS and industry. Any future BiOp amendments or COAs shall be a requirement and binding on subsequent BOEM authorizations. Through adaptive management, BOEM would incorporate new or updated measures resulting from ongoing or future consultations into post-lease plan reviews and authorizations, as appropriate (Chapter 6 of the GOM Oil and Gas SID).

Table 4.9-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure[1]	**Enforcing Agency**	**Impact-Producing Factor(s) Reduced/Avoided**	**Supporting References and Sections**
Protected Species Stipulation	BOEM	Offshore Habitat Modification/ Space Use, Noise, Unintended Releases into the Environment, and Strikes and Collisions	Chapters 6 and 7.5 of the GOM Oil and Gas SID
OCSLA	BOEM, BSEE	Offshore Habitat Modification/ Space Use	43 U.S.C. 1331, OCS Report BOEM 2025-040 (BOEM 2025a)
CZMA	NOAA, States	Coastal Land Use/Modification	16 U.S.C. 1251 and 15 CFR 930, OCS Report BOEM 2025-040 (BOEM 2025a)

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
ESA	FWS, NOAA, NMFS	Noise, Offshore Habitat Modification/Space Use, Strikes and Collisions, Coastal Land Use/Modification	2018 FWS BiOp, as amended March 28, 2025; OCS Report BOEM 2025-040; Chapter 5; 2025 NMFS BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.7 Sea Turtle Resuscitation Guidelines Protocol, A.8 Explosive-Severance Scenario Mitigation Protocol, A.9 Pile Driving Monitoring and Reporting Requirements Protocol, and A.10 Site-clearance Trawling Protocol
National Marine Sanctuaries Act – Flower Garden Banks National Marine Sanctuary, including NMSA 304(d)	NOAA, ONMS	Noise, Bottom Disturbance	15 CFR 922. L; 16 U.S.C. 1434(d)
CWA Section 404	USACE	Coastal Land Use/ Modification, Discharges and Wastes	33 U.S.C. 1251, OCS Report BOEM 2025-040 (BOEM 2025a)
Marine Plastic Pollution Research and Control Act	USCG	Unintended Releases into the Environment	33 U.S.C. 1901, OCS Report BOEM 2025-040; 2025 NMFS BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
National Contingency Plan (CWA, Oil Pollution Act, National Oil and Hazardous Substances Pollution Contingency Plan)	USCG; USEPA; State, Regional, and local governments	Unintended Releases into the Environment	40 CFR 300.311 of the Clean Water Act, Oil Pollution Act of 1990 (33 U.S.C. 2701), the National Response Framework, E.O.s 12580 and 12777, S.O. 3299

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Marine Debris Research, Prevention, and Reduction Act	USEPA, USCG	Unintended Releases into Environment	33 U.S.C. 1901, OCS Report BOEM 2025-040 , NMFS 2025 BiOp (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b) A.2 Marine Debris Protocol
Hard Bottom Habitat Avoidance Mitigations	BOEM, BSEE	Bottom Disturbance, Offshore Habitat Modification/Space Use	BOEM NTL No. 2009-G39; BOEM NTL No. 2009-G40; Chapters 6, 7.6, and 7.9 of the GOM Oil and Gas SID
Topographic Features and Live Bottom Stipulations	BOEM, BSEE	Bottom Disturbance, Offshore Habitat Modification/Space Use	Chapters 6, 7.6, and 7.9 of the GOM Oil and Gas SID

[1] See Chapter 6 of the GOM Oil and Gas SID for conditions of approval commonly applied at the post-lease stage.

4.9.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Noise: Sea turtles in the GOA are exposed to several sources of anthropogenic noise with ongoing OCS oil- and gas-related activities, including vessel traffic, dredging, pile driving, decommissioning (including explosive severance), and G&G surveys. Noise has the potential to cause both lethal and nonlethal impacts, including behavioral disturbances, interference with communication via acoustic masking, potential hearing impacts, injury, and death. Sea turtles can detect sounds between 100 Hz and 2 kHz (BOEM 2021a); however, there is some sensitivity to frequencies as low as 50 Hz, and possibly as low as 30 Hz (Ridgway et al. 1969). This low-frequency hearing overlaps with low-frequency OCS oil- and gas- related noise in the ocean, including vessel traffic (e.g., decommissioning vessel traffic), pile driving, and drilling. Little is known about the extent to which sea turtles depend upon their auditory environment (Popper et al. 2014a). Sea turtle responses to low-frequency sounds are expected to include behavior responses, acoustic masking, temporary hearing loss, permanent hearing loss, and mortality (BOEM 2021a). Mounting evidence indicates noise can interfere with communication among sea turtles via acoustic masking (Clark et al. 2009).

Noise associated with OCS oil- and gas-related G&G activities may result in behavioral effects (e.g., changes in direction or swimming speed) or auditory masking in sea turtles. The most likely noise impacts on sea turtles are expected to be short-term behavioral responses. Studies have demonstrated avoidance behavior of sea turtles to seismic surveys (DeRuiter and Doukara 2012; Lenhardt 1994; McCauley et al. 2000; O'Hara and Wilcox 1990; Piniak et al. 2012; Suedel et al. 2019). Sea turtles may alter their behaviors when a seismic vessel approaches and thereby suspend

feeding, resting, or interacting with conspecifics. Such disruptions are expected to be temporary, however, and are not expected to impact the overall survival and reproduction of individual turtles. Seismic operations have the potential to harm sea turtles in very close proximity to active airgun arrays (Popper et al. 2014a). High levels of sound exposure, such as those from pile driving, can adversely affect sea turtles through hearing injury, impairment, and disturbance responses of oceanic juvenile sea turtles. Responses of sea turtles to pile-driving noise are not well studied. Underwater sound levels generated during pile driving vary depending on factors including the sound speed of the water column, bathymetry, and sediment composition.

In addition to construction and operational noise, the decommissioning of bottom-founded structures through the use of explosive charges, which is not typically the main method of removal, generates shock and pressure waves. These shock and pressure waves may cause impacts to sea turtles, including behavioral disturbances, potential hearing impacts, injury, and death (MMS 2005). Sea turtles have been documented as being severely injured, and, in a few cases, killed, as a result of explosive severance (Gitschlag et al. 1997; Klima et al. 1988; Zawawi et al. 2023), but other studies suggest that sea turtle ears may be relatively resistant to damage from explosives (Ketten et al. 2005). When structures are removed, visual observations are made within the expected zone of impact to ensure turtles are not in the immediate area. It is reasonable to assume that the marine turtle auditory apparatus is sensitive to sounds produced by underwater explosions, and the air-filled middle ear is sensitive to associated pressure effects. Sea turtles have exhibited a momentary startle response or temporary disorientation as a result of low intensity detonations or detonations at a distance from the individual. Non-lethal injuries to turtles from the effects of a blast include the rupture of the tympanum, known as the external hearing structure. The rupture of the tympanum has been correlated with permanent hearing loss (Ketten 1995; 1998). Impacts from any sound source are relative to the type; frequency, intensity, and duration of the source; and the distance to the animal (BOEM 2021a). Chapter 4.6.1 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.7.2.2 of the GOM Oil and Gas SID (BOEM 2023b) contain additional information on potential noise impacts from OCS oil- and gas-related activities to sea turtles.

Several mitigating measures may reduce the potential impacts of noise to sea turtles. BOEM-permitted activities implement mitigating measures for low-frequency noise (<180 kHz) during G&G survey activity, for explosive decommissioning, and for pile driving (**Table 4.9-2**). The requirements of the Protected Species Stipulation and the 2025 NMFS BiOp protocols including A.1 Operational National Mitigation Protocols for Geophysical Surveys (**Table 4.9-2**), are designed to identify the presence of sea turtles and implement procedures to avoid or reduce sea turtle exposure to seismic sources prior to a survey starting. Similarly, the Protected Species Stipulation; and 2025 NMFS BiOp protocols including A.8 Explosive-Severance Scenario Mitigation Protocol (**Table 4.9-2**), are designed to identify the presence of sea turtles nearby a structure prior to the detonation of explosives and to avoid or reduce exposure of sea turtles to the shock and pressure waves. These protective measures require the delay of explosive detonations if sea turtles are observed within an impact zone, the monitoring after detonations to detect impacted sea turtles (i.e., stunned, injured, or killed), and the collection of injured sea turtles so that aid can be rendered. Detonation delays are

also required if *Sargassum* is detected in the impact zone. Additionally, the 2025 NMFS BiOp A.9 Pile Driving Monitoring and Reporting Requirements Protocol requires visual monitoring by protected species observers prior to the start of activity, soft starts, and shutdowns in the event a sea turtle is sighted.

Offshore Habitat Modification/Space Use: Leasing on the OCS results in construction and operations activities that occupy OCS space for dedicated uses. Vessel traffic (including from decommissioning vessels) within estuaries could result in habitat loss or degradation and environmental contamination (Robb 2014). Offshore habitat modification through installation and decommissioning of infrastructure could destroy SAV habitat that sea turtles depend on for feeding and breeding. These losses would likely be localized, though they could lead to long-term impacts and shoreline loss. In addition, new pipeline landfalls could result in habitat loss or degradation onshore. Delayed decommissioning of wells, structures, and pipelines, provide no net positive or negative effect to sea turtles, but may provide a beneficial localized foraging source. Decommissioning may, over time, restore damaged or degraded habitat, allowing the return of pre-construction conditions. Decommissioned offshore structures typically have complex physical features, including pilings, submerged parts, and accumulated marine life, that provide ideal habitats for various marine organisms, including sea turtles (Lemasson et al. 2024). These physical features can be attractive to foraging sea turtles, because they enhance the availability of prey, including jellyfish and crustaceans. Additionally, decommissioned structures can provide shelter for sea turtles and provide enhanced foraging grounds to support reproductive success through providing sufficient nutrition before and after nesting activities (Lemasson et al. 2024). The removal of infrastructure can create disturbances similar to infrastructure installation. The removal of infrastructure can result in bottom disturbance creating turbidity in the water column, which may impact prey availability and foraging efforts if the water conditions persist. The effects of these activities would be localized and temporary, and habitat loss is not expected. Where practicable, mechanical removal and severance avoids the potential harm caused by the use of explosives to sea turtles (Bull and Love 2019).

In the course of construction, operation, and decommissioning activities, sea turtles could be exposed to entanglement and entrapment risks from diving activities, site clearance trawling activities, or when moon pools are used during diving activities or drilling operations. Sea turtle entanglement or entrapment has the potential to cause injury or death. The Protected Species Stipulation, the 2025 NMFS BiOp protocols including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.7 Sea Turtle Resuscitation Guidelines Protocol, A.5 Moon Pool Monitoring Protocol, A.10 Site-clearance Trawling Protocol, and A.4 In-water Line Precaution Protocol (**Table 4.9-2**) provide guidelines for lines used in the water to prevent looping and tangling, provide response measures if a turtle is injured due to an entanglement, and provide protocols for the use of moon pools to prevent sea turtle entrapment, and, if entrapped, a prompt detection and release. These measures reduce the potential for entanglement and provide protocols for rendering care if the sea turtle is entangled or entrapped. Chapter 4.6.5 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.7.2.2 of the GOM Oil and Gas SID (BOEM 2023b) contain additional information on potential offshore habitat modification/space use impacts from OCS oil- and gas-related activities to sea turtles.

Bottom Disturbance: Most of the GOA seabed is composed of ubiquitous, soft bottom sediments. In comparison, hard bottom and live bottom habitats have a much more limited distribution. Some sea turtles forage on live bottoms (e.g., sea grass beds). Bottom-disturbing activities can degrade or destroy benthic features used by some sea turtles for foraging and/or habitat. Such activities can result in the loss of foraging grounds and/or preferred habitat. For example, anchors and structure emplacement disturb the seafloor and sediments in the area where they are dropped or emplaced. Further, anchoring can cause physical crushing and compaction beneath the anchor and chains or lines. Routine structure-removal activities such as support vessel and barge anchoring, pre-severing operations, severing operations, post-severing operations, site clearance activities, and reefing of portions of the removed structure could all contribute to localized bottom disturbance. Sediment disturbance would occur on a limited area of seafloor over a time period of less than a week to about a month for the most extensive removal projects (MMS 2005). BOEM-permitted activities, including decommissioning activities, implement mitigating measures such as the Topographic Features Stipulation and Live Bottom (Pinnacle Trend) Stipulation to avoid sensitive benthic habitats that may be used by some sea turtles for foraging (**Table 4.9-2**). Therefore, potential impacts from bottom disturbance on the OCS are expected to be limited to soft bottom habitats and distanced from SAV habitat that sea turtles may depend on for feeding (see **Chapter 4.4** for an analysis of impacts to benthic communities). Drilling impacts would be localized and not expected to occur outside of the immediate area. In addition, infrastructure emplacement, pipeline trenching, and structure removal would be localized and temporary, and habitat loss is not expected.

Lighting and Visual Impacts: Nesting sea turtles and hatchlings are greatly influenced by lighting on nesting beaches. Ports, support facilities, construction facilities, transportation infrastructure, and processing facilities emit light onshore, which could impact sea turtles. Depending on the location of onshore facilities in relation to nesting beaches, lighting could disorient nesting sea turtles and hatchlings. Upon hatching, sea turtles use natural light cues to orient themselves and advance toward the ocean (Witherington and Martin 2003). Additional onshore lighting can confuse hatchling turtles when they emerge from their nests. Artificial light sources (or light pollution) on land might draw hatchlings away from the ocean, resulting in high mortality due to dehydration and predation (Silva et al. 2017; Witherington and Martin 2003). A number of factors can affect light transmission, both in air and water. In air, the transmission of light can be affected by atmospheric moisture levels, cloud cover, and the type and orientation of lights. In water, turbidity levels and waves, as well as the type of light, can affect transmission distance and intensity. Artificial lighting from vessels conducting BOEM-regulated, OCS oil- and gas-related activities, including decommissioning activities, would be localized, intermittent, and temporary within any one area.

4.9.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOAR).

Unintended Releases into the Environment: Entanglement in marine debris, including what could come from decommissioning activities or vessels, could lead to injury, infection, reduced mobility, increased susceptibility to predation, decreased feeding ability, fitness consequences, and/or mortality (e.g., drowning) of sea turtles (Gall and Thompson 2015). Marine debris ingestion could lead to intestinal blockage, which can impact feeding ability and lead to injury or death (Senko et al. 2020). Data on marine debris in some locations of the GOA is largely lacking; however, Choi et al. (2021) evaluated plastic ingestion by green sea turtles by synthesizing information from over 33 years along the Texas Coast of stranded and incidentally captured green sea turtles. Smaller turtles ingested more and smaller sizes of plastic debris than larger turtles. Choi et al. (2021) suggested the smaller pelagic-stage sea turtles may be more vulnerable to plastic ingestion due to foraging location and behavior. It still remains difficult to draw conclusions as to the precise extent and origin of anthropogenic marine debris and its impacts on sea turtle populations. Recent studies have identified the potential for microplastics to cause, in addition to physical impacts, metabolic and toxicity impacts on variety of marine organisms including mammals, reptiles, and birds (Parolini et al. 2023). Through gut analysis, microplastic ingestion has been documented in marine turtles (Duncan et al. 2019). The presence of microplastics on nesting beaches may affect sea turtle nesting sites by altering the properties of sediment that affect temperature and permeability (Estrella-Jordon et al. 2023). In addition to plastics, toxins may be unintentionally released into the environment, resulting in stress to marine life, including sea turtles. Sensitivity to pollutants varies by species and limited data are available regarding the impacts of persistent pollutants on sea turtles' health (Arienzo 2023). Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with regulatory requirements (**Table 4.9-2**), that would minimize unintended releases of trash and debris by oil and gas operators. Mitigating measures include the Protected Species Stipulation and the 2025 NMFS BiOp protocols including A.2 Marine Debris Protocol, which reiterate the prohibition of discharging materials into the marine environment as outlined in the Marine Plastic Pollution Research and Control Act, MARPOL Annex V, and the Marine Debris Research, Prevention and Reduction Act (**Table 4.9-2**). Oil spills may put sea turtles at risk because of their lack of avoidance behavior, indiscriminate feeding in convergence zones, and large pre-dive inhalations (Shigenaka et al. 2010). Sea turtles accidentally exposed to oil or tarballs may suffer inflammatory dermatitis, ventilatory disturbance, salt gland dysfunction or failure, immune responses, and digestive disorders or blockages (Lutcavage et al. 1995). Contact with hydrocarbons may not cause direct or immediate impacts, but sublethal impacts. Eggs, hatchlings, and small juveniles are particularly vulnerable to contacting or ingesting hydrocarbons due to the convergence of their habitat and areas where oil typically aggregates. Contact in young individuals may bioaccumulate over their lifespan. Bioaccumulation of heavy metals and polycyclic aromatic hydrocarbons (PAHs) have been documented in sea turtles worldwide, and numerous potential exposure pathways for these persistent pollutants have been identified and include pollution and spills (Arienzo 2023). Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements, such as the National Contingency Plans (**Table 4.9-2**), which provide effective control and containment and would be expected to limit the volume and area of exposure. Chapters 4.6.8.1 and 4.6.8.3 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.7.2.3 of the GOM Oil and Gas SID contain additional information on

potential impacts from OCS oil- and gas-related unintended releases into the environment to sea turtles.

Response Activities: Spill-response activities may affect sea turtle habitat and temporarily displace sea turtles from suitable habitat. Impact-producing factors might include artificial lighting, machine and human activity, vessel traffic, and changed beach landscapes and composition. Impacts from cleanup could include crushed nests, deterred nesting behavior, and increased mortality of hatchlings (Lutcavage et al. 1997). Due to spill response and cleanup efforts, much of an oil spill may be recovered before it reaches the coast. However, offshore cleanup efforts may result in additional mortality to individuals, particularly neonates and juveniles. Due to the nature of response activities, impacts could occur, resulting in behavioral changes of individuals in the immediate area. Through the National Contingency Plan (40 CFR 300) and the Federal laws that underpin this regulation, response plans at the Federal, State, and local level (e.g., from the USCG, BSEE, States, NMFS, FWS, and NPS) have been developed to detect sea turtles during response activities and implement cleanup strategies that avoid or reduce direct impacts to sea turtles, such as damaging nests or discouraging females from coming onto the beach or altering sea turtle habitat making beach sites no longer suitable for nesting. These plans increase surveillance and the detection of animals, thus reducing potential impacts through avoidance measures (see **Table 4.9-2**). Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements. Chapter 4.6.8.2 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.7.2.3 of the GOM Oil and Gas SID (BOEM 2023b) contain additional information on potential impacts from OCS oil- and gas-related response activities to sea turtles.

Strikes and Collisions: Vessel traffic in the GOA is concentrated near major ports, such as Port Fourchon, Louisiana, and Houston, Texas. Vessel strikes are known to result in injury and mortality to sea turtles (Work et al. 2010). Sea turtles are known to bask at the surface of the water and recent studies show that time spent at the surface for basking, feeding, orientation and mating are about 11 percent for loggerhead (Garrison et al. 2020), approximately 19 percent for green sea turtles (Roberts et al. 2022) and between 11 and 23 percent (Garrison et al. 2020) for Kemp's ridley sea turtles, depending on the season. Although sea turtles are able to move somewhat quickly, they are still at risk of being struck by vessels, including decommissioning vessels, moving rapidly while on the surface. Foley et al. (2019) studied vessel strike injury among stranded (i.e., dead, sick, or injured) sea turtles found in Florida between 1986 and 2014 along the entire Florida coastline. Based on this analysis, the frequency of vessel strike was identified in a third (33%) of the stranded loggerhead, green and leatherback sea turtles and a slightly lower percentage for Kemp's ridley sea turtles (26%) and hawksbill sea turtles (15%). A subset of the dead sea turtles was necropsied and vessel strike injury was identified as the cause or the probable cause of death in over 90 percent of those sea turtles. BOEM permitted activities, including decommissioning, implement mitigating measures for vessel strikes during activity (see **Table 4.9-2**), which would prevent or substantially reduce sea turtle interactions with transiting vessels. The Protected Species Stipulation and 2025 NMFS BiOp protocols, including A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, provide requirements for vigilant monitoring for sea turtles

during transit and maintaining a separation distance while underway if sea turtles are detected. These requirements reduce the potential for vessel strikes or collisions and require operators to report instances of vessel strikes and collisions. There have been no documented sea turtle collisions with OCS oil- and gas-related vessels in the GOA; however, collisions with small or submerged sea turtles may go undetected. Chapter 4.6.8.4 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.7.2.3 of the GOM Oil and Gas SID contain additional information.

4.9.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence sea turtles in the GOA through noise; discharges and wastes; coastal land use/modification; lighting and visual impacts; offshore habitat modification/space use (including fisheries interactions); bottom disturbance, and strikes and collisions. Other environmental factors not already discussed as part of existing conditions but which are reasonably foreseeable and may contribute to impacts to sea turtles include climate-related factors and natural processes (e.g., disease). The content under each IPF heading below summarizes the more relevant detailed discussion of how non-OCS oil- and gas-related activities can affect sea turtles found in Chapter 4.3.7.1.2 of the GOM Oil and Gas SID.

Noise: Over the last few decades, low-frequency ambient ocean noise has increased substantially due to a steady increase in shipping as vessels have become more numerous and of larger tonnage (Haver et al. 2021; Hildebrand 2009; McKenna et al. 2012). Vessel traffic is recognized as a major contributor to anthropogenic ocean noise, primarily in the low-frequency bands between 5 and 500 Hz. Elevated ocean noise levels could increase stress in sea turtles, which, in turn, could lower reproductive output and increase susceptibility to disease (Kight and Swaddle 2011). The impacts of increasing ambient noise are expected to be behavioral responses and possibly masking effects. Potential masking noises could fall within at least 50-1,000 Hz. However, there are no quantitative data demonstrating masking effects for sea turtles. State-based seismic surveys may also impact sea turtles and cause avoidance or injury. Chapter 3.6.6.1 of BOEM's Biological Environmental Background Report (BOEM 2021a) and Chapter 4.3.7.2.1 of the GOM Oil and Gas SID contain additional information on potential cumulative noise impacts on sea turtles.

Discharges and Wastes: Marine debris poses a threat to sea turtles through ingestion, entanglement, and habitat degradation. In the U.S., approximately 80 percent of marine debris enters the oceans from land-based sources and 20 percent from ocean sources (USEPA 2017). Point and nonpoint discharges of metals and organic compounds can degrade water quality. Debris in the form of trash and plastics can be ingested by sea turtles (Choi et al. 2021). Plastics have increasingly been found inside of deceased sea turtles (Gregory 2009; Schuyler et al. 2016). The ingestion of plastics and marine debris in general can lead to intestinal blockage, which could impact feeding and which may ultimately lead to injury or death. Recent studies have identified the potential for microplastics to cause, in addition to physical impacts, metabolic and toxicity impacts on variety of marine organisms (Parolini et al. 2023). The presence of microplastics on nesting beaches may

affect sea turtle nesting sites by altering the properties of sediment that affect temperature and permeability (Estrella-Jordon et al. 2023). Sea turtles may also become entangled in marine debris, which can lead to injury, infection, fitness consequences, and mortality. Chapter 4.3.7.2.1 of the GOM Oil and Gas SID contains additional information on potential cumulative impacts from discharges and wastes on sea turtles.

Coastal Land Use/Modification: Sea turtle habitats may be degraded or destroyed by coastal development activities, such as beach reclamation, beach renourishment, and dredging activities (Kildow et al. 2016; Sengupta et al. 2018; Shamblott et al. 2021). Increasing infrastructure is likely to affect sea turtle nesting habitat. Coastal construction that disrupts the process of egg-laying can impact sea turtles due to how long it takes to reach sexual maturity (Harewood and Horrocks 2008). Additionally, this construction may change the composition and composure of the beach, which can impact sea turtles. Coastal construction may also indirectly degrade water quality by increased sedimentation, pollutant runoff, and potential discharges from construction vehicles.

Lighting and Visual Impacts: Increasing coastal development, including artificial lighting from beachfront properties and other buildings, could threaten nesting success and hatchling survival (Harewood and Horrocks 2008; Silva et al. 2017). Beachfront lighting has the potential to attract and disorient hatchlings when they emerge from the nest, leading them away from the water and towards roads and buildings where they may die from exposure, predators, or vehicles, or become trapped by obstacles.

Offshore Habitat Modification/Space Use: Offshore habitat modification could degrade sea turtle habitats via pollution, bottom or land disturbance, and state oil and gas decommissioning. Pollution has the potential to modify suitable habitat for sea turtles (Morton 2003). Bottom disturbance could also destroy SAV habitat that sea turtles depend on for feeding and breeding although likely temporarily. Habitat degradation could persist and have long-term residual impacts on community structure and habitat function (Morton 2003).

Commercial fishing operations, such as shrimp trawl fisheries, often use equipment that may threaten sea turtles through entanglement or ingestion (Valverde and Holzwart 2017). Similar to commercial fishing, recreational fishing also results in increased marine traffic and resource consumption. Fishing line and gear that is not disposed of properly can create hazards to sea turtles and are outside BOEM and/or BSEE's regulatory authority. Sea turtle bycatch occurs in the GOA, especially for the longline fishery, and can be driven by turtle density, fishing intensity, or both (Lewison et al. 2014). Turtles may be accidentally caught and killed in finfish trawls, seines, gill nets, weirs, traps, longlines, and driftnets (Brady and Boreman 1993; Epperly et al. 2007; Jenkins 2012).

To reduce fishery impacts to sea turtles, NMFS has required the use of turtle excluder devices in southeast U.S. shrimp trawls since 1989 and has increased efforts over the years for adequate protection to decrease the number of entrapments/entanglements. Since implementing the required use of turtle excluder devices throughout the shrimp fishing industry, gear improvements continue to be introduced nearly annually. Florida and Texas have banned all but very small nets in

State waters. Louisiana, Mississippi, and Alabama have also placed restrictions on gillnet fisheries within State waters, such that minimal commercial gillnetting takes place in southeast waters. Mortality rates have decreased since the implementation of these regulations but because turtles mature slowly, populations are still recovering (Jenkins 2012; Valverde and Holzwart 2017). Chapter 3.6.6.3 of BOEM's Biological Environmental Background Report contains additional information.

Bottom Disturbance: Green, Kemp's ridley, and loggerhead turtles use soft bottom benthic habitats for foraging. Hawksbill turtles feed in coral and hard bottom areas, which are generally avoided. Various bottom-disturbing anthropogenic activities can degrade or destroy benthic features used by some sea turtles for foraging and/or habitat. Such activities can result in the loss of foraging grounds and/or preferred habitat. For example, anchors and trawling disturb the seafloor and sediments in the area where they are dropped or emplaced. Further, anchoring can cause physical crushing and compaction beneath the anchor and chains or lines. State-regulated infrastructure emplacement, pipeline trenching, and structure removal would be localized and temporary, and habitat loss is not expected. It is assumed that careful timing of activities and siting of onshore and State-regulated infrastructure, particularly with regard to ESA-listed species, would be applied.

Strikes and Collisions: Vessel traffic in the GOA occurs primarily near major ports, such as Port Fourchon, Louisiana, and Houston, Texas. Vessel strikes are a poorly studied threat to sea turtles, though they are known to result in injury and mortality (Work et al. 2010). Several species, such as loggerheads, are known to bask at the surface for long periods. Although sea turtles can move somewhat rapidly, they are still vulnerable to strikes from vessels that are moving at more than 4 km/hr (2.5 mph), which is common in open water (Hazel et al. 2007; Work et al. 2010). Both live and dead sea turtles are often found with deep cuts and fractures indicative of collision with a boat hull or propeller (Hazel et al. 2007). Chapter 3.6.6.4 of BOEM's Biological Environmental Background Report contains additional information.

There are limited data available about potential sea turtle impacts from vessel strikes due to a lack of studies and/or the challenges with detecting such impacts (Nelms et al. 2016). Nonetheless, strikes from all types of vessels are known to result in sea turtle injury and mortality in the GOA (Lutcavage et al. 1997; Nelms et al. 2016; Work et al. 2010). Sea turtles occur in all GOA planning areas and are vulnerable to vessel strikes because of the time they spend at the surface. If a sea turtle is struck by a vessel, serious injury, and/or minor, non-lethal injury can occur, and the associated effects vary based on the size and speed of the vessel.

Other Environmental Factors: Sea-level rise can decrease the physical extent of nesting beaches and may decrease nesting suitability (Martins et al. 2022). Projected sea-level rise and storm surge activity pose major threats to nesting habitat and reproductive success (Lyons et al. 2020). Hatchling sex is determined by temperature during embryonic development: warmer nests usually produce more females (Gatto et al. 2021; Hays et al. 2014; Laloë et al. 2014). Therefore, warmer nests could produce more females and potentially bias sex ratios that ultimately may have population level impacts (Gatto et al. 2021; Hays et al. 2014; Laloë et al. 2014; Lockley and Eizaguirre 2021). The continued increase in temperature is also linked to hatchling mortality. As

incubation temperatures reach the upper thermal tolerance limit, temperature-linked mortality also increases (Lyons et al. 2022). Synthesis and modeling studies using regional (Catron et al. 2023) and worldwide (Hays et al. 2023) nesting data and projected global temperature information project population decreases through different mechanisms. However, competition for mates tends to balance operational sex ratios (Jennions and Fromhage 2017). Therefore, relying solely on sex ratios based on nest incubation temperature may not be the most reliable method for assessing the over-feminization of a population or the impact of climate on the sea turtle population long-term (Tomillo 2022). Additionally, factors surrounding key demographic parameters (e.g., male breeding rates and sex-specific survival) need further investigation to properly project the impacts of warming on the sea turtle population (Maurer et al. 2021). Additional information regarding sea turtles can be found in the 2018 FWS BiOp (FWS 2018), 2025 NMFS BiOp (NMFS 2025a), Chapter 3.6 of BOEM's Biological Environmental Background Report and Chapter 4.3.7 of the GOM Oil and Gas SID (BOEM 2023b).

Sea turtles are affected by disease, including species-specific fibropapillomatosis; viral, bacterial, and mycotic (fungal) infections; parasites (internal or external); and other environmental health problems (e.g., hypothermic stunning) (Herbst 1994; Van Houtan et al. 2014). Disease can cause physical impacts and disrupt swimming, feeding, and other life functions. Disease could impact sea turtle survival, reproductive fitness, and longevity. Population levels that impact disease are not well understood. Host-pathogen relationships are sensitive to environmental conditions, and climate-related factors may increase the risk of disease (Burge et al. 2014).

4.9.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct or indirect impacts to sea turtles would occur as a result of the proposed action (i.e., a proposed oil and gas lease sale) and the impact of Alternative A on sea turtles would be **none**. However, ongoing OCS oil- and gas-related activities associated with previous lease sales, and other non-OCS oil- and gas-related activities would continue to potentially affect sea turtles under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) may potentially affect sea turtles through noise, offshore habitat modification/space use, bottom disturbance, lighting/visual impacts, unintended releases into the environment, response activities, and strikes and collisions. The potential impacts are summarized above in **Chapters 4.9.2.1** and **4.9.2.2** and in greater detail in Chapter 4.4.3 of the GOM Oil and Gas SID.

The potential impacts of ongoing OCS oil and gas activity (**Table 3.3-2**) on sea turtles varies depending on biological and oceanographic conditions, as well as species distribution and space

use. The hearing range of sea turtles overlaps with low-frequency ongoing OCS oil- and gas-related noise, including vessel traffic (e.g., decommissioning vessel traffic), pile driving, and drilling. Sea turtle responses to low-frequency noise could result in behavior responses, acoustic masking, temporary hearing loss, permanent hearing loss, and mortality (BOEM 2021a). For noises from G&G sources less than 180 kHz, explosive severance, and pile driving, BOEM applies mitigations (**Table 4.8-2**) that require distancing, impact zones, and the use of protected species observers to minimize or avoid impacts to sea turtles. There have been no reports of oil- and gas-related vessel strikes on sea turtles in the GOA. BOEM permitted activities, including decommissioning, implement mitigating measures for vessel strikes during activity (see **Table 4.9-2**), which prevent or substantially reduce sea turtle interactions with transiting vessels. Bottom-disturbing activities can degrade or destroy benthic features used by some sea turtles for foraging and/or habitat. BOEM-permitted activities, including decommissioning activities, implement mitigating measures, such as the Topographic Features Stipulation and Live Bottom (Pinnacle Trend) Stipulation, to avoid sensitive benthic habitats that may be used by some sea turtles for foraging (**Table 4.9-2**). Potential impacts from bottom disturbance on the OCS are expected to be limited to soft bottom habitats and distanced from SAV habitat that sea turtles may depend on for feeding. Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.9.1** and in further detail in Chapter 4.3.7.1 of the GOM Oil and Gas SID. Considering the estimates of ongoing OCS oil- and gas- activities (**Table 3.3-2**), the wide-ranging distribution of sea turtles in the GOA, and the mitigations applied by BOEM (**Table 4.9-2**), impacts from ongoing OCS oil- and gas- activities would range from **negligible** to **moderate**, with no substantial effects to overall population levels.

***Non-OCS Oil- and Gas-Related Activities*:** Bottom disturbance, lighting and visual impacts, noise, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect sea turtles under the No Action alternative, as described above. Most notably, the bottom trawling fishery was recently reported to be an order of magnitude greater than any other stressor impacting certain species of sea turtles in the GOA (Love et al. 2017). The northern GOA and the continental shelf along southwest Florida are areas of particular concern for Kemp's ridley turtles due to high densities of foraging sea turtles overlapping with historical bottom trawling effort (Hart et al. 2012; Shaver et al. 2013). Bottom trawling is also the leading cause of mortality in loggerhead sea turtles (Love et al. 2017). Additionally, vessel strikes are known to impact sea turtles through either shell or soft tissue injuries (Fuentes et al. 2021). Sea turtles have demonstrated behavioral changes and avoidance behaviors in high traffic areas. Other non-OCS oil- and gas-related factors impacting sea turtles in the GOA include, but are not limited to, disease, sea level rise, lighting and visual disturbances, and noise. Disease coupled with changing climate-related factors are of particular concern. Disease can cause physical impacts to sea turtles and may impair swimming and feeding capabilities. Diseases, particularly those of host-pathogen nature, are sensitive to environmental conditions and climate-related factors may increase the risk of disease (Burge et al. 2014). These IPFs and environmental factors may impact sea turtle populations as described above in **Chapter 4.9.2.3**. Due to their broad scale, the impacts from the described non-OCS oil- and gas-related sources are expected have more substantial consequences

on sea turtles than the OCS oil and gas development and activities. These IPFs would be expected to persist into the future, even if the No Action alternative were selected.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS oil and gas lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing, which could change the spatial distribution of the scenario activities, but not their overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table 4.9-3**). Impacts are shown both with and without the mitigating effects of BOEM's protective measure(s) being considered in this Programmatic EIS, if applicable to that IPF. The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.9-3. Impact Determinations for Routine and Accidental Impacts to Sea Turtles from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	**BOEM's Protective Measure(s)[1]**	**Alternative B**	**Alternative C**	**Alternative D**
Noise	Without Protective Measures	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Noise	With Protective Measures	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Offshore Habitat Modification/ Space Use	Without Protective Measures	**Negligible** to **Moderate**	**None** in excluded areas; **Negligible** to **Moderate** in leased areas only	**None** in excluded areas; **Negligible** to **Moderate** in leased areas only
Offshore Habitat Modification/ Space Use	With Protective Measures	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Bottom Disturbance	Without Protective Measures	**Negligible** to **Minor**	**None** in excluded areas; **Negligible to Minor** in leased areas only	**None** in excluded areas; **Negligible to Minor** in leased areas only
Bottom Disturbance	With Protective Measures	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Lighting and Visual Impacts	N/A	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Unintended Releases into the Environment (marine debris)	Without Protective Measures	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Impact-Producing Factor	BOEM's Protective Measure(s)[1]	Alternative B	Alternative C	Alternative D
Unintended Releases into the Environment (marine debris)	With Protective Measures	**Negligible**	**Negligible**	**Negligible**
Unintended Releases into the Environment (oil spills)	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	Without Protective Measures	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Strikes and Collisions	With Protective Measures	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. Considering the estimates of ongoing OCS oil- and gas- activities (**Table 3.3-2**), the wide-ranging distribution of sea turtles in the GOA, and the mitigations applied by BOEM (**Table 4.9-2**), impacts from ongoing OCS oil- and gas- activities would range from **negligible** to **moderate**, with no substantial effects to overall population levels.

[1] Protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. Additional BOEM protective measures for sea turtles would be considered at the site-specific stage in compliance with existing and future regulatory and consultation requirements.

Alternative B – Regionwide OCS Lease Sale

Noise: Noise can result from any routine OCS oil- and gas-related activity, including decommissioning activities, listed in **Table 3.3-2**. Within this geographic area, impacts from noise, including the impacts of shock and pressure waves from installation and decommissioning activities, would affect sea turtles in a number of ways, including behavioral disturbances, interference with communication via acoustic masking, potential hearing impacts, injury, and death. The level of impact is dependent on a variety of factors, including the sound source type, distance from the source, and hearing sensitivity. Sea turtles have been shown to respond to low-frequency sounds; however, noise is not likely to measurably disrupt normal behavior patterns essential to their survival, including breeding and feeding. For impacts to occur, the individual must be within close vicinity of the sound source. Individuals near a sound source may be exposed to intense noises or shock and pressure waves and be injured, and the injury may be irreversible. Given the level of the activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, the impact of noise to sea turtles is **negligible** to **moderate** when mitigating measures, including those used during decommissioning activities, are not applied since sea turtles would not be observed during OCS oil- and gas-related activities and could be exposed to noise at levels that could cause lethal or nonlethal injury. The impacts from noise are expected to be **negligible** to **minor** when mitigating measures are used. Applicable mitigating measures (see **Table 4.9-2**), such as the Protected Species Stipulation; and the 2025 NMFS BiOp A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.7 Sea Turtle Resuscitation Guidelines Protocol, A.8 Explosive-Severance Scenario Mitigation Protocol, and A.9 Pile Driving Monitoring and Reporting Requirements Protocol identify the presence of sea turtles, implement procedures to avoid or reduce sea turtle exposure to seismic sources prior to a survey starting, require the delay of explosive detonations if sea turtles and/or *Sargassum* (juvenile sea turtle

habitat) are observed within an impact zone, require pile driving soft starts and shutdowns in the event a sea turtle is sighted, and require collection of injured sea turtles so that aid can be rendered. With the application of these protective measures, it is expected that impacts would not be at levels that would affect the fitness of any population.

Offshore Habitat Modification/Space Use: Offshore habitat modification/space use could occur from any routine OCS oil- and gas-related activity (including decommissioning activities) except for G&G survey activity, service vessel trips, and helicopter operations (**Table 3.3-4**). The number of projected installed production structures would be less than the number of projected to be removed (**Table 3.3-2**) and 0-1 pipeline landfalls are expected from a single oil and gas lease sale. Given the level of routine OCS oil- and gas-related installation and decommissioning activities that could lead to offshore habitat modification/space use described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to sea turtles could occur in the vicinity of routine OCS oil- and gas-related construction, operation, and decommissioning activities. Offshore habitat modification/space use has the potential to cause behavioral effects, decreased feeding ability, reduced mobility, stress, injury, or death. The impacts are expected to be **negligible** to **moderate** when mitigating measures (**Table 4.9-2**) are not used because, although effects will be localized, entanglement in lines or trawl nets (including those used in site clearance during decommissioning) may result in death of individual sea turtles. Impacts from offshore habitat modification/space use are expected to be **negligible** when mitigating measures are used because the application of the Protected Species Stipulation and the 2025 NMFS BiOp A.7 Sea Turtle Resuscitation Guidelines Protocol, A.5 Moon Pool Monitoring Protocol, and A.4 In-water Line Precaution Protocol provide guidelines for lines used in the water to prevent looping and tangling, provide response measures if a turtle is injured due to an entanglement, and provide protocols for the use of moon pools to prevent sea turtle entrapment and if entrapped a prompt detection and release. These measures reduce the potential for entanglement and entrapment, and provide protocols for rendering care if the sea turtle is entangled or entrapped. With the application of these protective measures, effects from a single proposed OCS oil and gas lease sale are not anticipated to produce population-level impacts on sea turtles in the GOA.

Bottom Disturbance: Bottom disturbance can occur from any routine OCS oil- and gas-related activity (including decommissioning activities), except for service-vessel trips and helicopter operations (**Table 3.3-4**). Given the level of these installation and decommissioning activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to sea turtles in the vicinity of bottom-disturbing activities, such as drilling, are expected to be relatively undetectable. Bottom disturbance could affect sea turtles in the vicinity of bottom-disturbing activities, such as drilling, installation and removal of infrastructure, and anchoring. Bottom disturbance has the potential to displace some sea turtles from foraging grounds and/or preferred habitat, and impacts are expected to be **negligible** to **minor** when mitigating measures are not used since some sea turtles would experience reduced foraging and/or preferred habitat in a specific temporarily disturbed area. The impact is expected to be **negligible** when mitigating measures are used because there would be no detectable impacts on sea turtles. Applicable mitigating measures, such as the Topographic Features Stipulation and Live

Bottom (Pinnacle Trend) Stipulation (see **Table 4.9-2**) would prevent or substantially reduce sea turtle interactions with bottom-disturbing activities, including decommissioning activities, by requiring avoidance distances from sensitive benthos that some sea turtles may use for foraging and/or as habitat.

Lighting and Visual Impacts: Within this geographic area, impacts from lighting and visual impacts from onshore support infrastructure have the potential to disorient adult sea turtles as they move onshore to nest or hatchlings as they emerge from their nests and move offshore. Lighting on OCS offshore facilities is not expected to impact juvenile or adult sea turtles in open water and due to the structures' distance from beaches is not expected to impact nesting adults or hatchings on land. The contribution of lighting from new onshore oil and gas infrastructure resulting from the proposed action compared to the background level of lighting is expected to be low. New industrial construction is expected to occur within already industrialized areas and is likely to be distanced from nesting beaches. While sea turtle lighting protections are regulated in Florida through Florida Administrative Code 62B-55, other Gulf Coast states do not have statewide lighting codes designed to protect nesting adult sea turtles or hatchling. As a result, sea turtles that nest and hatch in the other Gulf Coast states located adjacent to the geographic area of Alternative B would not universally have the protection of lighting ordinances for sea turtle protection. However, given the level of routine OCS oil- and gas-related activities that could lead to lighting and visual impacts described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to sea turtles are expected to be **negligible**.

Unintended Releases into the Environment: Within this geographic area, impacts from unintended releases into the environment could lead to injury, infection, reduced mobility, increased susceptibility to predation, decreased feeding ability, fitness consequences, and/or mortality (e.g., drowning) of sea turtles from entanglement. Marine debris ingestion could lead to intestinal blockage, which can impact feeding ability and lead to injury or death. Unintended releases into the environment from accidental marine debris can occur from any routine OCS oil- and gas-related activity, including decommissioning activities (**Table 3.3-4**). Given the level of these installation and decommissioning activities described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to sea turtles could occur in the immediate vicinity of the accidental marine debris. The impacts from the accidental releases of trash and debris, including those from decommissioning activities, are expected to be **negligible** to **minor** when mitigating measures (**Table 4.9-2**) are not used because the amount of debris from a single oil and gas lease sale would be largely undetectable and highly localized. The impacts from accidental releases of trash and debris are expected to be **negligible** when mitigating measures (**Table 4.9-2**) are used because the Protected Species Stipulation; and the 2025 NMFS BiOp protocols including A.2 Marine Debris Protocol, reiterate the prohibition of discharging materials into the marine environment as outlined in the Marine Plastic Pollution Research and Control Act, MARPOL Annex V, and the Marine Debris Research, Prevention and Reduction Act, which could reduce the amount of trash and debris in the marine environment. Additionally, localized impacts of trash and debris are not expected to result in population-level impacts to the species.

Unintended releases into the environment from oil spills can occur from any routine OCS oil- and gas-related activity (**Table 3.3-4**). The effects of a spill would depend on the volume of the spill and time before it is actively removed as part of a spill response or naturally weathers (see **Appendix B.3.1.1**). Small spills, though relatively common, dissipate quickly and have limited, localized impacts. However, a limited number of large spills are expected to occur as a result of the proposed action. Although spills with volumes >10,000 bbl are uncommon, they can occur, and one did occur in the GOA in the past year (refer to **Appendix B.3.1.1**). There have been no reported impacts to wildlife. Spills >10,000 bbl may affect sea turtles because a greater volume of spilled oil would be expected to also affect a larger area of surface waters, into which a sea turtle could surface. The effects of contact with spilled oil on individual sea turtles could include mortality; decreased health, reproductive fitness, and longevity; as well as increased vulnerability to disease and contamination of prey species. If contact were made, population-level effects are unlikely given sea turtles' large range and general trends of increasing populations. Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements, such as the National Contingency Plans (**Table 4.9-2**), which provide effective control and containment and would be expected to limit the volume and area of exposure. Therefore, impacts from accidental oil spills would be **negligible** to **moderate** depending on the spill size and location.

Response Activities: Response activities can occur from any routine OCS oil- and gas-related activities except for helicopter operations (**Table 3.3-4**). Given the scale and effects of response activities would depend on the volume of the spill (**Appendix B.3.1.1**), impacts to sea turtles could occur in the vicinity of spill-response activities on the OCS. Impacts from response activities may result in behavioral responses, injury, or mortality through vessel strike, entanglement, chemical inhalation, and disturbance to beach nesting habitats. Exposure to response activities may result in potential changes in behavior and/or distribution, thereby potentially stressing sea turtles and perhaps making them more vulnerable to various physiologic and toxic effects of spilled oil. Through the National Contingency Plan (40 CFR 300) and the Federal laws that underpin this regulation, response plans at the Federal, State, and local levels have been developed to reduce potential impacts through avoidance measures (**Table 4.9-2**). Thus, given the likely non-catastrophic spill size, if it were to occur (**Chapter 3** and **Appendix B**; Ji and Schiff 2023), subsequent response activities expected to occur in a limited area, the wide-ranging movements and distribution of sea turtles, and the spill response plans and safety protocols (e.g., National Contingency Plans) that lessees must abide by when conducting OCS oil and gas-related activities (**Table 4.9-2**), the impacts of response activities are expected to be **negligible** to **minor**. In addition, response activities for a single OCS oil and gas lease sale are likely to be localized and limited to effects on the individual and not the population.

Strikes and Collisions: Accidental strikes and collisions can occur from the routine OCS oil- and gas-related activity of G&G survey activity, production structures removed using explosives, other structure removal, installation, service, and decommissioning vessel trips, and helicopter operations (**Table 3.3-4**). Given the level of this installation and decommissioning activity described in **Appendix C** and **Table 3.3-2** for a single proposed OCS oil and gas lease sale to occur over a 40-year lifespan, impacts to sea turtles could occur in the immediate vicinity of transiting vessels.

The impacts of strikes and collisions could include injury or mortality of sea turtles. The percentage of vessel traffic in the GOA that can be attributed to OCS oil- and gas-related activities, including decommissioning activities, is relatively low compared to all other vessel traffic in the GOA (**Table 3.3-2**), and the portion of time sea turtles spend at the surface is also documented to be low (up to 23% of the time). The number of additional service-vessel trips from a single oil and gas lease sale account for a fraction of cumulative service-vessel- trips (**Table 3.3-2**). Thus, the impacts of a single proposed OCS oil and gas lease sale are not expected to produce population-level impacts to sea turtles and is expected to be **negligible** to **moderate** when mitigating measures (**Table 4.9-2**) are not used because sea turtles would be more vulnerable to vessel strikes without speed restrictions, separation distances, and the use of protected species observers, causing injury or death. The impact of vessel strikes and collisions on sea turtles is **negligible** to **minor** when mitigating measures, including those for decommissioning activities, are used. The Protected Species Stipulation and 2025 NMFS BiOp protocols, including A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, provide requirements for vigilant monitoring for sea turtles during transit and maintaining a separation distance while underway if sea turtles are detected (**Table 4.9-2**). These requirements reduce the potential for vessel strikes or collisions and require operators to report instances of vessel strikes and collisions. To date, no incidents have been reported throughout the duration of the long-standing program.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternatives B on sea turtles would be **negligible** to **moderate** without applicable measures in place to protect sea turtles from harmful levels of noise; slack-lines in the water; bottom disturbance; accidental marine debris entanglement, entrapment, or ingestion; accidental vessel strikes; accidental oil-spill contact; and spill response activities. When mitigating measures, including the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations; NTL No. 2009-G39; the Protected Species Stipulation; and the 2025 NMFS BiOp protocols including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.7 Sea Turtle Resuscitation Guidelines Protocol, A.8 Explosive-Severance Scenario Mitigation Protocol, A.9 Pile Driving Monitoring and Reporting Requirements Protocol, and A.10 Site-clearance Trawling Protocol are used, impacts would be **negligible** to **minor** for those IPFs subject to the above mentioned protective measures because exposures to the IPFs would be substantially reduced or avoided, thereby substantially reducing or eliminating IPF impacts to sea turtles.

Alternative C –Targeted OCS Lease Sale Area

Alternative C represents a geographical constraint on available acreage for leasing, which would cause a change in the spatial distribution of most activities compared to Alternative B but not to the types of activities or their levels. Most impacts to sea turtles from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternative C because, as discussed under Alternative B, areas of impacts from routine OCS oil- and

gas-related activities occur within limited areas surrounding activity and these activities would not occur in excluded areas. Impacts from most routine activities would be limited to the areas leased under this alternative. One exception is noise, which could potentially travel from the sound source into excluded areas, resulting in impacts to sea turtles. The impacts from accidental events would be the same as described for Alternative B, including strikes from vessel traffic, which can occur throughout the GOA from port to lease activity. This is because navigation transit routes are not restricted in the exclusion areas. In addition, oil spills and response activities could occur in the excluded areas. This potential spatial redistribution of activity does not affect impact levels for sea turtles because they are widely distributed throughout the GOA.

While the overall impact levels for routine activities would not differ from Alternative B, the impacts to sea turtles could be reduced in and near the exclusion areas. Some benefits to breeding, nesting, and hatchling sea turtles may also be realized for those individuals that nest and hatch off Baldwin County, Alabama, and the Texas coast shoreward of the identified wind energy areas. Removal of these areas from leasing under this alternative would prevent the installation of new infrastructure in these areas. As a result, the sea turtles moving onshore to nest or offshore after hatching in these areas could have a lower level of exposure to IPFs associated with the installation, operation, maintenance, and decommissioning of offshore OCS oil- and gas-related infrastructure. The exclusion of whole and partial blocks identified as SSRAs located along the Texas, Louisiana, and Mississippi coastlines could benefit Kemp's ridley sea turtles. Kemp's ridley sea turtles use the northern GOA and in particular areas shoreward of the 100-m (328-ft) isobath extending from Texas to the Florida Keys for dispersal and foraging (Gredzens and Shaver 2020). The benefits of Alternative C would be mostly limited to exclusion areas, where routine OCS oil- and gas-related activities would not occur, and areas nearby. Although the exclusion areas would cause a spatial redistribution of OCS oil- and gas-related activities, the impact levels to sea turtles under Alternative C would be the same as under Alternative B because of the sea turtles' wide distribution and broad use of the GOA.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternatives C on sea turtles would be **negligible** to **moderate** in the leased areas if applicable measures are not in place to mitigate IPF impacts (e.g., vessel strike, noise injury, entanglement in lines, bottom disturbance; accidental oil spill contact, spill remediation interactions, or accidental marine debris entanglement, entrapment, or ingestion) to sea turtles. When mitigating measures, including the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations; NTL No. 2009-G39; the Protected Species Stipulation; and the 2025 NMFS BiOp A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.7 Sea Turtle Resuscitation Guidelines Protocol, A.8 Explosive-Severance Scenario Mitigation Protocol, A.9 Pile Driving Monitoring and Reporting Requirements Protocol, and A.10 Site-clearance Trawling Protocol are used, this impact would be **negligible** to **minor** in leased areas because exposures to the IPFs

would be substantially reduced or avoided, thereby reducing or eliminating IPF impacts to sea turtles.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D represents a further geographical constraint on available acreage for leasing, which would cause a change in the spatial distribution of most activities compared to Alternatives B and C but not their overall activity levels. Most impacts to sea turtles from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternative D because, as discussed under Alternative B, areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding activity and these activities would not occur in excluded areas. Impacts from most routine activities would be limited to the areas leased under this alternative. One exception is noise, which could potentially travel from the sound source into excluded areas, resulting in impacts to sea turtles. The impacts from accidental events would be the same as described for Alternative B, including strikes from vessel traffic, which can occur throughout the GOA. In addition, oil spills and response activities could occur in the excluded areas. This potential spatial redistribution of activity does not affect impact levels for sea turtles because they are widely distributed throughout the GOA.

While the overall impact levels for routine activities would not differ from Alternative B, the reduced impacts to sea turtles in and near the areas excluded under Alternative C all still apply for Alternative D. Alternative D also excludes coastal areas shoreward of the 20-m (66-ft) isobath along the central and western Louisiana and eastern Texas coasts, providing additional benefits to Kemp's ridley sea turtles and other species that use these areas for foraging since the exclusion prevents the development of additional infrastructure in these areas. Further protection is provided with the exclusion of the Gulf of America Wind Leasing Call Area because routine OCS oil- and gas-related activities would not occur in the areas excluded under Alternative D, and sea turtles foraging and resting within those areas would not experience impacts from routine OCS oil- and gas-related activities. The impacts from accidental events would be the same as described for Alternative B, including strikes from vessel traffic, which can occur throughout the GOA from port to lease activity. Navigation transit routes are not restricted in the exclusion areas; therefore, navigation traffic and the potential for vessel strike could still occur in the exclusion areas. In addition, oil spills and response activities could occur in the excluded areas. The benefits of Alternative D would be mostly limited to exclusion areas, where routine OCS oil- and gas-related activities would not occur, and areas nearby. Although the exclusion areas would cause a spatial redistribution of OCS oil- and gas-related activities, the impact levels to sea turtles under Alternative D would be the same as under Alternative B because of sea turtles' wide distribution and broad use of the GOA.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternatives D on sea turtles would be **negligible** to **moderate** in the leased areas if applicable measures are not in place to mitigate IPF impacts (e.g., vessel strike, noise injury, entanglement in lines, bottom disturbance, accidental oil spill contact, spill remediation interactions,

or accidental marine debris entanglement, entrapment, or ingestion) to sea turtles. When mitigating measures–including the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations; NTL No. 2009-G39; the Protected Species Stipulation; the 2025 NMFS BiOp protocols, including A.1 Operational National Mitigation Protocols for Geophysical Surveys, A.2 Marine Debris Protocol, A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, A.4 In-water Line Precaution Protocol, A.5 Moon Pool Monitoring Protocol, A.7 Sea Turtle Resuscitation Guidelines Protocol, A.8 Explosive-Severance Scenario Mitigation Protocol, A.9 Pile Driving Monitoring and Reporting Requirements Protocol, and A.10 Site-clearance Trawling Protocol–are used, this impact would be **negligible** to **minor** in leased areas because exposures to the IPFs would be substantially reduced or avoided, thereby substantially reducing or eliminating IPF impacts to sea turtles**.**

4.9.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which include ongoing and future OCS oil- and gas-related activities, could potentially affect sea turtles and their associated habitats through discharges and wastes, bottom disturbance, light and visual impacts, noise, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions as described above in **Chapters 4.9.2.1** and **4.9.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.9.1** and in further detail in Chapter 4.3.7.1 of the GOM Oil and Gas SID. These ongoing impacts would be **negligible** to **moderate**, with no substantial effects to overall population levels. Decommissioning activities are being performed at much higher rates than installations over the past decade (see **Chapter 3.2.5**). This trend is anticipated to continue for the foreseeable future and is not expected to result in net positive or net negative impacts to sea turtles. Decommissioned structures may provide ecological benefits to sea turtles, such as foraging habitat (see **Chapter 4.9.2.1**). However, in the process of decommissioning, sea turtles may be temporarily impacted by noise and bottom disturbance (see **Chapter 4.9.2.1**). Future lease sales would prolong and add small but measurable impacts to the past and present impacts, resulting in similar types of impacts though future OCS oil- and gas-activities might expand geographically. OCS oil- and gas-activities occur in dense aggregations, with most drilling and decommissioning operations occurring in a finite area. Sea turtles are a wide-ranging species that are expected move throughout previously leased blocks and to show avoidance behaviors in relation to new activity and operations. Regulatory requirements and protective measures applied by BOEM (**Table 4.9-2**) minimize or avoid potential impacts to sea turtles from OCS oil- and gas- activities. The requirements and protocols outlined in **Table 4.9-2** are expected to be applied to future OCS oil- and gas- activities. Therefore,

impacts to sea turtles from cumulative OCS oil- and gas- activities are expected to be similar to the effects experienced from ongoing OCS oil- and gas- activities, with no notable increase in effects from future lease sales.

Non-OCS Oil- and Gas-Related Activities: Cumulative non-OCS oil- and gas- activities could potentially affect sea turtles through ocean acidification, changes to sea surface temperature, and sea-surface height. Changes to sea surface temperature and the process of ocean acidification could cause physiological effects on sea turtles and their prey (Lettrich et al. 2020). Sea turtle prey abundance and distribution has been correlated with sea surface temperature (Rutherford et al. 1999). Shifts in sea turtle prey abundance could result in a shift in sea turtle distribution, resulting in potential exposure to new risks and impacts. There are no direct physiological impacts to sea turtles documented from ocean acidification. However, ocean acidification has been linked to impacts to sea turtle prey species (Fabry et al. 2008; Langdon and Atkinson 2005). Changes in sea-surface height may eliminate shoreline habitat over time, resulting in loss of nesting habitat for sea turtles. The potential impacts from these factors are additionally discussed in **Chapter 4.9.2.3** and are expected to continue.

Future non-OCS oil- and gas-related activities include proposed deepwater ports as described in **Appendix B.4.2.7**. These proposed ports could impact sea turtles through dredging and impacting mechanisms including bottom disturbance, changes to water quality, and entrainment (Michel et al. 2013). Loggerhead and Kemp's ridley turtles are the most likely to be directly affected by bottom disturbance from dredging. Dredging may result in the temporary loss of foraging habitat from the removal of sand and biota in sandy substrates (Michel et al. 2013). Benthic resources are expected to recover in a relatively short period of time and dredging affects mostly small areas of foraging habitat. Therefore, impacts to sea turtles are expected to be temporary in nature. Impacts of dredging on water quality are discussed in **Chapter 4.2.2.5**. Potential indirect impacts to sea turtles from changes in water quality could be related to turbidity impacts to prey and habitats. However, the mobility of sea turtles would likely minimize such impacts. Entrainment and mortality are the most serious of the potential impacts to sea turtles during dredging activities, depending upon the type of vessel used. Based on their foraging preferences, loggerhead, green, and Kemp's ridley sea turtles are most at risk of entrainment during dredging operations. Sea turtles may be able to escape entrainment depending on the type of vessel used. Entrainment from dredging may result in more permanent impacts to sea turtles. However, relocation trawling appears to be an appropriate mitigation tool to reduce impacts to sea turtles from dredging (Michel et al. 2013). Overall, impacts to sea turtles from dredging are expected to be limited in geographic and temporal scope. Due to their broad scale, the impacts from the described non-OCS oil- and gas-related sources are expected have more notable consequences on sea turtles than the OCS oil and gas development and activities. These IPFs would be expected to persist into the future, even if the No Action alternative were selected.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion (0.3-1.8%) of activity when compared to the existing OCS Oil and Gas Program in the Gulf (**Table 3.3-2**). BOEM has assessed

past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as having a substantial effect on sea turtles. However, the incremental contribution of impacts from one lease sale to those cumulative effects would not increase the level of impacts substantially. Therefore, the incremental contribution of a proposed OCS oil and gas lease sale to cumulative impacts on sea turtles would be **negligible** when properly regulated and mitigated. An OCS oil and gas lease sale would not be expected to result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by sea turtles in the area of analysis. When taking into consideration impacts from non-OCS oil- and gas- related activities and impacts from other anthropogenic activities, the factors discussed above appear to be more dominant on sea turtles than the incremental contribution of the proposed action, and would still occur in the absence of the activities resulting from a single proposed lease sale.

The incremental contribution of a single proposed lease sale to cumulative impacts on sea turtles would not differ substantially between action alternatives, because the primary mechanisms affecting sea turtles (bottom disturbance, noise, vessel strikes) would be similar across all alternatives, differing only in spatial distribution based on the lease blocks offered. In addition, impacts would not differ due to sea turtles' wide distributions and movements throughout the GOA. The regulatory requirements and protective measures (**Table 4.9-2**) imposed will remain in place for ongoing OCS oil- and gas-activities, providing continued protection to sea turtles from ongoing and cumulative impacts. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Chapters 4.9.2.1** through **4.9.2.4** above. However, it should be noted that some activities, such as oil and gas extraction, may cease following decommissioning of facilities, potentially reducing impacts over time.

4.9.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on sea turtles. Such information includes impacts from noise, climate-related factors, disease, marine trash and debris, and oil spills and spill-response activities on sea turtles in the GOA, which can be difficult to quantify. The future rates of sea-level rise, beach erosion, and nest sex ratios as a result of climate-related factors are unknown, and so future impacts to the GOA are unknown beyond predictions developed by models and short-term trends. BOEM has determined that such information is not essential to a reasoned choice among alternatives because none of the available scientific publications reveal reasonably foreseeable significant adverse impacts to sea turtles not otherwise considered in this Programmatic EIS. BOEM's subject-matter experts have used publicly available scientifically credible evidence presented herein and applied accepted scientific methodologies to integrate existing information qualitatively and quantitatively (if available) and extrapolated potential outcomes in completing this analysis and formulating the conclusions. Therefore, the incomplete or unavailable information, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

4.10 COMMERCIAL FISHERIES

Commercial fisheries are an important industry and economic driver in the GOA. Some of the most economically important commercial fisheries in the GOA are white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), eastern oysters (*Crassostrea virginica*), Gulf menhaden (*Brevoortia patronus*), blue crab (*Callinectes sapidus*), red grouper (*Epinephelus morio*), red snapper (*Lutjanus campechanus*), and tunas (*Thunnus* spp.). Commercial fisheries are managed by NMFS, as advised by the Regional Fisheries Management Councils. NMFS reports each year to Congress and the Fishery Management Councils on the status of all fish stocks in the Nation. Commercial fisheries are regulated by various mechanisms, including permitting, closures, quotas, and gear restrictions; as described by the Gulf Council (2025). Some of the most common gear types are trawls (for shrimp), purse seines (for menhaden), dredges (for oysters), traps (for blue crab), and longlines (for various finfish). The biological aspects of the affected environment for the targeted species are discussed in **Chapter 4.6.1** and habitats are discussed in **Chapters 4.3.1**, **4.4.1,** and **M.2.1**. For more information on commercial fisheries of the GOA, see Chapter 4.2.2 of the GOM Oil and Gas SID (BOEM 2023b).

Under any of the alternatives, BOEM's analysis of commercial fisheries found the impacts associated with a proposed action to be minor or less (**Table 4.10-1**) across all IPFs. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale to cumulative impacts on commercial fisheries under Alternative B, C, or D would be **negligible** to **minor adverse** when properly regulated. Therefore, to focus the analysis on the important impacts of the Proposed Action, the detailed analysis of Commercial Fisheries has been moved to **Appendix M**.

Table 4.10-1. Impact Determinations for Routine and Accidental Impacts to Commercial Fisheries from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure(s)[1]	Alternative B	Alternative C	Alternative D
Noise	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible Adverse**
Socioeconomic Changes and Drivers	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**
Bottom Disturbance	N/A	**Negligible**	**Negligible**	**Negligible**
Coastal Land Use/ Modification	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**
Lighting and Visual Impacts	N/A	**Negligible Beneficial** to **Negligible Adverse**	**Negligible Beneficial** to **Negligible Adverse**	**Negligible Beneficial** to **Negligible Adverse**
Offshore Habitat Modification/Space Use	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Negligible Beneficial** to **Negligible Adverse**

Impact-Producing Factor	BOEM's Protective Measure(s)[1]	Alternative B	Alternative C	Alternative D
Unintended Releases into the Environment	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**
Response Activities	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**
Strikes and Collisions	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors would be **none** and indirect impacts from the alternative would be **negligible**. Impacts to fish populations from ongoing OCS oil- and gas-related activities would be **negligible** to **minor** (see **Chapter 4.6** for more detail), therefore, the corresponding impacts to commercial fisheries would also be **negligible to minor**. This is because disruptions to fish and invertebrate populations would proportionately reduce commercial fishing revenues, as well as impact the seafood supply chain.

[1] No programmatic protective measures related to commercial fisheries for application at the lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for resources that commercial fisheries rely on would be considered at the site-specific stage.

4.11 RECREATIONAL FISHING

Marine recreational fishing in the GOA is very popular with both residents and tourists, and it is economically important to the coastal states of Texas, Louisiana, Mississippi, Alabama, and Florida. The recreational fishing resource category includes land-based, coastal, and offshore fishing. Recreational fishing is confined primarily to smaller, closer inshore areas of the GOA than commercial fishing. This resource includes private land- and vessel-based fishing, rental boat fishing, and charter boat fishing. Recreational fishing activities on the OCS take several forms (e.g., bottom fishing, trolling, and spearfishing).

Under any of the alternatives, BOEM's analysis of recreational fishing found the impacts associated with a proposed action to be minor or less (**Table 4.11-1**) across all IPFs. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale to cumulative impacts on recreational fishing under Alternative B, C, or D would be **minor beneficial** to **minor adverse**. Therefore, to focus the analysis on the important impacts of the Proposed Action, the detailed analysis of Recreational Fishing has been moved to **Appendix M**.

Table 4.11-1. Impact Determinations for Routine and Accidental Impacts to Recreational Fishing from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Bottom Disturbance	N/A	**Negligible**	**Negligible**	**Negligible**
Coastal Land Use/ Modification	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Noise	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Lighting and Visual Impacts	N/A	**Beneficial** to **Negligible**	**Beneficial** to **Negligible**	**Beneficial** to **Negligible**
Offshore Habitat Modification/Space Use	N/A	**Beneficial** to **Minor**	**Beneficial** to **Minor**	**Beneficial** to **Minor**
Socioeconomic Changes and Drivers	N/A	**Beneficial** to **Minor**	**Beneficial** to **Minor**	**Beneficial** to **Minor**
Unintended Releases into the Environment	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **negligible**. Under the ongoing scenario, impacts from OCS oil- and gas-related activities to recreational fishing would still occur and range from **beneficial (moderate)** to **moderate adverse**. This is primarily because the addition or removal of structures has a notable and measurable localized impact on the subsection of recreational fishers which might use them.

[1] No recreational fishing specific programmatic protective measures for application at the lease sale stage are being contemplated in this Programmatic EIS.

4.12 RECREATIONAL RESOURCES

Recreational resources are natural or humanmade things that are used as part of activities that are primarily for human enjoyment, including tourism. The Gulf Coast is home to various ocean and land-based resources that support recreational activities, including coastal beaches, barrier islands, estuarine bays and sounds, river deltas, and tidal marshes enjoyed by residents of the Gulf Coast and tourists from throughout the Nation and globally. Publicly owned and administered areas (such as national seashores, parks, beaches, marine protected areas, artificial reefs, and wildlife lands), as well as specially designated preservation areas (such as historic and natural sites and landmarks, wilderness areas, wildlife sanctuaries, and scenic rivers) attract residents and visitors throughout the year. Commercial and private recreational facilities and establishments (such as resorts, casinos, marinas, amusement parks, and ornamental gardens) also serve as primary interest areas and support services for people who seek enjoyment from the recreational resources near the GOA.

Under any of the alternatives, BOEM's analysis of recreational resources found the impacts associated with a proposed action to be minor or less (**Table 4.12-1**) across all IPFs. When considered in the context of all other past, present, and reasonably foreseeable activities in the proposed OCS lease sale area, the *incremental contribution* of an OCS oil and gas lease sale to

cumulative impacts on recreational resources under Alternative B, C, or D would be **negligible**. Therefore, to focus the analysis on the substantive impacts of the Proposed Action, the detailed analysis of Recreational Resources has been moved to **Appendix M**.

Table 4.12-1. Impact Determinations for Routine and Accidental Impacts to Recreational Resources from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure	Alternative B	Alternative C	Alternative D
Air Emissions and Pollution	N/A	**Negligible**	**Negligible**	**Negligible**
Bottom Disturbance	N/A	**Minor**	**Minor**	**Negligible**
Coastal Land Use/Modification	N/A	**Negligible**	**Negligible**	**Negligible**
Lighting and Visual Impacts	Without	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Negligible**
Lighting and Visual Impacts	With	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Negligible**
Offshore Habitat Modification/ Space Use	N/A	**Minor Beneficial**	**Minor Beneficial**	**Negligible**
Socioeconomic Changes and Drivers	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Negligible**
Unintended Releases into the Environment	N/A	**Minor**	**Minor**	**Negligible**
Response Activities	N/A	**Negligible**	**Negligible**	**Negligible**
Strikes and Collisions	N/A	**Negligible**	**Negligible**	**Negligible**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors would be **none**, and indirect impacts from the alternative would be **negligible**. Impacts from ongoing OCS oil and gas activities would range from **minor beneficial** to **minor adverse,** with no substantial effects to overall recreationist levels.

4.13 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES

Archaeological resources are any material remains of human life or activities that are at least 50 years of age and that can provide a scientific or humanistic understanding of past human behavior, cultural adaptation, and related topics. Archaeological sites are non-renewable resources that, once lost, cannot be regenerated. The National Historic Preservation Act of 1966 (NHPA), as amended (54 U.S.C. 300101), includes archaeological resources among potential "historic properties," defined as any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the NRHP, including artifacts, records, and material remains relating to the district, site, building, structure, or object (54 U.S.C. 300308). In some cases, the term "cultural resources" covers a wider range of resources than "historic properties," such as sacred sites, archaeological sites not eligible for the National Register of Historic Places, and archaeological collections (CEQ and ACHP 2013). Traditional cultural properties and sacred sites may also be designated as historic properties.

4.13.1 Affected Environment

Archaeological resources on the OCS are categorized under one of two general designations: pre-contact or historic. Pre-contact archaeological resources refer to Native American archaeological sites or artifacts that date prior to the arrival of Europeans in North America beginning in the late fifteenth century C.E. (Common Era). It includes sites that are now submerged on the OCS but that were associated with the first humans to occupy areas of the Gulf Coast at least 14,500 years ago (Halligan et al. 2016).

Historic archaeological resources on the Gulf of America OCS consist of shipwrecks and aircraft. BOEM has identified over 2,000 known or reported shipwrecks on the Gulf of America OCS with at least 40 documented shipwrecks having been determined eligible or potentially eligible for listing on the NRHP (BOEM 2021c). The actual locations of reported shipwrecks may not be accurately described in archival records, and the existing records are not inclusive of all potential historic shipwrecks that may be located on the OCS. Submerged shipwrecks off the coasts of Texas, Louisiana, Mississippi, and Alabama are likely to be moderately well-preserved because of the high sediment load in the water column from upland drainage and wind and water erosion.

4.13.2 Environmental Consequences

Chapter 4.5 of the GOM Oil and Gas SID describes the relevant programmatic concerns, which include major storm events (e.g., hurricanes), seafloor mudslides, and sedimentation from upland drainage. In the GOA, it is almost certain that many existing shipwrecks on the OCS have been, or can be, affected by major storm events and hurricanes, primarily due to storm surge and seabed shifting. Shipwrecks in shallow water nearer to shore have been reworked and scattered by subsequent storms more often than those wrecks occurring at greater depths on the OCS. Similar patterns would be expected for future major storm events as well.

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact cultural, historical, and archaeological resources. Non-OCS oil- and gas-related activities also have the potential to impact cultural, historical, and archaeological resources (**Table 4.13-1**). These IPFs and their potential to affect cultural, historical, and archaeological resources are discussed below and in greater detail in Chapter 4.5.2 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.5.2 of the GOM Oil and Gas SID.

Table 4.13-1. Impact-Producing Factors with the Potential to Impact Cultural, Historical, and Archaeological Resources.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Air Emissions and Pollution	Unintended Releases into the Environment	Air Emissions and Pollution
Discharges and Wastes	Response Activities	Discharges and Wastes
Bottom Disturbance	Strikes and Collisions	Bottom Disturbance

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Coastal Land Use/Modification	-	Coastal Land Use/Modification
Lighting and Visual Impacts	-	Lighting and Visual Impacts
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

There are several existing regulatory programs and requirements in place to reduce or avoid the environmental effects of these IPFs to archaeological resources in the GOA. For example, pursuant to 30 CFR § 550.194 and 30 CFR § 1727, BOEM's archaeologists review all agency-plans and most BOEM and BSEE permitted activities for their potential to affect archaeological resources and, when appropriate, take steps in coordination with lessees to avoid, minimize, or mitigate any adverse effects. Regulatory requirements enforced by BOEM, BSEE, and other agencies are outlined in **Table 4.13-2** and further described in the *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025a). Lessees are required to perform OCS oil- and gas-related activities in accordance with all regulatory requirements; therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements when making impact determinations, including those related to decommissioning activities as described further below and in **Appendix C**.

Table 4.13-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
30 CFR 550.194 – Reporting and Avoidance Requirements	BOEM, BSEE	Bottom Disturbance, Discharges and Wastes	Chapters 4.5 and 5.9 of the GOM Oil and Gas SID
30 CFR 551.6 – Obligations and rights under a permit or a Notice	BOEM	Bottom Disturbance, Discharges and Wastes	Chapters 4.5, 5.2.5, and 5.9 of the GOM Oil and Gas SID
30 CFR 250.1727 – What information must I include in my final application to remove a platform or other facility	BSEE	Bottom Disturbance, Discharges and Wastes	Chapters 4.5, 5.2.5, 5.2.7.4, and 5.9 of the GOM Oil and Gas SID
Sections 106 and 110 of the National Historic Preservation Act	Advisory Council of Historic Preservation (ACHP)	Bottom Disturbance, Discharges and Wastes, Coastal Land Use/Modification	Chapters 4.5 and 5.9 of the GOM Oil and Gas SID

[1] See Chapter 6 of the GOM Oil and Gas SID for conditions of approval commonly applied at the post-lease stage.

4.13.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOAR).

Air Emissions and Pollution: Air emissions and pollution from routine OCS oil and gas operations (including decommissioning) contribute to carbon dioxide and other pollutants in the atmosphere and may be a contributing factor to acidic deposition, ocean acidification, and eutrophication in the GOA (Caldeira and Wickett 2003; Driscoll et al. 2003; Howarth 2008; Paerl et al. 2002; Vitousek et al. 1997; Wanninkhof et al. 2015). Based on the analysis of terrestrial resources, archaeological resources can deteriorate faster in higher acidic environments (Al-Hosney and Grassian 2005; Baedecker et al. 1992; Winkler 1970). Conversely, the deterioration of submerged shipwreck materials is typically slowed in low oxygen or anoxic conditions. Air emissions and pollution from routine OCS oil and gas operations must comply with BOEM and USEPA air quality regulations. Air quality reviews would be conducted to determine if the projected air emissions proposed in site-specific plans meet or exceed certain thresholds and, if necessary, identify appropriate emissions controls to mitigate or prevent unreasonable air quality degradation (**Chapter 4.1** and Chapter 4.1 of the GOM Oil and Gas SID).

Discharges and Wastes: Discharges and wastes, such as drilling muds and cuttings, released from routine OCS oil- and gas-related operations can physically impact the seafloor through sediment, trace metal, and hydrocarbon deposition. These discharges can place trace metals, hydrocarbons, and suspended materials within several acres around the drilling location (Continental Shelf Associates Inc. 2004a), which could potentially alter an archaeological site's formation processes through physical, chemical, or biological disruption of its localized environment as described under "Bottom Disturbance" below. Discharges are allowed only if the requirements of the CWA and the corresponding NPDES permit are met, including no unreasonable degradation of the environment as discussed in Section 403 of the CWA (USEPA 2023d). Furthermore, compliance with the regulatory requirements under 30 CFR 550.194, including avoidance mitigation to prevent physical damage to archaeological resources, would inherently reduce the likelihood of routine discharges and wastes occurring near archaeological resources (see **Table 4.13-2**). More information is included in **Chapter 4.2** and **Appendix B**.

Bottom Disturbance: Bottom disturbance from routine OCS oil- and gas-related activities (including decommissioning and removal) represents the primary source of potential negative impacts to archaeological resources. These potential effects include removal, reorientation, and/or destruction of the artifact assemblage or other physical components of an archaeological site, inhibiting the proper identification and interpretation of the site as a result. Bottom-disturbing activities could result in the complete destruction of a submerged pre-contact archaeological site or an inability to accurately resolve the site in subsequent remote-sensing surveys. If severe enough, this loss of archaeological information may minimize site integrity and prevent a determination of the site's eligibility to the NRHP or reverse a previous determination of eligibility. In all cases, these negative effects are permanent. Alternative decommissioning methods, like decommissioning pipelines in place, can, in many cases, dramatically reduce the amount of bottom disturbance relative to decommissioning by removal when CWA regulations are followed. In complex decommissioning scenarios near historic properties as defined by 36 CFR 60.4, BOEM and BSEE work directly with operators to develop innovative scenarios to minimize bottom disturbance near sites meeting the quality and integrity criteria for inclusion in the NRHP. National program policy on

these determinations is set by the National Park Service's (NPS) NRHP, the President's Advisory Council on Historic Preservation, and under NHPA.

A potential indirect negative effect from bottom disturbance is a disruption of the localized environment that accelerates the degradation of an archaeological site. As parts of a shipwreck are buried in oxygen-deprived sediments and as ferrous objects become encrusted in a protective concretion of iron mixed with sand and shell, the shipwreck reaches a relative state of equilibrium with its surrounding environment. Once natural or anthropogenic events alter the environmental conditions, then this state of equilibrium is also disrupted and can expose the site to further degrade. For this reason, indirect consequences from a bottom-disturbing event are likely to continue long after the initial event.

To fulfill the requirements of Section 106 of the NHPA (36 CFR 800) and BOEM's regulations at 30 CFR 550.194, BOEM's archaeologists review all agency-plans and permitted activities for their potential to affect historic properties and, when appropriate, take steps in coordination with operators to avoid, minimize, or mitigate adverse effects. These steps include conducting geophysical surveys of the operator's area of potential effect to locate potential archaeological resources and requiring avoidance of potential resources or, if avoidance is not possible, further investigation to document their NRHP eligibility as required under 36 CFR 60.4 (see **Table 4.13-2**). Sites are located with the assistance of geophysical surveys under the supervision of a qualified marine archaeologist. If the site is potentially eligible for listing in the NRHP, further avoidance will be prioritized. If avoidance is not possible, alternate mitigating measures, including but not limited to archaeological data recovery operations, will be designed in coordination with applicable State Historic Preservation Offices (SHPO), Tribal Historic Preservation Offices (THPO), and the Advisory Council on Historic Preservation (ACHP) as required by NHPA. If an archaeological resource is unexpectedly discovered during an operator's bottom-disturbing activities, BOEM and BSEE regulations require operators to halt those activities and report the discovery to BOEM and BSEE to receive further instructions on how to protect the discovery prior to resuming activities. Typical mitigating measures require either avoidance or further investigation to determine appropriate avoidance distances of potential shipwrecks or submerged landforms with the potential for Native American site preservation (see **Table 4.13-2**). Additionally, during project reviews, BOEM archaeologists recommend buffers around known and potential archaeological site locations to avoid adverse effects to resources. From 2020 to 2024, BSEE has documented only four instances where an inadvertent event (e.g., anchor placement) may have contacted an archaeological resource (Bleichner 2024, official communication), suggesting that BOEM's recommended avoidance measures are effective at reducing the risk of bottom disturbance to these resources.

Coastal Land Use/Modification: Routine OCS oil and gas development may result in the expansion or installation of coastal infrastructure such as oil and gas service bases, waste disposal facilities, gas processing plants, pipeline landfalls, and navigation channels. Potential impacts to archaeological sites and other historic properties would be a result of their associated ground or seafloor disturbances or from restricted access to traditional cultural properties. These activities would be subject to applicable State laws and regulations, including potential review by the relevant

SHPO (see **Table 4.13-2**). Activities for which BOEM is the lead Federal agency or a cooperating agency for NHPA and NEPA would also be subject to additional coordination and consultation between BOEM and the relevant State, Tribe(s), and other consulting parties in fulfillment of Section 106 of the NHPA. However, as noted in **Appendix B.2.5**, existing onshore oil and gas infrastructure is expected to be sufficient to handle activities associated with a proposed action. While an oil and gas lease sale and subsequent OCS oil- and gas-related activity would contribute to the continued need for maintenance dredging of existing navigation channels, a mature network of navigation channels already exists in the analysis area; therefore, new navigation channel construction as a direct result of a single proposed oil and gas lease sale is not likely (Dismukes 2011).

Lighting and Visual Impacts: Coastal historic property types that may have a setting dependent upon the surrounding seascape include lighthouses, fortifications, historic resorts, personal residences, and traditional cultural properties. These same property types, and others, may have inland-facing viewsheds that are not solely dependent on the maritime landscape. Offshore oil and gas infrastructure is generally not considered to have visual impacts to coastal archaeological, cultural, and historic sites as offshore oil and gas infrastructure has existed on the Gulf of America OCS since the 1940s. Additionally, offshore oil and gas infrastructure pre-dates the NHPA and, therefore, any coastal historic property currently listed on the NRHP would not derive its eligibility from an unobstructed view of the GOA. These visible OCS infrastructure emplacements are not permanent and are expected to have maximum lifespans of 50-75 years, and decommissionings incrementally restore the viewsheds to their pre-1940s condition.

4.13.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOAR).

Unintended Releases into the Environment: Unintended releases into the environment could impact a cultural, historic, or archaeological site if the accidental release directly contacts the resource and alters its localized physical, chemical, or biological environment, thereby putting the site in disequilibrium with its surroundings and accelerating site decomposition (Hamdan et al. 2018; Mugge et al. 2019). Research has also shown that both chemical and biological degradation/deterioration of wood "reduces its mechanical and physical properties" (Chang et al. 2002). Over time and given the right environmental conditions, waterlogged wood often becomes increasingly fragile (Jordan 2001). A study of wood in terrestrial environments has suggested that, while wood degradation is initially delayed by contamination with crude oil, at later stages it is accelerated (Ejechi 2003). Marine trash and debris may also damage an archaeological site and its associated artifacts and result in a loss of diagnostic information or introduce modern material that masks the acoustic or magnetic signature of the archaeological site in remote-sensing surveys.

If decommissioned materials, whether removed or left in place, are not properly prepared for decommissioning, they may still contain chemicals, materials, or byproducts that could harm the preservation of archaeological sites. However, since the decommissioned or idle infrastructure is no longer active, the potential exposure is limited to what remains within the structure or segment and is mostly localized to the area of initial breakage. BSEE guidance under NTLs 2018-G03 and 2020-N03 and requirements under 30 CFR 250.1703, 250.1711, 250.1751, 250.1752, and 250.1753 define what actions OCS lease holders are responsible to do with their infrastructure.

Response Activities: Spill-response activities such as dispersant use, chemical cleaning agents, mechanical removal, and exposure to oil itself could affect cultural, historic, and archaeological resources. Following the 2010 *Deepwater Horizon* oil spill in the GOA, Salerno et al. (2018) documented that the release of hydrocarbons and chemical dispersant in marine environments may affect the structure of benthic microbial communities and biofilms found on artificial substrates, such as historic shipwrecks. That study indicated that exposure to oil and dispersant could disrupt the composition and metabolic function of biofilms colonizing metal hulls, potentially compromising the environmental equilibrium of the shipwreck and accelerating corrosion processes.

Spill-response activities may also impact coastal archaeological sites, including contamination of artifacts, ecofacts, and samples, with the potential to distort the results of archaeometric dating techniques, including radiocarbon dating and pottery residue analysis. Rees et al. (2019) assessed the effects of the 2010 *Deepwater Horizon* oil spill on eight precontact archaeological sites on Louisiana's Gulf Coast. Crude oil and dispersant used during the response were detected in redeposited shoreline middens and intact archaeological contexts. Effects to dating the artifacts were shown that they could be mitigated with a solvent-extraction process before testing. Spill-response impacts to coastal archaeological sites may additionally occur from associated bottom disturbances. For example, the major impacts to coastal archaeological sites from the *Exxon Valdez* spill in Alaska in 1989 were related to cleanup activities, such as the construction of helipads, roads, and parking lots, and to looting by cleanup crews, rather than from the oil itself (Bittner 1993).

Strikes and Collisions: According to BSEE data, from 2008 to 2019 there were 160 OCS oil- and gas-related vessel collisions, with both other vessels and infrastructure like platforms, in the GOA (Mathews 2020). Once they occur, accidental vessel strikes and collisions by their nature cannot be mitigated. Although most strikes and collisions do not happen directly to an embedded archaeological resource, impacts to shipwrecks from vessel collisions could include direct physical damage to the resource from post-collision debris or secondary impacts from the release of pollutants that contact the shipwreck as described above in "Bottom Disturbance" and "Unintended Releases into the Environment."

4.13.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence cultural, historical, and archaeological resources in the GOA through air emissions and pollution; discharges and wastes; bottom disturbance; coastal land use/modification; and lighting and visual impacts as summarized below, with more detailed discussions in Chapter 4.5.2.1 of the GOM Oil and Gas SID.

Air Emissions and Pollution: Similar to air emissions from routine OCS oil- and gas-related activities, air emissions from non-OCS oil- and gas-related sources contribute to acidic deposition, ocean acidification, and eutrophication in the GOA (Caldeira and Wickett 2003; Driscoll et al. 2003; Howarth 2008; Paerl et al. 2002; Vitousek et al. 1997; Wanninkhof et al. 2015). These emissions are from anthropogenic sources like commercial vessels, military activities, onshore refineries, and recreational fishing vessels, and naturally occurring sources like methane seeps, bacterial processes, and other biogenic/geogenic sources. As described above, archaeological resources can deteriorate faster in more acidic environments. However, increased eutrophication as the result of cumulative activities can lead to blooms of phytoplankton, which are consumed by microbes on the seafloor as the bloom dies and settles out. The microbial consumption uses oxygen and can lead to hypoxic or anoxic conditions on the OCS. Through this pathway, eutrophication may, theoretically, enhance shipwreck preservation in some circumstances. More information is included in **Chapter 4.1** and **Appendix B**.

Discharges and Wastes: Non-OCS oil- and gas-related discharges and wastes that could potentially affect cultural, historical, and archaeological resources include historical chemical weapons disposal, historical industrial waste disposal, dredged material disposal, marine trash and debris, non-OCS oil- and gas-related spills, and natural seeps. Many of the impacts from these activities would be related to their associated bottom disturbances as described below. Chemical weapons or industrial waste containers disposed of on top of a historic shipwreck could damage the site through direct physical contact or by chemical alteration of the site's localized environment, thereby accelerating site degradation. Additionally, these containers, and other types of marine trash and debris that reach the seafloor, could affect the ability to accurately interpret archaeological sites in remote-sensing survey data. A concentration of non-archaeological objects on the seafloor could be misinterpreted in sonar data as a potential shipwreck (i.e., false positives), or more likely, magnetic interference from these objects could mask or distort the magnetic signature of an underlying shipwreck buried below the mudline and prevent the accurate archaeological interpretation of magnetometer data (i.e., false negatives). Oil from natural seeps contributes to the region's "background" chemicals, but the magnitude and effects of this oil source are very different from acute effects that would be typical of routine discharges and wastes and unintended releases into the environment from OCS oil- and gas-related activities. More information is included in **Chapter 4.2** and **Appendix B**.

Bottom Disturbance: The majority of non-OCS oil- and gas-related effects to cultural, historical, and archaeological resources would be from bottom-disturbance from State oil and gas activities, artificial reefs, dredging related to sand borrowing or navigation channels, commercial fish

trawling, renewable energy installations, military operations, mass wasting events (seafloor mudslides), undersea cables, recreation, and anchoring, buoys, and moorings. Bottom disturbance impacts could also occur from non-OCS oil- and gas-related spills and spill-response activities such as the construction of staging and access areas for cleanup crews and deployment of nearshore spill-response equipment. As described above, the primary negative effects of these activities would be the removal, reorientation, and/or destruction of the artifact assemblage or other physical components of an archaeological site, either unintentionally (e.g., commercial trawling over an unknown archaeological site) or intentionally (e.g., commercial and/or illegal salvage of a historic shipwreck). This, in turn, could result in a loss of archaeological information and inhibit the proper identification and interpretation of the site, potentially affecting a site's eligibility for listing in the NRHP. A secondary negative effect from bottom disturbances is a disruption of the localized environmental conditions, which may accelerate the degradation of an archaeological site.

Many of these activities – due to State jurisdictions, water depth limitations, or their role in supporting coastal infrastructure needs – are more likely to impact historic and pre-contact archaeological resources in relatively shallow near-coastal waters (e.g., State oil and gas, artificial reefs, dredging, trawling, renewable energy, recreation, spill response, and anchor, buoy, and mooring areas). Compared with isolated point-source impacts (such as an anchor or pipeline emplacement), dredging activities have a relatively high potential for bottom disturbing impacts from the removal of large sediment volumes over contiguous horizontal and vertical areas. In addition to direct physical contact of dredging equipment with archaeological sites in either the dredge pit or the dredged material disposal area, potential impacts also include the redepositing of artifacts into the disposal area and seabed destabilization around sites adjacent to the dredge pit.

Commercial trawl nets that snag on shipwrecks could destroy and disperse artifacts and large sections of vessel hulls, particularly those of wooden-hulled wrecks, which are generally less structurally sound than iron or steel-hulled wrecks. Intrusive trawl netting that snags on a shipwreck and is left behind could also obscure significant sections of the site and preclude a detailed archaeological analysis.

Recreational bottom-disturbing impacts to archaeological sites include treasure hunting/looting and sport diving. Often, specific shipwrecks are targeted and impacts could range from the collection of surface artifacts to the complete destruction and/or removal of the vessel. Sport diving includes private or commercial recreational diving on archaeological sites for pleasure and education. Negative effects to archaeological sites from sport diving may result from boat anchor and mooring damage, disturbance to and removal (looting/souvenir hunting) of artifacts, intentional and unintentional physical contact (body or equipment), and the interaction of exhaled air bubbles with the site. Sport divers may, however, have a beneficial impact to archaeological sites by monitoring sites, encouraging fellow divers to protect sites, and reporting any observed negative impacts to the appropriate State or Federal agency.

Coastal Land Use/Modification: Coastal land disturbance as a result of sea-level rise and subsidence, coastal erosion, dredging of navigation canals, and tourism infrastructure could affect

cultural, historical, and archaeological resources in ways similar to bottom-disturbing activities described above, whereby the physical characteristics of an archaeological site are irreversibly altered through direct contact. Coastal land disturbances are relatively less likely to impact historic shipwrecks (except for navigation canal dredging) and more likely to impact pre-contact archaeological sites or other historic buildings, sites, structures, objects, or districts. Dredging equipment or construction of tourism infrastructure may remove, disperse, or destroy features of a historic property if that property is not adequately identified and avoided.

Lighting and Visual Impacts: Any coastal or onshore infrastructure development that introduces lighting impacts or obscures a property's associated viewshed may adversely impact its setting integrity.

Other Environmental Factors: Sea-level rise, subsidence, and erosion may result in terrestrial historic and pre-contact sites becoming submerged and their features redistributed through wave energy. Coastal land disturbances can also adversely affect traditional cultural properties by restricting or reducing access or permanently altering characteristics that contribute to their cultural significance.

4.13.2.4 Alternatives Analysis

The impact-level definitions in **Table 4.13-3** build on and refine those initially introduced in **Table 4.0-4**. The impact levels for cultural resources are defined by the degree to which their historical integrity would be impaired if OCS oil- and gas-related activities associated with the proposed action would alter any of the characteristics that qualify them for listing in the NRHP.

Table 4.13-3. Negative Impact-Level Definitions for Cultural Resources by Type.

Impact Level	Historic Properties under Section 106 of the NHPA	Archaeological Resources and Ancient Submerged Landform Features	Historic Built/Onshore Resources
Negligible	No historic properties affected, as defined at 36 CFR 800.4(d)(1).	A. No cultural resource subject to potential impacts from ground- or seabed-disturbing activities; or B. All disturbances to cultural resources are fully avoided, resulting in no damage to or loss of scientific or cultural value from the resources.	A. No measurable impacts; or B. No physical impacts and no change to the integrity of resources or visual disruptions to the historic or aesthetic settings from which resources derive their significance; or C. All physical impacts and disruptions are fully avoided.

Impact Level	Historic Properties under Section 106 of the NHPA	Archaeological Resources and Ancient Submerged Landform Features	Historic Built/Onshore Resources
Minor	No adverse effects on historic properties could occur, as defined at 36 CFR 800.5(b). This can include avoidance measures.	A. Some damage to cultural resources from ground- or seabed-disturbing activities, but there is no loss of scientific or cultural value from the resources; or B. Disturbances to cultural resources are avoided or limited to areas lacking scientific or cultural value.	A. No physical impacts (e.g., alteration or demolition of resources) and some limited visual disruptions to the historic or aesthetic settings from which resources derive their significance; or B. Disruptions to historic or aesthetic settings are short term and expected to return to an original or comparable condition (e.g., temporary vegetation clearing and construction vessel lighting).
Moderate	Adverse effects on historic properties as defined at 36 CFR 800.5(a)(1) could occur. Characteristics of historic properties would be altered in a way that diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association, but the adversely affected property would remain eligible for the NRHP.	As compared to minor impacts: A. Greater extent of damage from ground- or seabed-disturbing activities, including some loss of scientific or cultural data; or B. Disturbances to cultural resources are minimized or mitigated to a lesser extent, resulting in some damage to and loss of scientific or cultural value from the resources.	As compared to minor impacts: A. No or limited physical impacts and greater extent of changes to the integrity of cultural resources or visual disruptions to the historic or aesthetic settings from which resources derive their significance; or B. Disruptions to settings are minimized or mitigated; or C. Historic or aesthetic settings may experience some long-term or permanent impacts.
Major	Adverse effects on historic properties as defined at 36 CFR 800.5(a)(1) could occur. Characteristics of historic properties would be affected in a way that diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association to the extent that the property is no longer eligible for listing in the NRHP.	As compared to moderate impacts: A. Destruction of or greater extent of damage to cultural resources from ground- or seabed-disturbing activities; or B. Disturbances are minimized or mitigated but do not reduce or avoid the destruction or loss of scientific or cultural value from the cultural resources; or C. Disturbances are not minimized or mitigated, resulting in the destruction or loss of scientific or cultural value from the resources.	As compared to moderate impacts: A. Physical impacts on cultural resources (e.g., demolition of a cultural resources onshore); or B. Greater extent of changes to the integrity of cultural resources or visual disruptions to the historic or aesthetic settings from which resources derive their significance, including long term or permanent impacts; or C. Disruptions to settings are not minimized or mitigated.

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct or indirect impacts to cultural, historical, and archaeological resources would occur from the proposed action (i.e., a proposed OCS oil and gas lease sale). An indirect consequence of the cancellation of a lease sale would be an incremental reduction in the discovery of potential OCS archaeological resources. Archaeological surveys conducted in support of oil and gas exploration and development activities have been the primary means through which BOEM has identified known and potential archaeological resources on the Gulf of America OCS. The cessation of future surveys in unleased and unexplored areas could limit BOEM's awareness of the presence or absence of potential archaeological resources in unleased blocks and, consequently, the information that would be available to other Federal and State agencies to inform the protection of those resources during non-OCS oil- and gas-related activities or during response activities associated with accidental events.

Ongoing OCS oil- and gas-related activities associated with previous lease sales, and non-OCS oil- and gas-related activities that would continue to potentially affect cultural, historical, and archaeological resources under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would still potentially affect cultural, historical, and archaeological resources through air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, lighting/visual impacts, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions as summarized above in **Chapters 4.13.2.1** and **4.13.2.2**. Bottom disturbance from ongoing OCS oil- and gas-related activities (including decommissioning and removal) represents the primary source of potential negative impacts to archaeological resources. These potential effects include removal, reorientation, and/or destruction of the artifact assemblage or other physical components of an archaeological site, inhibiting the proper identification and interpretation of the site, as a result. Potential impacts from ongoing operations are effectively mitigated through avoidance measures applied to permits (see **Table 4.13-2**) and therefore result in a negligible impact determination. However, some of these impacts are unintentional, accidental, or part of emergency spill response activities that might have major adverse effects to archaeological resources that are largely unavoidable from ongoing activities. The GOA is a huge area with thousands of significant sites, both discovered and undiscovered, in varied states of preservation. BOEM and its predecessor agencies working hand-in-hand with our leaseholders have had long success managing, mitigating, and minimizing harm to archaeological sites over our over 40-year duration. Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.13.1** and in further detail in Chapter 4.5.1 of the GOM Oil and Gas SID). Impacts from ongoing OCS oil and gas activities, would range from **negligible** to **major**.

***Non-OCS Oil- and Gas-Related Activities*:** Air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, lighting and visual impacts, and other environmental factors associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect cultural, historical, and archaeological resources under the No Action alternative, as described above. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. Most notably, trawling from commercial fishing often impacts submerged archaeological sites. Due to the lack of surveys conducted before shrimping and fishing, many shipwreck sites in the Gulf have been found with nets snagged on them. Currently, the extent of the impact on these sites from commercial fishing is unknown; however, it occurs frequently enough that its effects are likely more substantial than those resulting from both past and present OCS oil and gas lease sales because BOEM identifies and avoids impacts to sites wherever possible. Furthermore, these impacts, listed above, would continue to occur independently of ongoing OCS oil and gas activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS oil and gas lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing that could change the spatial distribution of the scenario activities but not their overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced or altered by the geographic constraints under Alternatives C and D (**Table 4.13-4**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.13-4. Impact Determinations for Routine and Accidental Impacts to Cultural, Historical, and Archaeological Resources from a Single Proposed OCS Oil And Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Air Emissions and Pollution	N/A	**Negligible**	**Negligible**	**Negligible**
Discharges and Wastes	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Bottom Disturbance	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Coastal Land Use/ Modification	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Lighting and Visual Impacts	N/A	**Negligible** to **Moderate**	**Negligible** to **Moderate**	**Negligible** to **Moderate**
Unintended Releases into the Environment	N/A	**Negligible** to **Major**	**Negligible** to **Major**	**Negligible** to **Major**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Strikes and Collisions	N/A	**Negligible** to **Major**	**Negligible** to **Major**	**Negligible** to **Major**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors would be none. Impacts from ongoing OCS oil and gas activities, would range from negligible to major.

[1] No programmatic protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for archaeological resources would be considered and applied at the site-specific stage.

Alternative B – Regionwide OCS Lease Sale

Alternative B considers a regionwide lease sale area. Within this geographic area, the types of potential impacts from bottom disturbance, discharges and wastes, air emissions, and lighting and visual impacts to cultural, historical, and archaeological resources for routine activities under Alternative B would be the same as those described above in **Chapter 4.13.2.1**.

Air Emissions and Pollution: Impacts from air emissions and pollution would likely be **negligible** given the widespread distribution of emissions, their transient nature and distance from most archaeological features, and compliance with various regulatory standards for air quality to prevent unreasonable air quality degradation. In certain circumstances, eutrophication from air emissions could result in **negligible** to **minor** beneficial impacts to archaeological resources by decreasing overall oxygen levels in their vicinity. Preservation of archaeological materials is usually improved in lower oxygen environments. That said, while there may be limited benefits, they are relatively small when considered across the entire GOA, thus the overall beneficial effects are **negligible**.

Discharges and Wastes: Similarly, because the potential impacts from routine discharges and wastes would be in compliance with existing regulatory requirements (see **Table 4.13-2**), those impacts would be **negligible** to **minor**.

Bottom Disturbance: While there is the potential for up to **major** impacts to occur from bottom disturbance, with the implementation of required archaeological surveys and application of avoidance mitigations through existing regulations (see **Table 4.13-2**), the expected impacts to cultural, historical, and archaeological resources would be **negligible** to **minor**. Because the protective measures mentioned above scale to the geographic scope and activities associated with each alternative, there is not expected to be measurable differences among the alternatives in impacts to these resources from routine bottom disturbances.

Coastal Land Use/Modification: Impacts from Coastal Land Use/Modification would likely range from **negligible** to **minor** as described in section **4.13.2.1** OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities and with the application of regulatory requirements (**Table 4.13-2)**. Oil and gas exploration, production, and development activities on the OCS are supported by an expansive and mature onshore infrastructure industry that includes large and small companies providing an array of services from construction facilities, service bases, and waste

disposal facilities to crew, supply, and product transportation, as well as processing facilities. Existing onshore oil and gas infrastructure is expected to be sufficient to handle development associated with the proposed action as stated in the scenario information in **Chapter 3**. Should there be some expansion at current facilities, the land in the analysis area is sufficient to handle such development. Further, should shore based expansions occur, they will follow state and/or federal preservation laws, regulations, and policies in consultation with SHPO, THPO, and ACHP (see **Table 4.13-2** for specific federal laws and regulations).

Lighting and Visual Impacts: The introduction of new lighting sources or visible infrastructure is expected to have **negligible** to **moderate negative** impacts on coastal cultural, historic, or archaeological resources. This is largely due to two factors. First, given the extensive existing onshore infrastructure, new onshore infrastructure is not expected. Second, there is extensive offshore infrastructure already in place that provides a substantial baseline of lighting sources and visible infrastructure and, thus, the construction of any new offshore infrastructure would have a marginal incremental effect. Even with the substantial amount of infrastructure, though, the construction of a new structure in particular locations could have an adverse effect on the viewshed of a coastal historic property.

Unintended Releases into the Environment: The potential impacts to cultural, historical, and archaeological resources from accidental events under Alternative B would be the same as those described above in **Chapter 4.13.2.2**. The negative impacts from unintended releases would be **negligible** to **major**. More specifically, if the spatial extent of an unintended release is isolated and does not encroach the applied avoidance boundaries of known or potential archaeological resources, the negative impacts would be **negligible** to **minor**. If the unintended release comes into direct physical contact with an archaeological resource, then the potential for disturbances to the seafloor from unintended releases to cause localized, negative impacts to that resource could be **negligible** to **major**. Compared to planned bottom disturbances, which are mitigated through BOEM's post-lease permitting and approval processes, these seafloor disturbances from unintended releases inherently do not benefit from pre-planning and avoidance.

Response Activities: For response activities that involve seafloor or coastal/terrestrial bottom disturbances, the negative impacts to cultural, historical, and archaeological resources would be **negligible** to **minor**. If chemical dispersants come into direct physical contact with an archaeological resource, then the potential for bottom disturbance to cause localized, negative impacts to that resource is **negligible** to **major**.

Strikes and Collisions: Similarly, though guidance and communication practices reduce their likelihood, accidental vessel strikes and collisions do occasionally still occur, are essentially random, and inherently cannot be predicted or mitigated through planned avoidance. Thus, negative impacts to cultural resources from accidental collisions could be **negligible** to **major**. However, the likelihood of a vessel collision directly impacting a historic property is very low and BSEE did not report any such events within the past five years.

Based on the IPFs above, the projected activity levels for the proposed action as provided in **Chapter 3** and BOEM's existing regulatory requirements, the overall impact conclusion for routine activities on cultural, historical, and archaeological resources would be **negligible** to **minor**. If new platforms or other infrastructure in particular locations are found likely to have an adverse effect on the viewshed of potentially NRHP eligible properties during review of an individual permit application, BOEM would conduct a site-specific Section 106 consultation to determine ways to minimize, mitigate, or avoid adverse effects to those historic properties where possible. Most reasonably foreseeable accidental events are expected to be highly localized, and adherence to archaeological survey requirements and avoidance mitigations, when applicable, should prevent or reduce most impacts. Therefore, the overall impacts from accidental events to archaeological resources is expected to be **negligible** to **minor**. However, where protective measures cannot be applied or adhered to and an accidental event comes into direct physical contact with an archaeological resource, negative impacts to that resource could be **negligible** to **major**. Accidental events coming into direct contact with an archaeological resource is not common.

Alternative C –Targeted Lease Sale Area

Alternative C represents a geographical constraint on available acreage for leasing, which could cause a change in the spatial distribution of activities compared to Alternative B but not the types of activities or their overall levels. This potential spatial redistribution of activity would further reduce the potential to impact archaeological sites on the deferred lease blocks, but it would not result in a meaningful difference in the overall potential impacts to archaeological resources from routine activities or accidental events when compared to Alternatives B and D. Therefore, the impacts to cultural, historical, and archaeological resources from routine activities under Alternative C would be **negligible** to **minor** given the spatial extent of the projected activities and the existing regulatory requirements (**Table 4.13-2**). Impacts from accidental events to cultural, historical, and archaeological resources would be **negligible** to **minor** when mitigating measures can be used or **negligible** to **major** when mitigating measures cannot be used.

Alternative D – Targeted Lease Sale Area with Additional Exclusions

Alternative D represents a geographical constraint on available acreage for leasing, which could cause a change in the spatial distribution of activities compared to Alternative B or C but not the types of activities or their overall levels. This potential spatial redistribution of activity would further reduce the potential to impact archaeological sites on the deferred lease blocks, but it would not result in a meaningful difference in the overall potential impacts to cultural, historical, and archaeological resources from routine activities or accidental events when compared to Alternatives B and C. Therefore, the impacts to cultural, historical, and archaeological resources from routine activities under Alternative D would be **negligible** to **minor** given the spatial extent of the projected activities and the existing regulatory requirements (**Table 4.13-2**). Impacts from accidental events to cultural, historical, and archaeological resources would be **negligible** to **minor** when mitigating measures can be implemented or **negligible** to **major** when mitigating measures cannot be implemented.

4.13.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, potentially affect cultural, historical, and archaeological resources through air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, lighting/visual impacts, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions, as summarized above in **Chapter 4.13.2.2.** The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.13.1** and in further detail in Chapter 4.5.1 of the GOM Oil and Gas SID. These ongoing impacts would be **negligible** to **major**. Future lease sales would add to the past and present impacts and range from undetectable to substantial. However, it is worth noting that wells and structures are being decommissioned and removed at much higher rates than installations over the past decade (see **Chapter 3.2.5**), a trend expected to continue for the foreseeable future. While future lease sales may extend impacts, the types of impacts would remain similar though future OCS oil and gas activities might expand the geographic footprint of affected areas as new lease blocks are developed. The cumulative impact of OCS oil- and gas-related activities is therefore reasonably foreseeable to increase incrementally over time, though all would continue to be regulated and provided protections through BOEM's Section 106 review and permitting process under NHPA. As production in some areas ends and facilities are decommissioned, potential impacts to cultural, historical, and archaeological resources from oil and gas operations would cease at those locations, and new lease sales would shift operational activities to different areas. The impacts from these activities would extend several decades into the future based on the project activity scenarios outlined in **Table 3.3-2**. Despite these changes in operational footprint over time, established regulatory frameworks would continue to minimize, mitigate, and avoid impacts to cultural, historical, and archaeological resources.

Aging infrastructure, including pipelines umbilicals, and structures (whether still in operation, abandoned, awaiting decommissioning, or out of service), may contribute to cumulative impacts on GOA cultural, historical, and archaeological resources. Over time, pipelines and structures, particularly those no longer in use, may become more vulnerable to corrosion and damage leading to unanticipated areas of bottom disturbances. While decommissioning practices are regulated by BSEE and subject to Section 106 review by BOEM, the timeliness of these actions is outside of BOEM control. Furthermore, extreme weather events like hurricanes may displace both active and decommissioned infrastructure, potentially causing disturbances to the seabed in areas that were not under review under the initial permitting. The extent of the impact from aging infrastructure is currently unknown. Decommissioned infrastructure that is left in place may eventually degrade over

time. While some of this disturbance could result in environmental impacts, not all of it would necessarily be negative to cultural, historical, and archaeological resources.

Non-OCS Oil- and Gas-Related Activities: Other reasonably foreseeable environmental factors that could contribute to cumulative impacts to cultural, historical, and archaeological resources, include sea-level rise, subsidence, erosion, and coastal land disturbances. The potential impacts from these factors are discussed in **Chapter 4.13.2** and are expected to continue. In addition, future non-OCS oil- and gas-related activities include proposed deepwater ports. These proposed ports could affect cultural, historical, and archaeological resources through various activities like dredging for access channels, berths and increased vessel traffic, all of which could increase turbidity and suspend sediments, potentially exposing materials that previously were provided some measure of protection and slowed degradation by virtue of being buried. Deepwater ports could also affect viewsheds associated with historic properties that draw their significance from views of historic seascapes.

Climate-related factors that are reasonably foreseeable and could contribute to cumulative impacts to cultural, historical, and archaeological resources, include ocean acidification, changes to sea surface temperature, and weather patterns. The potential impacts from these factors are expected to continue. Any changes in storm intensity and frequency, coupled with higher sea levels, could increase coastal flooding and erosion, degrade coastal archaeological sites, and may substantially influence the seabed. If storm frequency and intensity increase (Chapter 3.4.2 of the GOM Oil and Gas SID), the additional disturbance of sediment may increase impacts to cultural, historical, and archaeological resources in nearshore and coastal areas. While there is currently no consensus on the extent to which climate may impact hurricane frequency in the Atlantic since 1900 (NOAA 2012; 2023), observations since the 1980s show an increasing trend in the intensity of tropical cyclones in the North Atlantic. However, evidence for the continuation of this trend remains uncertain due to data limitations (NOAA 2023).

The extent of the impact to these sites from non-OCS oil- and gas-related activities is currently unknown; however, their effects are likely more substantial than those resulting from past, present, and reasonably foreseeable future OCS oil and gas lease sales because BOEM identifies and avoids impacts to sites wherever possible.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion (0.3-1.8%) of activity when compared to the existing OCS Oil and Gas Program in the GOA (**Table 3.3-2**). BOEM has evaluated past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA, identifying substantial effects on cultural, historical, and archaeological resources, but the incremental impacts from a single lease sale are not expected to substantially elevate the level of adverse effects already identified in the cumulative analysis. When properly mitigated through existing regulatory frameworks (see **Table 4.13-2**), the contribution of a proposed GOA lease sale to cumulative impacts on cultural, historical, and archaeological resources would be **negligible**. The cumulative impact of a single OCS oil and gas lease sale coupled with the extensive existing

infrastructure would be insubstantial. While bottom disturbances associated with the installation and removal of oil and gas infrastructure have the potential to adversely affect historic properties (as recognized since the passage of the NHPA), these impacts have been adequately mitigated. It is important to note that while the cumulative lighting and visual impacts of oil and gas infrastructure may be notable, ongoing adverse effects to specific historic properties that have not been mitigated would be limited. Overall, an OCS oil and gas lease sale is not expected to result in a noticeable increase in any ongoing or reasonably foreseeable cumulative impacts on cultural, historical, and archaeological resources within the area of analysis.

The incremental contribution to cumulative impacts on cultural, historical, and archaeological resources would not differ substantially between action alternatives because with the application of the same BOEM protective measures described under Alternative B (see **Table 4.13-2**), no substantial effects to these resources would be expected. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Chapters 4.13.2.1** through **4.13.2.4** above. However, it should be noted that some activities, may cease following decommissioning of facilities, potentially reducing the likelihood of further impacts over time.

4.13.3 Incomplete or Unavailable Information

There is a lack of complete information about the location and baseline characteristics of archaeological resources on the OCS, as well as the long-term effects of environmental changes, such as sea-level rise, subsidence, erosion, and coastal land disturbance. BOEM has concluded that this information is not critical for making informed decisions among alternatives. Comprehensive understanding of the long-term impacts of coastal and environmental changes on cultural, historical, and archaeological resources cannot be achieved within the timeframe of this Programmatic EIS. Additionally, the impact conclusions are consistent across all alternatives and do not rely on the incomplete or unavailable data. The proposed action's incremental contribution to future effects from sea-level rise, subsidence, and erosion is not expected to be detectable when compared to the rate of environmental change under the no-action alternative. Moreover, BOEM’s archaeological survey requirements are anticipated to effectively identify potential archaeological resources in any leased area. Therefore, while the incomplete or unavailable information is relevant, it is unlikely to alter the impact conclusions and is not essential for making a reasoned choice among alternatives.

4.14 Land Use and Coastal Infrastructure

Land use describes the human use of land for economic and cultural activities, which can be divided into six general categories: transportation, recreation, agriculture, residential, commercial, or industrial uses. For purposes of this analysis, coastal infrastructure used here refers only to onshore oil- and gas-related infrastructure that provides support for offshore OCS oil- and gas-related activities. Infrastructure as systems is included in the consideration of land use because this type of coastal infrastructure serves as both an IPF for other resources (**Chapter 3.4.5**) and also as an

impacted resource. While it is not feasible to adequately cover all of the infrastructure systems in such a large area, it is reasonable to focus on OCS oil- and gas-related infrastructure affecting onshore populations.

4.14.1 Affected Environment

Along the Gulf Coast, 133 counties and parishes constitute 23 BOEM-identified Economic Impact Areas (EIAs) (**Chapter 4.15**). **Figure 4.14-1** shows the primary economic land uses within the 133 counties and parishes that constitute the EIAs. This geographic area is diverse in the types of land use and distribution of coastal infrastructure. In addition to homes, condominiums, and some industry, this coastline supports one of the major recreational regions of the United States, particularly for fishing and beach activities. The coastal zone includes miles of recreational beaches and an extended system of barrier islands. It also has a deepwater port, oil and gas support industries, manufacturing, farming, ranching, and hundreds of thousands of acres of wetlands and protected habitat.

Oil and gas exploration, production, and development activities on the OCS are supported by an expansive onshore network of coastal infrastructure that includes large and small companies providing a wealth of services from construction facilities, service bases, and waste disposal facilities to crew, supply, and product transportation, as well as processing facilities (Dismukes 2024). The coastal infrastructure network in the GOA region is mature, and is part of the regional economy developed over several decades. For example, Port Fourchon is a major onshore staging area for OCS oil- and gas-related activities in the GOA, and is the headquarters of the Louisiana Offshore Oil Port (LOOP), which offloads 10-15 percent of U.S. foreign oil imports. The LOOP is the only U.S. deepwater port that is able to offload very large crude carriers and ultra-large crude carriers (LOOP LLC 2020), though other proposed projects are in various stages of licensing and permitting (see **Appendix B.4.2.7**). Port Fourchon also services over 95 percent of deepwater GOA development. Up to 1,200 trucks per day come and go from Port Fourchon and over 400 service vessels per day use the port (Greater Lafourche Port Commission 2020).

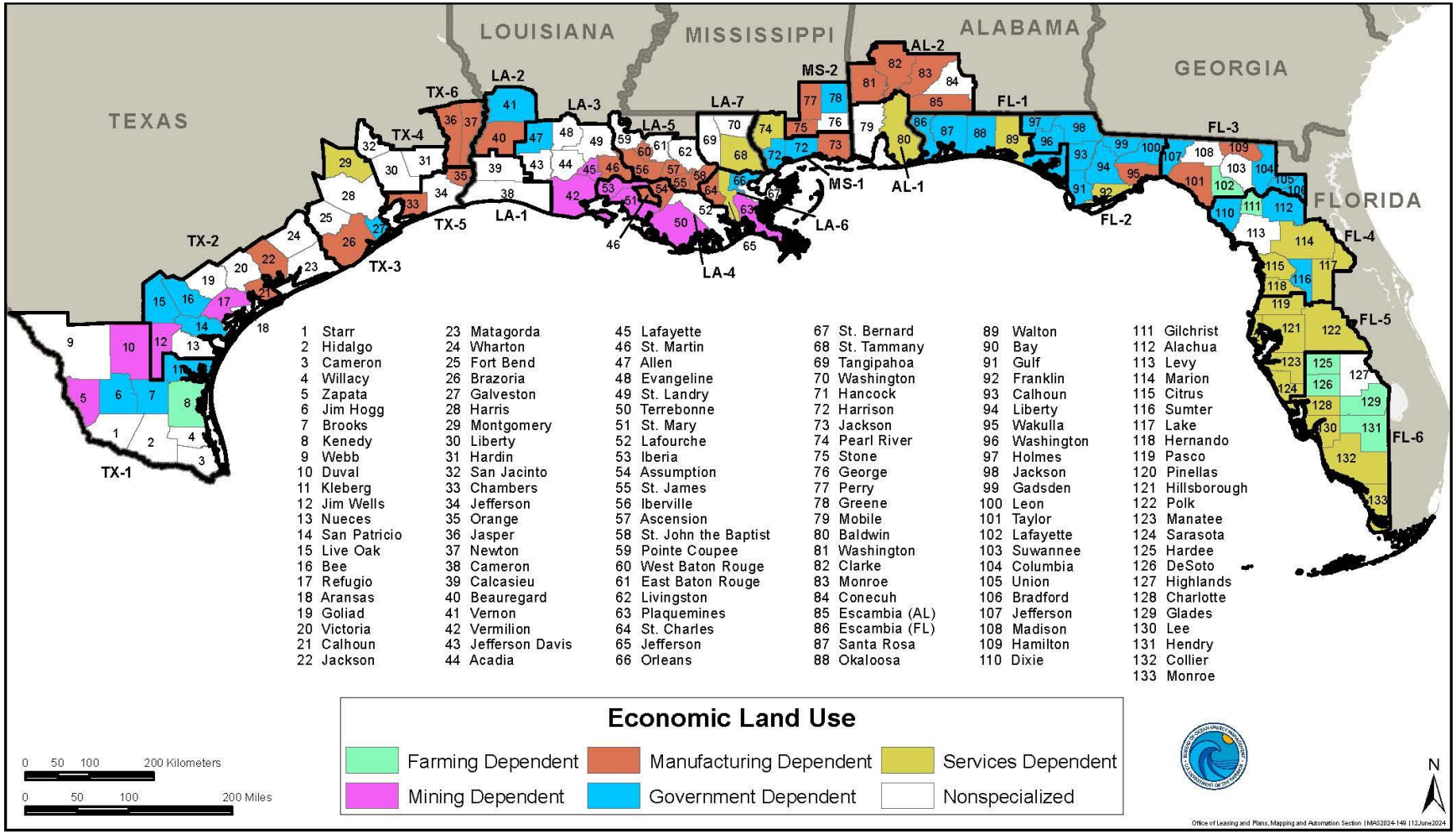

Figure 4.14-1. Economic Land Use in the Gulf of America Region.

4.14.2 Environmental Consequences

Chapter 4.4.1 of the GOM Oil and Gas SID describes programmatic concerns influencing land use, including coastal resource-dependent industries, land-use patterns, coastal land loss, marine trash and debris, and other environmental factors. In addition, **Chapter 4.4.1** describes land uses in the GOA coastal states and OCS oil- and gas-related coastal infrastructure, including construction facilities, support facilities, and transportation and processing facilities.

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact land use and coastal infrastructure. Non-OCS oil- and gas-related activities also have the potential to impact land use and coastal infrastructure (**Table 4.14-1**). These IPFs and their potential to affect land use and coastal infrastructure are discussed below and in greater detail in Chapter 4.4.1 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.4.1 of the GOM Oil and Gas SID.

Table 4.14-1. Impact-Producing Factors with the Potential to Impact Land Use and Coastal Infrastructure.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Discharges and Wastes	Unintended Releases into the Environment	Discharges and Wastes
Coastal Land Use/Modification	Response Activities	Coastal Land Use/Modification
Lighting and Visual Impacts	Strikes and Collisions	Lighting and Visual Impacts
Socioeconomic Changes and Drivers	-	Offshore Habitat Modification/ Space Use
-	-	Socioeconomic Changes and Drivers
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

It is important to note that the onshore analysis area, spanning 133 counties and parishes across five Gulf Coast States, is regulated by many local, State, and Federal laws and regulations from local zoning ordinances to State environmental and natural resource regulations and Federal laws and regulatory requirements. This vast regulatory and legal framework serves to reduce potential impacts to land use and coastal infrastructure.

4.14.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities from the ongoing OCS oil and gas program (i.e., past lease sales in the GOA). However, the described routine activities would be similar for a single proposed OCS oil and gas lease sale and reasonably foreseeable OCS oil and gas program (i.e., future lease sales in the GOA).

***Discharges and Wastes*:** Discharges and wastes from OCS oil- and gas-related activities can directly and indirectly impact land use and coastal infrastructure. The volume of OCS waste generated is closely correlated with the level of offshore drilling and production activity (Dismukes et al. 2007). While new waste facilities or the expansion of existing ones are not anticipated, the capacity of current facilities would continue to be managed to handle any fluctuations in waste generation. This could stimulate localized economic growth, resulting in increased demand for services, higher consumer spending, and potentially new employment opportunities, though these effects would likely be temporary and localized. Additionally, while there are risks associated with waste discharges, existing regulatory frameworks, including the CWA (**Chapter 4.2**), are designed to manage these discharges and mitigate their impact on environmental and infrastructure stability. Decreases in demand for services could negatively affect local and possibly regional economies. The OCS oil- and gas-related activity levels fluctuate based on variations in market demand, commodity prices, and day rates for offshore service vessels associated with shipyards, shipbuilding, and transportation services. State and Federal agencies have their own mitigation requirements that aim to reduce and avoid pollution from oil- and gas-related waste streams (see **Table 4.2-2**).

***Coastal Land Use/Modification*:** The OCS oil- and gas-related activities drive demand for onshore support infrastructure and contribute to any land-use changes that may occur as a result of these activities, such as current operations at OCS oil- and gas-related infrastructure including construction facilities (e.g., fabrication yards, pipe-coating plants), support facilities (e.g., ports, service vessels), and processing facilities, (e.g., natural gas processing and refineries). Coastal land use modifications contribute both negatively and positively to land use and coastal infrastructure impacts. For example, ports associated with OCS oil- and gas-related activities are important components of industrial activities that can positively affect land use and coastal infrastructure by contributing to and supporting the local and regional economies. Increased port activity enhances economic growth and job creation in related sectors. However, modifications to port facilities, such as dredging for deeper draft vessels or expanding acreage for support facilities, can have detrimental effects. These modifications may reduce available habitats for species sought by subsistence and recreational hunters and fishers or encroach upon agricultural and recreational areas, as detailed in **Chapter 4.12**. Additionally, Kaiser and Pulsipher noted "[s]tructures, rigs, and marine vessels contribute to scrap supply in coastal communities and is an important sector for many regional economies, but relative to aggregate scrap sources are considered marginal contributors to total supply" (Kaiser and Pulsipher 2010). As such, the decommissioning associated with routine OCS oil- and gas-related activities does not substantially influence changes in land-use related to scrap yards or other supporting onshore infrastructure.

***Lighting and Visual Impacts*:** Visual impacts can affect land use in coastal areas by detracting from or enhancing the intended use and enjoyment of private and public properties along the coast. Offshore OCS oil- and gas-related lighting could minimally affect land use by diminishing the visual aesthetics for some recreational sites by detracting from some nature experiences. However, because aesthetics can be subjective, structure lighting can also have some minimal positive effects on land use by improving visibility of the structures and adding contrast to the

landscape. State and Federal agencies seek to avoid or reduce visual and lighting impacts by placing restrictions over where oil- and gas-related facilities may be located. One such restriction is the Blocks South of Baldwin County, Alabama Stipulation, detailed in **Table 4.12-2** of **Chapter 4.12** of this Programmatic EIS. Discussion of potential visual impacts to recreational resources is provided in **Chapter 4.12** of this Programmatic EIS with more detail in Chapter 4.4.5 of the GOM Oil and Gas SID.

Socioeconomic Changes and Drivers**:** Socioeconomic changes and drivers that may negatively or positively affect land use and coastal infrastructure are connected indirectly to oil and gas operations as demonstrated by changes in the levels of OCS oil- and gas-related activities. These socioeconomic drivers of OCS oil- and gas-related activity levels include fluctuations in oil and natural gas prices; economic shifts on local, state, national and global levels; fluctuations in the gross domestic product; rising or decreasing corporate profits; supply chain effects; local, State, and Federal government revenue; changes in government regulations and policies at all levels; labor demands; skilled workforce shortages; and variations in global market supply and demand. Higher activity levels increase demand for services, which can affect land use if a facility needs to acquire additional land for expansion to meet the demand, and it could affect infrastructure facilities by potentially increasing profits and the need to hire additional employees. This would be a positive effect and could cause localized expansion of economies (i.e., increased demand for services, consumer spending, and indirectly, new employment), resulting in localized land-use changes including commercial and residential development and growth. However, land use may be negatively affected by a reduction in the availably of land for other types of development.

4.14.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from the ongoing OCS oil and gas program (i.e., past lease sales in the GOAR). However, the accidental activities described would be similar for a single proposed OCS oil and gas lease sale and reasonably foreseeable OCS oil and gas program (i.e., future lease sales in the GOAR).

Unintended Releases into the Environment**:** Oil spills and chemical spills related to OCS oil- and gas-related activities could negatively affect land use and coastal infrastructure. The severity of these impacts would depend on the geographic location, volume spilled, duration, and type of oil or chemical. Reasonably foreseeable (non-catastrophic) offshore oil spills associated with the proposed action would normally volatilize and be dispersed by currents and therefore, would have a low probability of contacting and affecting coastal areas (Ji and Schiff 2023). Oil and chemical spills in coastal and inland waters, such as those resulting from the operations of offshore supply vessels, pipelines, barges, tanker ships, and ports, are more likely to negatively affect land use and coastal infrastructure. For example, if waterways are closed to traffic following a spill, this may result in effects to upstream and downstream business interests as it impedes the flow of commerce. Other potential effects from oil or chemical spills could include damages to private and public lands, personal injury, damages to collateral property (moveable property such as vehicles and boats), and

economic damages from the disruption of business. The intensity of any effects related to a spill would be experienced inconsistently among businesses and residents: it would be worse for some businesses/residents than for others. For example, those who have alternative means of transporting their goods would not feel the effects of a spill as harshly as those who are most dependent on the affected waterway for transport. Impacts to land use and coastal infrastructure from coastal and offshore oil spills are variable and depend on the size and location of the spill.

Response Activities: Spill response may negatively or positively affect land use and coastal infrastructure. The influx of spill-response workers could contribute to filling short-term rental vacancies at hotels, apartments, and other properties that could provide housing, which could be a positive effect on land use and infrastructure, and by extension, the local economies. Conversely, the requisite needs for staging operations, equipment handling, and waste disposal could negatively impact land use by occupying land that would otherwise be available. Also, spill response generates large quantities of waste, and this can strain existing waste disposal capacity and increase the risk of solid and liquid waste being disposed of improperly, thereby generating negative effects for land use and coastal infrastructure. The potential impacts of spill-response activities on land use and coastal infrastructure would depend on the spill's location, duration, and whether the event is a small-scale spill (<1,000 bbl) or a larger spill (≥1,000 bbl); the larger the spill, the greater the impacts.

Strikes and Collisions: The majority of offshore vessel collisions involve service vessels colliding with structures or pipeline risers, although sometimes vessels collide with each other. The collisions could result in the spilling of chemicals or oil, but offshore spills resulting from collisions do not typically affect coastal areas (**Chapter 3.5**). Vessel collisions in coastal waters may involve other vessels or stationary structures like bridges and docks. These collisions often result in spills of various substances, and spills in coastal waters can have adverse impacts to land use and coastal infrastructure, depending on the severity and location of a vessel collision, the size of the vessels involved, and whether the collision involves a bridge, pier, or other structure. Land use and coastal infrastructure are most likely to be affected when a collision involves a bridge, pier, or other structure, or when vessels collide in busy industrial waterways such as the Houston Ship Channel. These collisions negatively affect transportation (e.g., bridge traffic) and waterborne commerce when waterways are obstructed, and land uses in the area such as local businesses may be negatively affected.

4.14.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

The non-OCS oil and gas-related activities and associated effects described in this section apply to past, present, and reasonably foreseeable future activities in the GOA region. These non-OCS oil and gas-related activities influence land use and coastal infrastructure in the GOA through discharges and wastes, coastal land use/modification, lighting and visual impacts, offshore habitat modification/space use, and socioeconomic changes and drivers. For a detailed discussion of how non-OCS oil and gas-related activities affect land use and coastal infrastructure, see Chapter 4.4.1.2 of the GOM Oil and Gas SID.

Discharges and Wastes: Discharges and wastes can impact land use and coastal infrastructure positively and negatively, including onshore dredged material disposal, land-based discharges associated with agricultural uses, trash and debris, and oil spills from State oil and gas activities that occur near or onshore. Dredged material disposal often benefits surrounding land by shoring up areas undergoing subsidence and improving previous land uses. For example, the Coastal Wetlands Park at Port Fourchon, Louisiana, was developed from the beneficial use of dredged materials produced from projects to expand the port's capacity with new slips and deeper canals. Land-based discharges are often associated with agricultural uses and may contribute to negative effects that include pesticide and nutrient runoff and changes in water and soil quality. Also, a negative impact is trash and debris that may accumulate onshore, such as household and industrial trash dumped on vacant lots. Accidental oil spills can also occur from ongoing State oil- and gas-related activities, resulting in similar effects to land use and coastal infrastructure as described earlier (**Chapter 4.14.2.1**).

Coastal Land Use/Modification: Coastal land use/modification impacts to land use and coastal infrastructure are mixed, positive and negative, including agricultural uses, urbanization, maintenance dredging of navigation canals, coastal restoration programs, and tourism infrastructure. Agricultural uses place many demands on the environment and produce negative impacts that include, but are not limited to, habitat fragmentation, pesticide and nutrient runoff, competing urban and agricultural water needs, changes to watershed hydrology, and changes in soil quality. Impacts of urbanization include habitat fragmentation, reduced water and air qualities, and the urban heat island impact. Development related to urbanization takes the place of natural ecosystems and fragments habitat. Maintenance dredging of canals can contribute to wetlands degradation. Coastal restoration programs provide beneficial effects for land use with efforts such as wetlands and marsh restoration and beach nourishment projects. Tourism infrastructure, such as parks, beaches, boat launches, and campgrounds, contribute positively to land use and coastal infrastructure by attracting visitors who contribute to the local economy, building up State and local revenues that then become available for use in improving various public works, roads, bridges, educational, and health system supports, and future land development or conservation projects.

Also, while there is currently only one operating deepwater LNG port in the GOA region, others are in various stages of licensing and permitting (see **Appendix B.4.2.7** and Chapter 2.7.2.6 of the GOM Oil and Gas SID; MARAD 2025). Construction operations could temporarily disturb land cover types and convert undeveloped areas for terminal facilities and pipeline installation. In addition, operational activities could result in permanent conversion of land to industrial use. Available EISs for these ports suggest that land use impacts could range from minor during operations to moderate during construction, depending on the specific activities and locations. For example, the terminal associated with the Texas GulfLink Deepwater Port would temporarily disturb approximately 2 km^2 (480 acres) during construction and permanently convert 1.3 km^2 (313 acres) to industrial use (USCG and MARAD 2024). Each port application must complete a site-specific NEPA review and CZMA consultation with the affected state(s). Along with the NEPA and CZMA reviews, the Maritime Administration has its own approval criteria, including the use of best available

technology to prevent or minimize adverse environmental impacts, that must be met before a license is issued.

Lighting and Visual Impacts: Lighting and visual impacts can affect land use in coastal areas by detracting from or enhancing the intended use and enjoyment of private and public properties along the coast. Coastal or nearshore lighting from vessels or State oil and gas activities may negatively affect land use by diminishing the visual aesthetics for some recreational sites and detracting from some nature experiences. However, because aesthetics can be subjective, coastal or nearshore lighting can also have positive effects on land use by improving the visibility of structures and adding contrast to the landscape. Potential visual impacts to recreational resources are discussed in **Chapter 4.4.5**.

Offshore Habitat Modification/Space Use: Offshore habitat modification, by definition, does not affect land use and coastal infrastructure. However, there are some potential issues related to coastal and nearshore space-use conflicts from non-OCS oil- and gas-related activities that may be relevant. These space-use conflicts involve recreation, ports and shipping, sand borrowing and coastal restoration, and renewable energy development occurring in or adjacent to coastal or nearshore waters. Most of these conflicts relate to limited land available for development along the coast that could be used for multiple purposes including recreation, port facilities, etc. Thus, development of these areas generally precludes other types of development and presents a space-use conflict. See Chapter 4.4.1.2 of the GOM Oil and Gas SID for additional examples of potential space-use conflicts associated with these industries.

Socioeconomic Changes and Drivers: Socioeconomic changes and drivers that may affect land use and coastal infrastructure are numerous. Although not an exhaustive list, the possible related non-OCS oil- and gas-related activities that are typically considered by BOEM include oil and gas activity in State waters; onshore oil and gas activities (includes private, State, and Federal lands); transportation systems and ports; construction and maintenance of industrial facilities; agricultural uses; urbanization; demographic shifts (immigration or emigration); evolution of State and Federal regulations; planning and zoning; development of residential areas and recreational facilities; modifications to public facilities (such as water, sewer, educational, and health facilities); military activities; fluctuations in global commodity markets; global, national and regional economic trends; and more recently, global pandemics. The cumulative impacts of these multivariate factors are diverse, wide-ranging and intertwined in a complex web of interacting impacts that may be positive or negative depending on perceptions of the individuals and entities involved. For example, construction or expansion and maintenance of non-OCS-related industrial facilities, such as paper mills and aluminum plants, could affect land use and coastal infrastructure depending on proximity and scale of the work being done. Similarly, while there are currently three operating deepwater ports in the U.S. (including one LNG port in the GOA region), there are several others in various stages of licensing and permitting (see **Appendix B.4.2.7** and Chapter 2.7.2.6 of the GOM Oil and Gas SID; MARAD 2025).Construction activities could temporarily increase employment and local spending while potentially straining housing supply and public services. In addition, operational activities could result in permanent changes to population demographics, local economies, and

regional economic contributions from marine commerce. Available EISs for these ports suggest that socioeconomic impacts could cause substantial changes ranging from minor to major depending on extent, including impacts to population demographics, housing demand, local employment levels, public services availability, and economic contributions from recreation, tourism, and marine commerce. For example, the terminal associated with the Texas GulfLink Deepwater Port could affect local employment, housing demand, and public service capacity during both construction and operations (USCG and MARAD 2024). Each port application must complete a site-specific NEPA review and CZMA consultation with the affected state(s). Along with the NEPA and CZMA reviews, the Maritime Administration has its own approval criteria, including the use of best available technology to prevent or minimize adverse environmental impacts, that must be met before a license is issued.

***Other Environmental Factors*:** Hurricanes have continued to negatively impact land use and coastal infrastructure (see **Appendix B.4.2.9**). Hurricane Nicholas made landfall 80 km (50 mi) south of Houston as a Category 1 hurricane on September 14, 2021, temporally shutting down the Colonial Pipeline (supplying natural gas to the East Coast) and closing the Houston Ship Canal for weeks. On August 29, 2021, Hurricane Ida made landfall near Port Fourchon as a Category 4 hurricane, shutting down an estimated 96 percent of OCS petroleum crude production, 94 percent of its natural gas production, and closing or damaging nine or more refineries. Flood control systems, much improved since Hurricane Katrina, helped protect the New Orleans urban area from Hurricane Ida's devastating flooding but failed to protect coastal and outlying areas. Hurricane Ida's infrastructure damages were substantial, and production was not expected to return to normal until October 2021 and infrastructure repairs are expected to take much longer (Energy Information Administration 2021).

Ongoing substantial coastal land loss resulting from erosion, subsidence, sea-level rise, and more severe and numerous storms continue to negatively impact land use and coastal infrastructure. Storms threaten important infrastructure, critical wetlands, barrier islands, coastal communities, and inland communities as inland waterways flood more frequently causing widespread property damage and dislocating residents and businesses. Coastal land loss is one of the greatest threats to the stability and future of OCS oil- and gas-related infrastructure, producing a substantial negative impact to those facilities located close to areas vulnerable to land loss. Gulf Coast States are taking various steps to address land loss and other issues of concern exacerbated by climate-related factors. For example, the Texas Coastal Resiliency Master Plan originated in 2017 and focuses on funding projects to address coastal vulnerabilities, aims to be an adaptable plan, and fosters communication with the public regarding the value of the Texas Coast and its preservation (Oyer 2021). In January 2023, Louisiana published the 2023 Louisiana's Comprehensive Master Plan for a Sustainable Coast, which follows three previous Master Plans that started after Hurricane Katrina in 2005 with the goal of countering the severe land loss that continues along the Louisiana coast (over 2,000 square miles lost since 1932) (Coastal Protection and Restoration Authority 2023). In addition to the Master Plan, Louisiana has a Climate Initiatives Task Force that created an action plan to address climate impacts in the state (Climate Initiatives Task Force 2022).

Critical infrastructure along the Gulf Coast, such as Port Fourchon, continues to be threatened by ongoing climate-related effects. Masters (2019) notes that warmer ocean temperatures, are making slow-moving storms more common and more damaging, because they can sit over one location for longer periods of time, increasing the amount of precipitation seen in an area. It also contributes to sea-level rise, which is one factor in the loss of coastal lands felt across the Gulf of America, but most acutely in Louisiana.

4.14.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct impacts to land use or coastal infrastructure would occur as a result of the proposed action (i.e., a single proposed OCS oil and gas lease sale). Furthermore, because a single lease sale would represent only a small fraction of the overall Cumulative OCS Oil and Gas Program production in the GOA (**Table 3.3-1**), cancellation would not be expected to result in a notable adverse or beneficial impact to coastal infrastructure. Given the existing infrastructure, the breadth of onshore and offshore oil and gas activity already using coastal infrastructure, and the long-term projections for industry needs, coastal infrastructure in the GOA region is not prone to rapid fluctuations.

***Ongoing OCS Oil and Gas Activities*:** Ongoing OCS oil and gas activities (**Table 3.3-2**) could still potentially effect land use and coastal infrastructure through discharges and wastes, coastal land use/modification, lighting/visual impacts, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions. Their potential types of impacts are summarized above in **Chapters 4.14.2.1** and **4.14.2.2**. Routine ongoing OCS oil and gas activities would have notable benefits overall like sustained economic growth and enhanced support of OCS oil- and gas-related infrastructure. Conversely, accidental events like oil spill and collisions could have potentially notable adverse effects like decreased diversity of land uses available over short periods, or for longer periods in some instances (e.g., a large oil spill). Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.14.1** and in further detail in Chapter 4.4.1 of the GOM Oil and Gas SID. Considering the estimates of ongoing OCS oil- and gas- activities (**Table 3.3-2**), impacts from ongoing OCS oil and gas activities would range from **moderate beneficial** to **moderate adverse**, with substantial effects to overall trends in coastal land use or coastal infrastructure.

***Non-OCS Oil- and Gas-Related Activities*:** Discharges and wastes, coastal land use/modification, lighting and visual impacts, offshore habitat modification/space use, and socioeconomic changes and drivers from non-OCS oil- and gas-related activities would continue to potentially affect land use and coastal infrastructure under the No Action alternative, as described above. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. As trends in agriculture, recreational uses, and urbanization shift over time, so could

impacts to land use and coastal infrastructure. Impacts from these shifts in agriculture, recreational uses, and urbanization can be substantial in their own right, and they also influence the magnitude of impacts from ongoing OCS oil- and gas-related activities. For example, expansion of urban development impinges on the land available for other uses, such as recreation, agriculture, or oil- and gas-related infrastructure. As a result of this enhanced urbanization, further demands from OCS oil- and gas-related activity become even more pronounced, given the lower amount of substitute areas available. Much like expansions from urbanization, similar stresses from increased recreational activity or agriculture can produce similar effects on local land use. Thus, changes in regional population growth, tourism development, state oil and gas, and industrial diversification would have substantially greater influence on coastal infrastructure and land use patterns in the GOA than the effects associated with ongoing OCS oil- and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS oil and gas lease sale. This alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced or altered by the geographic constraints under Alternatives C and D (**Table 4.14-2**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.14-2. Impact Determinations for Routine and Accidental Impacts to Coastal Land Use and Infrastructure from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure	Alternative B	Alternative C	Alternative D
Discharges and Wastes	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**
Coastal Land Use/Modification	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**
Lighting and Visual Impacts	N/A	**Negligible**	**Negligible**	**Negligible**
Socioeconomic Changes and Drivers	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**
Unintended Releases into the Environment	N/A	**Negligible** to **Moderate Adverse**	**Negligible** to **Moderate Adverse**	**Negligible** to **Moderate Adverse**
Response Activities	N/A	**Minor Beneficial** to **Moderate Adverse**	**Minor Beneficial** to **Moderate Adverse**	**Minor Beneficial** to **Moderate Adverse**
Strikes and Collisions	N/A	**Negligible** to **Moderate Adverse**	**Negligible** to **Moderate Adverse**	**Negligible** to **Moderate Adverse**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. Considering the estimates of ongoing OCS oil- and gas- activities (**Table 3.3-2**), impacts from ongoing OCS oil and gas activities would range from **moderate beneficial** to **moderate adverse**, with substantial effects to overall trends in coastal land use or coastal infrastructure.

Alternative B – Regionwide OCS Lease Sale

Discharges and Wastes: Onshore impacts from discharges and wastes could affect land use and coastal infrastructure in Texas, Louisiana, Mississippi, Alabama, or Florida, depending on which onshore waste facilities receive wastes from offshore activities. Louisiana and Texas, respectively, have the most OCS-related waste facilities in the GOA region, and therefore, have a greater likelihood of being impacted. If any impacts were to occur, they are expected to range from **minor beneficial** to **minor adverse** for two reasons. First, existing regulatory requirements guide the appropriate handling and disposal of wastes, and the types and quantity of discharges allowed. These regulatory requirements are largely implemented by State and Federal agencies that have their own mitigation requirements that serve to avoid and reduce impacts. Second, no new facilities or expansions of existing facilities are projected (**Chapter 3.4.5**), and the capacity at existing facilities is sufficient to handle wastes generated from ongoing routine OCS oil- and gas-related activities (Dismukes 2023). Impacts are largely minimal from a combination of no new expected facilities and an existing regulatory and mitigation framework (see **Table 4.2-2**) and, thus, beneficial (e.g., dredged material disposal that reduces subsidence) or adverse impacts would be **minor**. For additional discussion, see **Chapter 4.14.2** of this Programmatic EIS and Chapter 4.4.1.2 in the GOM Oil and Gas SID.

Coastal Land Use/Modification: Impacts from coastal land use or modification by other sectors vary depending on the type, scale, and location. These impacts range from **minor beneficial** to **minor adverse** because coastal land use/modification contribute both negatively and positively to land use and coastal infrastructure impacts as described in **Chapter 4.14.2** of this Programmatic EIS and Chapter 4.4.1.2 of the GOM Oil and Gas SID. A regionwide OCS oil and gas lease sale represents only about 0.3 to 1.8 percent of the overall Cumulative OCS Oil and Gas Program production in the GOA (**Table 3.3-1**) and no new onshore facilities or expansions of existing facilities are projected, so most of these impacts would be secondary and small and include activities like dredging and maintenance at existing facilities.

Lighting and Visual Impacts: Visual impacts can affect land use and coastal infrastructure negatively and positively as described in **Chapter 4.14.2** of this Programmatic EIS and Chapter 4.4.1.2 of the GOM Oil and Gas SID. However, these impacts would be **negligible** because they would not be measurable and particularly in the coastal areas where substantial oil and gas activities already occur as part of existing baseline conditions (offshore Texas, Louisiana, Mississippi and Alabama), perception of impacts are subjectively interpreted by the observers. Additionally, State and Federal agencies with jurisdiction over facility siting have their own mitigation requirements that serve to avoid or reduce any impacts.

Socioeconomic Changes and Drivers: Socioeconomic changes and drivers could affect land use and coastal infrastructure in the Gulf Coast States as described in **Chapter 4.14.2** of this Programmatic EIS and Chapter 4.4.1.2 of the GOM Oil and Gas SID. These impacts are expected to range from **minor beneficial** to **minor adverse** because there may be some small and measurable benefits for employment, improvements to local infrastructure and community services (e.g., job

creation, road/rail/port improvements, upgrading local parks and recreational areas), and there could be some adverse localized impacts that may disrupt uses temporarily (e.g., traffic disruption due to construction).

Unintended Releases into the Environment: Accidental events could affect land use and coastal infrastructure in the analysis area as discussed above in **Chapter 4.14.2** of this Programmatic EIS and Chapter 4.4.1.2 of the GOM Oil and Gas SID; impacts from unintended releases into the environment would range from **negligible** to **moderate adverse** depending on the size and location of the release. As noted in **Chapter 3.5.1.1**, the estimated number of spills decrease with increasing spill size. As such, most oil and chemical spills that do occur are small and dispersed which, when considered across the GOA, result in negligible to moderate impacts. Larger spills, while less likely (Ji and Schiff 2023), could result in localized impacts to areas of special importance to coastal communities (e.g., fishing grounds). That said, similar to the smaller spills, these spills generally volatize and are dispersed by currents, resulting in limited impacts to land use and coastal infrastructure.

Response Activities: Impacts from response activities would range from **minor beneficial** to **moderate adverse** depending on the type of activity and the onshore area affected (e.g., local businesses, beach recreation and space-use conflicts). Local hotels and apartments could benefit in the short-term from incoming spill-response workers, but at the same time, waste from spill response activity could overstrain waste disposal facilities and lead to an adverse impact on land use and coastal infrastructure.

Strikes and Collisions: Impacts due to collisions would range from **negligible** to **moderate adverse** based on the nature of the accident and duration of the disruption to onshore activities. Impacts would be negligible if, for example, there was a minor collision between a service vessel and an offshore structure. On the other hand, if there was a substantial collision between a vessel and a bridge, pier, or other structure, there could be a moderate adverse impact on coastal infrastructure.

Based on the description of the IPFs above and the scenario projections for a single oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative B on land use and coastal infrastructure would be **minor adverse**. Coastal infrastructure that supports offshore OCS oil- and gas-related activities is well established in the GOA region, and new or expanded infrastructure is not anticipated to support routine activities as a result of a single proposed OCS oil and gas lease sale. Furthermore, numerous State and Federal agencies permit onshore facility siting and expansions to minimize potential effects of these activities.

Alternative C –Targeted OCS Lease Sale Area

Alternative C represents a geographical constraint on available acreage for leasing, which could change the spatial distribution of activities when compared to Alternative B, but likely not the types of activities or their overall levels. This potential spatial redistribution of activity does not affect

land use and coastal infrastructure, because impacts to land use and coastal infrastructure are tied directly to the level of offshore activities, and a lease sale under Alternative C is not expected to alter the forecasted development activity, or the overall spatial and temporal land use patterns by the offshore oil and gas industry (described in **Chapter 3**).

Therefore, based on the description of the IPFs above and the scenario projections for a single OCS oil and gas lease sale provided in **Chapter 3**, the capacity of existing facilities and infrastructure to support the proposed activities, and because there would be no notable difference in the temporal and spatial patterns of land use when compared to Alternative B, the overall impacts from IPFs associated with Alternative C on land use and coastal infrastructure would be **minor adverse**.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D represents a geographical constraint on available acreage for leasing, which could change the spatial distribution of activities when compared to Alternative B or C, but likely not the types of activities or their overall levels. This potential spatial redistribution of activity does not affect land use and coastal infrastructure because impacts to land use and coastal infrastructure are tied directly to offshore activity levels, and a lease sale under Alternative D is not expected to alter the forecasted development activity (described in **Chapter 3**). The IPFs from routine activities are also unchanged from Alternative B.

Therefore, based on the description of the IPFs above and the scenario projections for a single oil and gas lease sale provided in **Chapter 3**, the capacity of existing facilities and infrastructure to support the proposed activities, and because there would be no notable difference in the temporal and spatial patterns of land use when compared to Alternative B, the overall impacts from IPFs associated with Alternatives D on land use and coastal infrastructure would be **minor adverse**.

4.14.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis builds on those effects by also considering the potential effects from reasonably foreseeable future OCS oil and gas lease sales and reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect land use and coastal infrastructure through discharges and wastes, coastal land use/modification, light and visual impacts, offshore habitat modification/space use, socioeconomic changes and drivers, and accidental events as described above in **Chapters 4.14.2.1** and **4.14.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.14.1** and in further detail in Chapter 4.4.1 of the GOM Oil and Gas SID. These ongoing impacts would be **moderate**

beneficial to **moderate adverse**. Future lease sales would add notably to the past and present impacts. Much like the impacts explained by the ongoing OCS oil- and gas-related activity above, those from coastal land use modifications are likely to remain the most notable, with respect to their effects on land use and coastal infrastructure. As noted above, increased development of port facilities, for example, can contribute positively to local economies and employment, while simultaneously impinging upon alternative recreational or agricultural uses. Additionally, the occurrence of large accidental oil spills in coastal and inland waters and the resulting spill response activity that would follow could put a strain on waste disposal facilities and provide temporary, but substantial, disruptions of local businesses. Therefore impacts from future sales would have similar notable benefits and potentially adverse effects to land use and coastal infrastructure based on the resulting level of activity associated with those future sales.

Non-OCS Oil- and Gas-Related Activities: Cumulative non-OCS oil- and gas-related activities such as substantial coastal land loss resulting from erosion, subsidence, sea-level rise, and more severe and numerous storms continue to negatively impact land use and coastal infrastructure. The potential impacts from these factors are discussed in **Chapter 4.14.1** and are expected to continue. NEPA and CZMA reviews, along with the Maritime Administration's own approval criteria, should minimize adverse environmental impacts from any new deepwater LNG port facilities. However, the aforementioned climate-related effects, including more severe and numerous storms and coastal land loss from these storms as well as from erosion, subsidence, and sea-level rise, pose some of the greatest threats to land use and coastal infrastructure overall. The storms themselves risk destroying critical infrastructure, as well as wetlands, barrier islands, coastal and inland communities. In addition, coastal land loss also endangers coastal infrastructure and removes available land for a host of uses, such as recreation, agriculture, and urban development. Given the magnitude of these potential impacts, climate-related factors have a greater overall impact on land use and coastal infrastructure than the OCS Oil and Gas Program cumulatively.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion of activity when compared to the ongoing OCS Oil and Gas Program in the GOAR (**Table 3.3-2**). BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as having potentially crucial effects on land use and coastal infrastructure. The incremental contribution of impacts from one lease sale to those cumulative effects would be undetectable. Additionally, existing non-OCS oil- and gas-related activities would continue to use and affect coastal infrastructure at current levels, regardless of whether a single proposed lease sale occurs. In the context of past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities within the area of analysis, the *incremental contribution* of a proposed GOA oil and gas lease sale to cumulative impacts on land use and coastal infrastructure would be **negligible**. An OCS oil and gas lease sale would not be expected to result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by land use and coastal infrastructure in the area of analysis.

The cumulative effects on land use and coastal infrastructure would not differ between action alternatives. While the distribution of areas offered for leasing vary among alternatives, the total amount of activity would not, and the land use of areas would largely be expected to be the same among alternatives. Cancellation of a single proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Appendix M.4.2.1** through **M.4.2.4**.

4.14.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on land use and coastal infrastructure. Information surrounding the outcome of ongoing efforts to combat the negative impacts of climate-related factors and coastal land loss are incomplete. A 2018 report by the National Academies of Sciences, Engineering, and Medicine found that more research is needed for a better understanding of how environmental changes affect coastal communities and infrastructure, especially Gulf Coast energy infrastructure (National Academies of Sciences 2018). BOEM has determined that such information is not essential to a reasoned choice among alternatives because the adverse impacts are well understood and any improved understanding of successful mitigation of these impacts would be additive to the analysis, but not essential. Additionally, the incremental impacts of the proposed action would be negligible when compared to overall cumulative activities in the context of existing baseline conditions and the long-standing, mature oil and gas program established along the Gulf Coast. BOEM has used the reliable information available to date and reasonably accepted scientific methodologies to extrapolate from existing information. Therefore, the incomplete or unavailable information, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

4.15 Economic Factors

Economic factors explain and quantify the human behaviors that determine the positive and negative effects that may arise from both OCS oil- and gas-related activities and non-OCS oil- and gas-related activities. The OCS oil- and gas-related activities affect various onshore areas because of the many industries involved and because of the complex supply chains for these industries. Several of these impacts occur in counties and parishes along the GOA region.

4.15.1 Affected Environment

BOEM aggregates 133 counties and parishes from the five Gulf Coast States into 23 economic impact areas (EIAs) based on economic and demographic similarities (Varnado and Fannin 2018; **Figure 4.15-1**). Much of BOEM's socioeconomic analyses focus on these EIAs because effects related to OCS oil and gas leasing in the GOAR are concentrated in these EIAs. For more information on EIAs, see Chapter 2.5 of the GOM Oil and Gas SID.

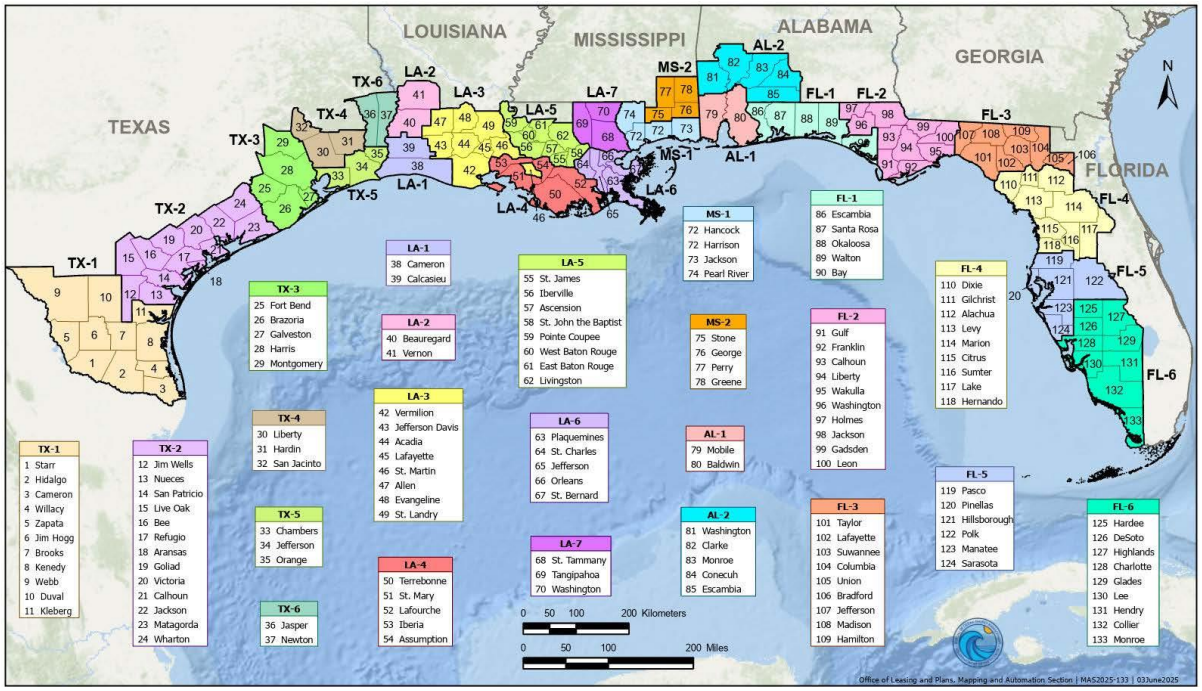

Figure 4.15-1. Economic Impact Areas in the Gulf of America Region.

Economic and Demographic Data

BOEM uses economic data from Woods & Poole Economics, Inc. to provide baseline and projected economic information for both OCS oil- and gas-related activity and non-OCS oil- and gas-related activities in the GOA region. These data are derived from historical local, regional, and national data, as well as likely changes to economic and demographic conditions. The projections include employment associated with the continuation of current patterns in OCS leasing activity, as well as the continuation of trends in other industries important to the region. BOEM acknowledges that these data are not comprehensive but provide reasonable projections based on future possible projects and actions.

The Woods & Poole Economics, Inc. data include county-level economic and demographic data for prior years, as well as forecasts through 2060. BOEM aggregates these data by EIA for select socioeconomic variables, including population, employment, gross regional product, labor income, median age, and percentage of males. According to Woods & Poole Economics (2023) (**Table 4.15-1**), the largest EIAs in 2022 (presented in descending order of gross regional product) were TX-3 (which includes Houston and Galveston), FL-5 (which includes Tampa), LA-6 (which includes New Orleans), FL-6 (which includes Fort Myers), LA-5 (which includes Baton Rouge) and TX-1 (which includes Laredo). The smallest EIAs (presented in ascending order of gross regional product) were MS-2, TX-6, LA-2, TX-4, and AL-2. The forecasts from Woods & Poole Economics (2023) for 2060 are presented in **Table 4.15-2** below.

Table 4.15-1. Economic Information for BOEM's Economic Impact Areas in 2022.

EIA	Population	Employment	Gross Regional Product (thousands, 2024 dollars)	Labor Income (thousands, 2024 dollars)
TX-1	1,732,673	870,411	$75,774,430	$43,076,332
TX-2	745,461	439,326	$57,993,107	$29,357,768
TX-3	7,095,431	4,661,963	$692,808,262	$428,248,973
TX-4	188,642	64,448	$5,659,646	$2,923,434
TX-5	387,958	224,612	$34,481,684	$16,227,149
TX-6	44,536	18,276	$2,175,367	$814,334
TX EIAs	10,194,701	6,279,036	$868,892,496	$520,647,990
LA-1	207,184	126,590	$20,961,163	$9,773,775
LA-2	83,494	40,438	$4,292,800	$2,718,232
LA-3	580,569	338,844	$31,684,890	$19,769,011
LA-4	336,985	185,662	$19,518,923	$12,559,819
LA-5	865,834	569,831	$76,096,106	$41,586,879
LA-6	914,042	640,657	$80,636,578	$46,369,499
LA-7	455,027	244,926	$25,053,143	$16,230,453
LA EIAs	3,443,135	2,146,948	$258,243,604	$149,007,670
MS-1	458,596	248,337	$28,834,887	$15,914,817
MS-2	68,804	22,823	$1,937,532	$999,826
MS EIAs	527,400	271,160	$30,772,418	$16,914,643
AL-1	657,929	387,271	$41,770,707	$24,163,797
AL-2	104,940	51,109	$5,627,555	$2,823,486
AL EIAs	762,869	438,380	$47,398,262	$26,987,283
FL-1	1,007,137	609,994	$67,510,044	$42,409,586
FL-2	518,026	305,771	$30,759,933	$19,681,855
FL-3	235,668	96,098	$10,253,716	$5,376,352
FL-4	1,686,153	764,696	$76,847,087	$44,330,427
FL-5	4,764,509	2,899,531	$338,873,757	$204,656,910
FL-6	1,724,581	965,730	$108,323,292	$62,633,927
FL EIAs	9,936,074	5,641,820	$632,567,828	$379,089,056
All EIAs	24,864,179	14,777,344	$1,837,874,608	$1,092,646,642

Notes: AL = Alabama; EIA = economic impact area; FL = Florida; LA = Louisiana; MS = Mississippi; TX = Texas.
Source: Woods & Poole Economics (2023).

Table 4.15-2. Economic Information for BOEM's Economic Impact Areas in 2060.

EIA	Population	Employment	Gross Regional Product (thousands, 2024 dollars)	Labor Income (thousands, 2024 dollars)
TX-1	2,735,933	1,691,753	$198,163,167	$125,025,313
TX-2	826,028	605,216	$92,582,463	$53,751,865
TX-3	11,527,107	7,938,814	$1,574,529,408	$1,012,077,407
TX-4	237,794	100,585	$10,275,329	$7,117,969
TX-5	449,729	320,205	$50,578,312	$32,916,794
TX-6	42,265	20,278	$2,363,720	$1,295,967
TX EIAs	15,818,856	10,676,851	$1,928,492,401	$1,232,185,315
LA-1	230,742	210,925	$37,823,446	$21,141,027
LA-2	85,301	49,772	$7,075,420	$4,845,847
LA-3	667,552	475,121	$62,819,948	$38,120,496
LA-4	343,690	219,674	$31,823,398	$20,111,046
LA-5	1,098,228	844,056	$130,827,029	$81,524,484
LA-6	788,877	662,878	$114,833,004	$63,654,173
LA-7	585,995	435,593	$53,163,629	$36,616,458
LA EIAs	3,800,385	2,898,019	$438,365,875	$266,013,533
MS-1	511,868	290,642	$34,659,521	$23,842,849
MS-2	83,251	29,255	$2,792,432	$1,764,735
MS EIAs	595,119	319,897	$37,451,953	$25,607,584
AL-1	801,422	547,465	$70,352,126	$42,852,636
AL-2	92,497	57,702	$7,628,850	$4,191,036
AL EIAs	893,919	605,167	$77,980,976	$47,043,672
FL-1	1,376,216	972,933	$143,851,479	$88,324,833
FL-2	639,474	423,013	$54,786,779	$34,774,814
FL-3	296,448	125,553	$17,206,534	$8,848,126
FL-4	2,888,132	1,378,231	$190,707,705	$108,943,382
FL-5	6,814,212	4,258,326	$668,111,727	$397,052,057
FL-6	2,941,527	1,543,355	$232,180,017	$132,762,562
FL EIAs	14,956,009	8,701,411	$1,306,844,242	$770,705,774
All EIAs	36,064,288	23,201,345	$3,789,135,447	$2,341,555,876

Notes: AL = Alabama; EIA = economic impact area; FL = Florida; LA = Louisiana; MS = Mississippi; TX = Texas.
Source: Woods & Poole Economics (2023).

Offshore Oil and Gas Industry

BOEM examined data from the Census Bureau at the State level to describe the oil and gas industry and associated support industry in the GOA region in 2022 (i.e., Texas, Louisiana, Mississippi, Alabama, and Florida). These State-level data allow BOEM to address issues inherent in limiting economic impact modeling to narrowly defined geographic areas (e.g., leakages through imports, taxes, profit, and commuting).

The oil and gas extraction subsector is composed of many different company types that are involved in operating and developing oil and gas fields. This array of industries has been working in the GOA region for many decades. **Table 4.15-3** presents employment data for the GOA companies directly involved in oil and gas extraction activities. As of 2022, Louisiana and Texas were the most dependent on oil and gas extraction-related activities, with 66,844 and 373,192 employees respectively (U.S. National Science Foundation and U.S. Census Bureau 2025). The companies operating in the offshore space may use more capital-intensive technologies and, as a result, may employ fewer people but pay higher wages. It is challenging, however, to separate onshore and OCS oil- and gas-related activities because many companies operate in both spaces.

Table 4.15-3. Number of Employees Working in Oil and Gas Extraction-Related Firms in 2022.

State	Total Number of Employees	Number of Employees in Oil and Gas Extraction and related companies
Alabama	1,685,757	1,034
Florida	9,136,164	702
Louisiana	1,593,706	66,844
Mississippi	879,371	5,452
Texas	11,749,766	373,192
Gulf of America Total	25,044,764	447,224

Source: National Center for Science and Engineering Statistics, U.S. National Science Foundation and U.S. Census Bureau. Note: this data excludes firms receipts valued less than $1,000 per year, non-employer businesses, and firms in the following industries: crop and animal production; rail transportation; postal service; monetary authorities – Central Bank, funds, trusts, and other financial vehicles, religious, grantmaking, civic, professional, and similar organizations, private households, and public administration. Data Axle Inc. (2022) and U.S. National Science Foundation and U.S. Census Bureau (2025)

Oil and Gas Production in the Gulf of America

The economic effects of the oil and gas industry are influenced by a variety of factors, including economic conditions, technological advancements, political events, and historical production trends. **Figure 4.15-2** shows long-term oil and gas production indices for the United States as a whole, the five Gulf Coast States, and the Gulf of America OCS (the shades of red represent gas and the shades of green represent oil), which have varied over time. For example, the oil price crash in 2014 caused slowdowns in offshore drilling activities (Beaubouef 2015) and rig construction (Odell 2015). Offshore investments increased in 2019 following the oil price recovery in 2018. Although OCS oil production has seen overall growth, it has remained highly volatile due to market fluctuations and external factors. The COVID-19 pandemic in 2020 and 2021 had major

impacts on the sector, leading to a decline in offshore investments as demand plummeted and production slowed. However, as global energy markets stabilized post-pandemic, offshore investment saw an upswing in 2022, supporting a renewed increase in OCS oil production. Meanwhile, OCS gas production has been on a consistent downward trend since 2001, given the increase in onshore natural gas production and associated decline in prices.

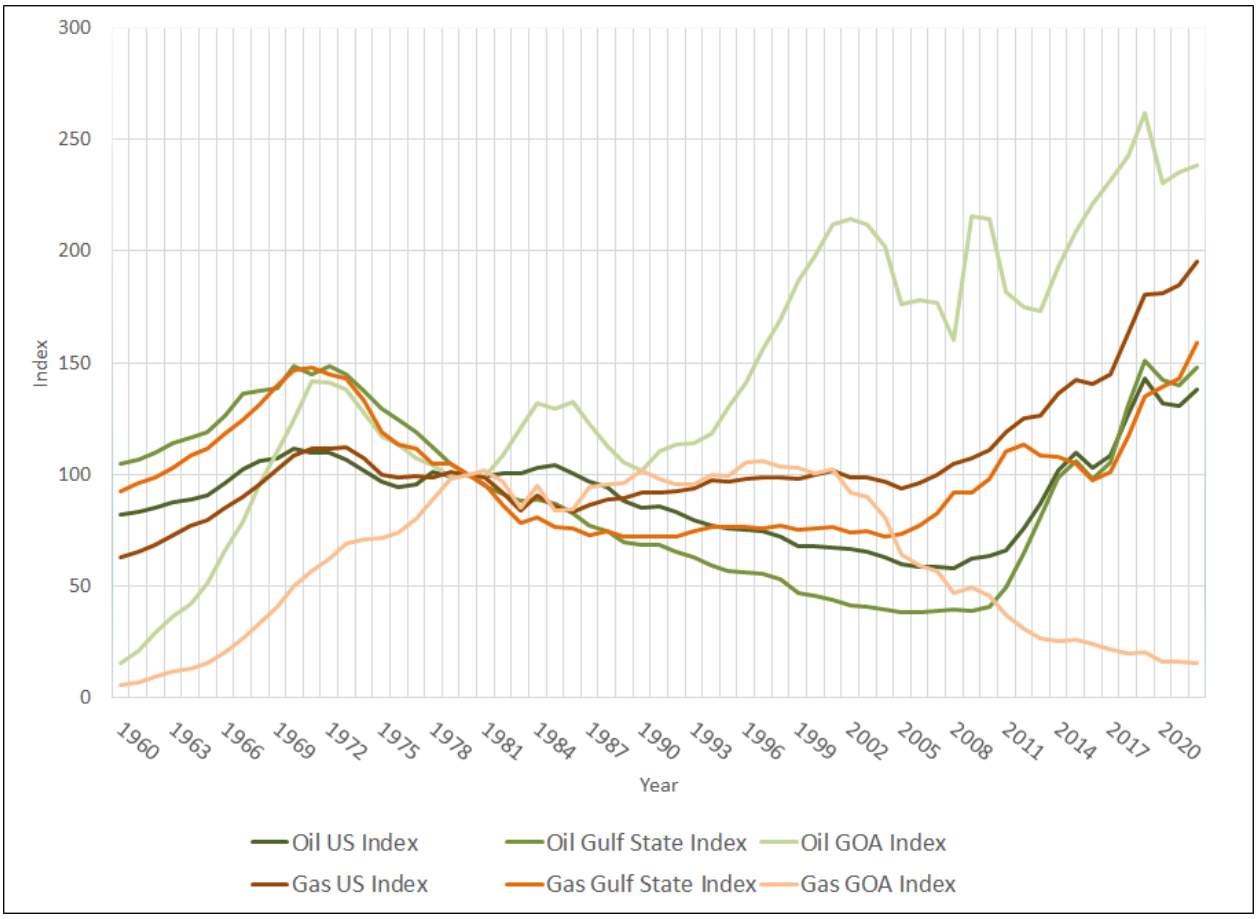

Figure 4.15-2. Oil and Gas Production Indices 1960-2022 ,1980=100 (Source: Energy Information Administration (2023)).

Oil and gas production indices diverged greatly since 2010, with OCS oil production reaching record levels in 2019 while OCS gas continues to decline (**Figure 4.15-2**). The U.S. and Gulf Coast States' gas and oil indices increased substantially between 2010 and 2022. Overall, Gulf of America OCS oil production grew by 4.53 percent annually from 1960 to 2022. Technological advancements, such as the "shale revolution," contributed to the growth in land-based oil and gas production. Similarly, enhancements in development and production techniques (e.g., spar, tension-leg platform, and subsea completions) for deepwater fields, coupled with the available volume of hydrocarbons and the rate of production, have contributed to the growth of deepwater OCS oil production. Offshore oil and gas production are generally slow to respond to changes in energy prices since offshore developments take years to be designed, approved, and developed. Once a project is producing, it

is often most profitable to maintain production as long as the revenues received are above the marginal costs of production.

BOEM uses production data submitted to BSEE along with knowledge of oil and gas reserves and resources to forecast future production. In 2024, GOA annual crude oil production was about 656.2 million barrels (MMbbl), averaging 1.80 MMbbl of oil per day, while annual natural gas production in 2024 was about 19.4 billion cubic meters (684.7 billion cubic feet), averaging 0.05 billion cubic meters (1.88 billion cubic feet) per day (BOEM 2025b). Natural gas and crude oil production is expected to remain relatively flat in 2025 (Energy Information Administration 2024).

BOEM relied on several other data sources for information concerning economic factors in the GOA region when conducting this analysis. Kaiser and Narra (2018) provide a robust overview of GOA oil and gas infrastructure inventories and trends, as well as operating cost data analysis and a decommissioning forecast for shallow and deepwater regions. Quest Offshore Resources Inc. (2011) provides an overview of the spending impacts of the offshore oil and gas industry in the GOA. This report estimates that $26.9 billion in capital and operating expenditures supported $29.1 billion in U.S. gross domestic product in 2009. Kaiser et al. (2013) provide background information on the drilling and rig construction markets, Kaplan et al. (2011) provides background information on the oil services contract industry, and Priest and Lajaunie (2014) and McGuire et al. (2014) provide background information on the shipbuilding and fabrication industries. These data are used to assess the importance of the offshore oil and gas industry on onshore industries in the GOA region.

Office of Natural Resources Revenue Data

In addition to industry spending, profits, and employment, government revenues from offshore oil- and gas-related activities are generated through bonus bids, rental payments, and royalty payments. The DOI's ONRR collects these revenues and provides production, revenue, and disbursement data, including but not limited to Federal OCS oil- and gas-related activities. BOEM's "Fair Market Value" webpage describes the rental rates, royalty rates, and other terms associated with GOA leases (BOEM 2024a). BOEM's "Royalty Relief Information" webpage provides more information regarding BOEM's royalty relief programs (BOEM 2024b).

Table 4.15-4 presents annual data regarding sales volumes, sales values, and government revenues received from Federal OCS oil- and gas-related activities in the GOA (ONRR 2023; 2024).

Table 4.15-4. Sales Volumes, Sales Values, and Revenues from OCS Oil- and Gas-Related Activities in the Gulf of America.

Product Type	2018	2019	2020	2021	2022	2023	2024
Sales Volumes – Gas (royalty) (Mcf)	644,625,654	705,093,904	602,517,338	507,807,516	541,334,267	538,101,059	468,432,702
Sales Volumes – Gas (non-royalty) (Mcf)	127,453,290	126,227,458	108,338,224	86,338,627	69,754,982	52,944,159	56,170,419
Sales Volumes – NGL (royalty) (gal)	1,761,166,271	2,050,562,634	1,876,979,720	1,770,070,074	1,952,341,979	2,056,358,124	2,063,193,715
Sales Volumes – NGL non-(royalty) (gal)	478,323,341	460,838,472	435,138,381	397,521,931	307,527,896	238,003,076	263,364,572
Sales Volumes – Oil (royalty) (bbl)	479,105,687	553,422,382	482,141,373	476,491,886	515,042,031	568,574,037	563,196,055
Sales Volumes – Oil (non-royalty) (bbl)	130,248,339	133,704,765	164,876,551	129,858,532	110,571,896	101,862,261	99,214,501
Sales Values – Gas ($)	$1,909,712,356	$2,103,825,424	$1,236,458,002	$1,669,328,854	$3,652,830,297	$1,955,350,770	$1,197,331,431
Sales Values – NGL ($)	$1,265,581,002	$989,162,443	$598,511,026	$1,046,769,170	$1,804,121,388	$1,136,575,121	$1,087,528,135
Sales Values – Oil ($)	$31,597,443,221	$34,560,758,308	$21,356,511,325	$28,606,047,952	$47,884,009,371	$44,553,457,472	$44,441,626,260
Sales Values – Other Products ($)	$4,242	-	-	$67,530	$24,505	$5,556	$2,358
Sales Values – Total Sales Value ($)	$34,772,740,821	$37,653,748,193	$23,191,482,373	$31,322,215,527	$53,340,987,583	$47,645,388,919	$46,726,488,183
Revenues – Gas Royalties ($)	$230,038,882	$254,659,899	$138,809,790	$204,937,263	$482,116,243	$237,328,319	$134,562,254
Revenues – NGL Royalties ($)	$134,601,421	$93,388,897	$51,507,584	$105,715,194	$194,769,362	$114,405,481	$108,130,388
Revenues – Oil Royalties ($)	$4,071,169,795	$4,500,169,908	$2,742,395,156	$3,713,071,790	$6,353,964,333	$5,984,607,331	$5,908,022,505
Revenues – Oil & Gas[1] Royalties ($)	-	-	($1,126,523)	($3,385,060)	-	-	
Revenues – Other Products[2] Royalties ($)	$707	-	-	$11,251	$4,084	$926	$393
Revenues – Rents ($)	$101,998,058	$102,682,557	$96,719,870	$85,445,733	$78,916,135	$115,710,978	$123,093,499
Revenues – Bonus ($)	$225,964,628	$407,261,497	$241,234,980	$111,559,312	-	$434,446,209	$372,460,408
Revenues – Other Revenues ($)	$67,349,182	$19,123,597	($19,946,211)	$49,826,743	$132,783,718	$7,213,226	($14,146,327)
Revenues – Total Revenues	$4,831,122,673	$5,377,286,354	$3,249,594,648	$4,267,182,225	$7,242,553,874	$6,893,712,470	$6,632,123,119

Notes: NGL = natural gas liquids; bbl = barrel; gal = gallon; Mcf = thousand cubic feet.

[1] Other products for sales values and revenues include sodium and sulfur.

[2] In 2020 and 2021 there are negative royalties for oil and gas; this is due to temporary royalty relief that was granted during that time period due to the pandemic.

Source: ONRR (2024).

4.15.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas related activities, including decommissioning, with the potential to impact economics. Non-OCS oil- and gas-related activities also have the potential to impact economic factors (**Table 4.15-5**). Many of these activities can have direct, indirect, cumulative, or unknown benefits or adverse impacts to economic factors and may be felt unevenly and by different groups or sectors across the GOA region. These IPFs and their potential to affect economic factors are discussed in greater detail in Chapter 4.4.7 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.4.7 of the GOM Oil and Gas SID.

Table 4.15-5. Impact-Producing Factors with the Potential to Impact Economic Factors.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Socioeconomic Changes and Drivers	Unintended Releases into the Environment	Socioeconomic Changes and Drivers
-	Response Activities	Other Environmental Factors
-	Strikes and Collisions	-

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

There are several existing regulatory programs and requirements to reduce the potential effects from these IPFs in the GOA region while taking into account economic factors and are enforced by BOEM, BSEE, and other agencies. For example, leases are not issued until BOEM has completed an extensive bid evaluation process to ensure that the Federal Government receives fair market value for the lease in accordance with Section 18 of OCSLA (43 U.S.C. 1344). The *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025a) overviews the complex interconnected regulatory regime that exists around GOA oil- and gas-related activities. Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements; therefore, the analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

4.15.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

***Socioeconomic Changes and Drivers*:** Extraction of oil, natural gas liquids, and natural gas generate expenditures on various goods and services and generate jobs. Routine activities would generate corporate profits and government revenues, and affect the overall energy market. In FY 2024, OCS oil- and gas-related activities sustained approximately 250,000 jobs and generated an estimated $30.83 billion in domestic value-added to the national gross domestic product (GDP)

(BOEM 2024c). BOEM estimates that approximately 69 percent of jobs remained in the states adjacent to the GOA (i.e., Texas, Louisiana, Mississippi, Alabama, and Florida).

Expenditure Impacts: OCS oil- and gas-related activities could have substantial economic effects on a variety of businesses along the OCS industry's supply chain. Activities expected from this proposed action would sustain the level of expenditures that currently occur in the region related to oil and gas activities. OCS oil- and gas-related activities could directly affect firms that drill wells, manufacture equipment, construct pipelines, and service OCS oil- and gas-related activities. The OCS oil- and gas-related activities could also affect the suppliers to those firms, as well as firms that depend on consumer spending of oil and gas industry workers. BOEM uses economic and financial models to estimate the output, value added, income, and employment associated with OCS oil- and gas-related activity. BOEM's analysis of the economic contributions of an oil and gas lease sale is presented later in this section.

Additionally, facilities are required to be decommissioned at the expense of the lessee. Decommissioning generates additional economic impacts. The BSEE Data Center (2025b) indicates that as of May 2025, decommissioning estimates for these facilities are estimated to be between $33 billion and $48 billion. These decommissioning estimates represent the entire cost of decommissioning all facilities in the GOA, including those currently active, and which would occur over many decades. A lessee is required to decommission and should prepare appropriately for these expenditures, in some cases this may include providing financial assurance to BOEM as security for future decommissioning costs. Decommissioning may also present a substantial opportunity for employment. Agerton et al. (2022) estimates that approximately 10,520 jobs per year could be supported by state and federal offshore plug-and-abandonment activities, generating $632 million in labor income and contributing $1.185 billion in value added. However, the single-sale impact numbers already account for the economic expenditures and impacts associated with decommissioning the facilities developed within the scenario. In some cases, a lessee may not undertake timely decommissioning. In addition to receiving administrative enforcement from BSEE, the lessee would likely also experience higher costs for decommissioning. For more detail, see **Appendix C**.

Government Revenue Impacts: The OCS oil- and gas-related activities would generate government revenues through bonus bids, rental payments, royalty payments, taxes, and Gulf of Mexico Energy Security Act (GOMESA) distributions (Pub. L. 109-432). Federal revenues totaled $7 billion from OCS oil and gas activities in fiscal year 2024. GOMESA provides for the sharing of OCS revenues with States, counties and/or parishes, and the Land and Water Conservation Fund, supporting local and State coastal conservation, restoration, and hurricane protection projects and goals. GOMESA distributions, however, are not directly tied to individual lease sales. Instead, annual distributions are based on specified percentages of the aggregate qualified OCS revenue within that year. Determining the proportion of these annual revenues that can be linked to a specific, individual lease sale from year to year is challenging and would be speculative to forecast for a single proposed OCS oil and gas lease sale. However, it is worth noting that the GOMESA revenue sharing cap (which is $$650 million annually for fiscal years 2025 through 2034 and $500 million annually for

fiscal years 2035 through 2055 for State/local governments and the Land and Water Conservation Fund combined) is likely to be reached in future years due to revenues from existing leases and, therefore, such revenue sharing is not projected to increase due to new leases resulting from a single proposed OCS oil and gas lease sale.

Effects resulting from the generation of these revenues depend on where and how the revenues are used. Historically, most revenues beyond the revenue sharing provisions have accrued directly to the Federal Treasury. This implies that the Federal revenue effects of OCS oil- and gas-related activities could be widespread, and thus not overly concentrated in BOEM's economic impact areas. The OCS oil- and gas-related activities can also induce government revenues arising from taxes on economic activities (such as taxes on profits and dividends). A detailed description of revenue sharing is presented in Chapter 4.4.7.2.2 of the GOM Oil and Gas SID.

Negative impacts to government revenues could potentially occur through decommissioning orphaned infrastructure after company bankruptcies. When companies declare bankruptcy, some, or all, of their decommissioning obligations could remain unfulfilled, shifting the financial burden to predecessor lessees or in some cases, to taxpayers by way of BOEM as the regulating agency. However, over the last few years, BOEM has made changes to its financial assurance regulations to better assess high-risk decommissioning liabilities. 30 CFR 556.900 et seq. provides BOEM's financial assurance requirements to ensure companies are appropriately bonded and to protect U.S. taxpayers against decommissioning costs. This framework includes the ability to re-evaluate companies' financial health annually and require supplemental financial assurance if necessary while leveraging the financial stability of strong lessees and grant holders—protecting taxpayers from undue financial burden and reinforcing responsible industry practices. On May 2, 2025, the Trump-Vance Administration announced their intent to revise this rule for a more balanced regulatory approach while protecting U.S. taxpayers from high-risk decommissioning liabilities.

Corporate Profit Impacts: The OCS oil- and gas-related activities could also generate profits to firms along the OCS supply chain. Corporate profits can be distributed to stockholders as dividends or retained by firms for future spending on goods and services. Higher profits can also increase stock prices, which could increase the wealth of stockholders. Since stocks of most energy firms can be held by people from anywhere in the world, the wealth and dividend impacts could be fairly widespread and, thus, not overly concentrated in BOEM's economic impact areas.

The high costs associated with decommissioning can strain financial resources, especially for smaller operators. Companies that fail to adequately plan for these expenses may face serious financial difficulties, sometimes leading to bankruptcy. Pursuant to DOI regulations, if firms declare bankruptcy, predecessor lessees are jointly and severally liable for meeting decommissioning liabilities, and financial assurance can be used to cover decommissioning costs.

BOEM employed the Life Cycle Impacts Model (LCIM) to estimate the number of jobs, labor income, and value added associated with anticipated activities from an oil and gas lease sale (**Table 4.15-6** and Price et al. 2020). These estimates include impacts arising from industry

expenditures, government revenues, and corporate profits. **Table 4.15-6** presents the average economic impact estimates in various regions during the lifecycle of oil and gas operations; years with zero activity were not included in the averages because including them would make the averages appear too low. In the low scenario, the proposed action could support up to 1,087 jobs, $77 million in labor income, and $130 million in value-added benefits throughout the U.S., mainly in the GOA region (i.e., the Texas and Louisiana coastal areas). In the high scenario, the action could support up to 18,941 jobs, $1.4 billion in labor income, and $2.2 billion in value -added. The mid scenario could support up to 7,407 jobs, $522 million in labor income, and $863 million in value-added, with a similar geographic distribution of impacts as the low and high scenarios.

Table 4.15-7 shows the EIA-level employment results in **Table 4.15-6** as a percentage of total 2022 employment in EIAs shown in **Table 4.15-1**. For the GOA EIAs in aggregate, the percentage of total employment ranges from 0.005 percent in the low scenario to 0.058 percent in the high scenario. The percentages of total employment are higher than those averages for EIAs in Texas, Louisiana, Mississippi, and Alabama; the percentages of total employment in Florida are much lower than the EIA averages. The highest percentages are for Louisiana EIAs, which range from 0.011 percent to 0.139 percent of total employment. Since the data presented are annual averages, impacts could be greater in particular years. Peak employment would occur during periods of substantial well drilling and structure fabrication, which would be approximately 5-10 years subsequent to the lease sale. The extent to which the jobs results reflect jobs that would be sustained or jobs that would be created would depend on various factors, such as the overall level of OCS oil- and gas-related activity.

Table 4.15-6. Annual Averaged Economic Impact Estimates of Gulf of America Single OCS Oil and Gas Lease Sale: High, Mid, and Low Scenarios.

Area	Scenario Case (high, mid, or low)	Employment1	Labor Income ($ million) (2024 dollars)	Value Added ($ million) (2024 dollars)
Texas EIAs	High	4,427	312	623
Texas Total	High	7,309	522	924
Louisiana EIAs	High	2,979	192	323
Louisiana Total	High	3,646	239	364
Mississippi EIAs	High	301	20	20
Mississippi Total	High	1,247	88	68
Alabama EIAs	High	302	18	26
Alabama Total	High	909	61	75
Florida EIAs	High	529	33	62
Florida Total	High	729	48	85
GOA EIA Total	High	8,539	575	1,054
Gulf of America Total	High	13,840	959	1,516
Rest of U.S.	High	5,101	391	704
U.S. Total	High	18,941	1,350	2,220
Texas EIAs	Mid	1,844	130	256
Texas Total	Mid	2,750	194	349

Area	Scenario Case (high, mid, or low)	Employment1	Labor Income ($ million) (2024 dollars)	Value Added ($ million) (2024 dollars)
Louisiana EIAs	Mid	1,269	82	137
Louisiana Total	Mid	1,526	100	153
Mississippi EIAs	Mid	127	9	9
Mississippi Total	Mid	501	35	28
Alabama EIAs	Mid	137	8	12
Alabama Total	Mid	378	25	31
Florida EIAs	Mid	228	14	26
Florida Total	Mid	304	20	35
Gulf of America EIA Total	Mid	3,605	242	440
Gulf of America Total	Mid	5,459	375	596
Rest of U.S.	Mid	1,948	147	267
U.S. Total	Mid	7,407	522	863
Texas EIAs	Low	352	25	49
Texas Total	Low	420	30	56
Louisiana EIAs	Low	236	15	26
Louisiana Total	Low	272	18	28
Mississippi EIAs	Low	23	2	2
Mississippi Total	Low	80	6	4
Alabama EIAs	Low	31	2	3
Alabama Total	Low	65	4	5
Florida EIAs	Low	47	3	5
Florida Total	Low	56	4	6
Gulf of America EIA Total	Low	689	47	84
Gulf of America Total	Low	893	62	100
Rest of U.S.	Low	194	15	30
U.S. Total	Low	1,087	77	130

EIA = economic impact area.

[1] Employment represents new activities for this OCS oil and gas lease sale, which may include individuals that are moving from previous, completed oil- and gas-related employment (i.e., a continuation of oil and gas employment).

Source: BOEM internal modeling estimates.

Table 4.15-7. Single Sale Employment as a Percentage of Total 2022 Employment.

EIAs/Scenario	Low	Mid	High
Texas EIAs	0.006%	0.029%	0.071%
Louisiana EIAs	0.011%	0.059%	0.139%
Mississippi EIAs	0.008%	0.047%	0.111%
Alabama EIAs	0.007%	0.031%	0.069%
Florida EIAs	0.001%	0.004%	0.009%
Gulf of America EIAs	0.005%	0.024%	0.058%

Overall Energy Market Impacts: The oil, natural gas, and natural gas liquids produced due to OCS oil- and gas-related activities could meet the demands of end users of those products and contribute to U.S. policy goals of energy independence and security. Increased energy supply could

put downward pressure on energy prices, although the scale of a proposed lease sale(s) relative to the overall energy market would temper these price effects. Decommissioning costs in the GOA vary widely, ranging from a few million dollars per lease in shallow waters to hundreds of millions in deep waters, depending on the complexity and scale of the remaining infrastructure. Companies are responsible for decommissioning their infrastructure once it is no longer used according to BSEE's 30 CFR 250, Subpart Q regulations. Given both the backlog of existing decommissioning projects and the anticipated future decommissioning liability, decommissioning in the GOA will continue to play an important role in the economics of the oil and gas industry in the region

4.15.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Unintended Releases into the Environment: Accidental events, such as oil and chemical spills, can lead to corresponding issues with local economies. The most direct impacts would likely be experienced in industries that depend on resources that are damaged or rendered unusable for a period of time. For example, beach recreation, recreational fishing, and commercial fishing would be vulnerable if beach or fish resources were damaged due to an accidental event. In addition, an oil spill could also impact transportation routes and the operations of port facilities. Oil spills can arise from accidents with respect to OCS oil- and gas-related vessels, pipelines, drilling operations, or production operations. The exact effects of an oil spill on economic factors would depend on the locations of oil spills, their frequency, duration, and geographic extent (see Chapter 4.4.7.2.3 of the GOM Oil and Gas SID).

Response Activities: Potential effects related to spill response may be negative or positive for the local economy. The influx of spill-response workers could contribute to filling short-term rental vacancies at hotels, apartments, and other properties that could provide housing, which could be a positive effect on land use and, by extension, on the local economies. Restaurants and hotels in the spill-response area could receive an influx of demand from cleanup workers that could offset losses otherwise expected from tourism declines resulting from a spill. However, the resources and funds required for effective response activities may divert attention and resources from other critical environmental and economic issues. Additionally, response activities may close off a location near a spill, which could preclude other activities (e.g., recreation and fishing) and which negatively impacts the local economy. See Chapters 4.4.1 and 4.4.5 of the GOM Oil and Gas SID for additional detail. The expected economic impacts of response activities for an oil spill depend on the timing, size, and location of the spill, and the use of technologies to reduce the probability of an accidental event occurring.

Strikes and Collisions: Vessel collisions with each other or coastal structures could affect the economy. If a vessel were to collide with a bridge, pier, or other structure, it could disrupt the

transportation of goods, services, and people to and from work and schools. The severity of the effects that could ripple through the economy would be dependent on the location of the vessel collision, the size of the vessels involved, and whether the collision involves a bridge, pier, or other structure. However, repairing and replacing damaged vessels and structures can create jobs and generate revenue for the economy. For more information, see Chapters 4.14 and 4.4.1 of the GOM Oil and Gas SID.

4.15.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Similar to the IPFs identified for routine oil- and gas-related activities, non-OCS oil- and gas-related activities also influence economic factors in the GOA.

Socioeconomic Changes and Drivers: BOEM uses projected data to analyze the impact of various industries and economic factors. For instance, they consider how changes in the oil and gas industry can affect supply and demand for energy products. Factors such as onshore energy production, commodity price fluctuations, international trade flows, geopolitical developments, and societal disruptions can influence the industry. Economic activity, technological advancements, and government policies also play a role in shaping energy product demand. Additionally, supply and demand for OCS oil and gas may be impacted by U.S. policies. The U.S. currently consumes significant volumes of crude oil and natural gas, and forecasts suggest that will continue over the next decade.

In the event of major changes in oil demand, there could be changes in GOA region oil and gas production and associated economic activity. However, the GOAR currently has over 2,100 active leases that play a pivotal role in regional energy economics and employment and are expected to do so for years to come. The potential for major changes in oil demand could lead to changes in GOA oil and gas production over time, affecting associated economic activity. Job and revenue fluctuations, and broader economic conditions hinge on how these elements interact. By assessing both short-term impacts and long-term implications, BOEM can assist the Secretary to make informed decisions that balance economic growth with environmental stewardship. For a detailed discussion of how non-OCS oil- and gas-related activities can affect economic factors, see Chapter 4.4.7 of the GOM Oil and Gas SID.

Non-OCS oil- and gas-related activities occur concurrently with an expansive existing OCS Oil and Gas Program in the GOA. BOEM measures these activities as part of the baseline economic conditions in the GOA region by using economic data provided by Woods & Poole Economics, Inc., which considers historical data trends and provides forecasts of various economic variables over time, as discussed in Chapter 4.4.7.1 of the GOM Oil and Gas SID. The Woods & Poole Economics, Inc. data include contributions of likely activities and trends based on local and regional data, as well as likely changes to economic and demographic conditions.

Other Environmental Factors: Climate-related factors may impact regional economic factors through increased vulnerability to extreme weather events, rising sea levels and coastal erosion,

changes in temperature and precipitation patterns, ocean acidification, species range shifts Damoah et al. (2024). Extreme weather events substantially disrupt economies by damaging infrastructure, reducing productivity, and increasing recovery costs. Hurricanes, wildfires, and floods can halt transportation, destroy businesses, and lead to higher insurance claims, burdening both public and private sectors. Agriculture and energy industries suffer supply chain disruptions, affecting global markets. In coastal areas like the GOA region, severe storms impact oil and gas operations, causing price fluctuations. The financial strain from disaster relief and rebuilding efforts can slow economic growth, making resilience planning crucial for long-term stability.

Relative sea level rise, shifting temperatures, and changing precipitation impact economies by disrupting industries, infrastructure, and resources. Coastal businesses, including non-OCS oil- and gas-related operations in the GOA region, face increased flooding risks, requiring costly adaptations. Higher temperatures can strain energy systems, raising operational expenses, while altered rainfall patterns affect agriculture, water supply, and transportation. These climate-driven shifts raise insurance costs, reduce economic stability, and demand greater investments in resilience strategies for long-term sustainability. Ocean acidification threatens coastal economies by weakening marine ecosystems that support fisheries, tourism, and industries (both OCS oil- and gas-related and non-OCS oil- and gas-related) in the GOA region. As acidity rises, shellfish populations decline, disrupting seafood markets, while coral degradation affects coastal protection and tourism revenue. These shifts drive up operational costs and force adaptation strategies, straining economic stability. Species range shifts can disrupt coastal economies by altering ecosystems that support industries like fisheries, tourism, and non-OCS oil- and gas-related activities in the GOA region. As marine species migrate to new areas due to changing ocean conditions, local fisheries may face shortages, impacting jobs and revenue.

4.15.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, the proposed OCS oil and gas lease sale would not take place and no new routine activities or accidental events associated with the proposed action would occur. However, socioeconomic changes and drivers from ongoing OCS oil- and gas-related activities associated with previous lease sales, and non-OCS oil and gas sectors would continue to potentially affect economics under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** The GOA region is currently experiencing ongoing OCS oil- and gas-related operations resulting from a long history of regularly occurring OCS oil and gas lease sales. As of May 2025, there are 2,165 active leases in the region that are contributing to regional economics and employment and would continue for years to come. Under Alternative A, ongoing activities stemming from these previous OCS oil and gas lease sales (see **Table 3.3-2**) would still potentially affect economic factors through socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions. The

potential types of impacts from these IPFs are summarized in **Chapter 4.15.2.2**, with greater detail in Chapter 4.4.3 of the GOM Oil and Gas SID.

Production revenue from existing leases is expected to continue contributing to the GOMESA revenue sharing and meeting the program's annual $500 million cap, even without the revenue that would have resulted from the cancelled lease sale. In addition to the direct contribution to the energy economy, OCS oil- and gas-related activities also support economic sectors like marine construction, marine transportation, and ship building. Ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.15.1** and in further detail in Chapter 4.4.7.1 of the GOM Oil and Gas SID. In the short term, the ongoing OCS oil- and gas-related activities would likely have **negligible** adverse effects on these economic sectors over the baseline economic environment which includes impacts from past OCS oil and gas lease sales. In the longer term, these economies could experience **minor** effects, particularly if operators decide to scale back operations that rely on these sectors. Other economic sectors such as tourism, recreation, and fisheries would also be impacted by any notable changes in OCS oil- and gas-related activities. Fishing industries use offshore structures as fish-attracting devices to enhance their catch. The extent to which offshore activities install or decommission structures would have corresponding effects to commercial and recreational fisheries. Oil and gas development may affect demand for recreation and tourism opportunities. See **Chapters 4.10, 4.11, and 4.12** for a complete analysis of the impacts of cancellation of a single proposed OCS oil and gas lease sale on these industries. The economic outcomes associated with ongoing oil and gas activities under the No Action Alternative are anticipated to remain consistent with and comparable to existing baseline conditions.

***Non-OCS Oil- and Gas-Related Activities*:** Socioeconomic changes and drivers associated with past and present non-OCS oil- and gas-related activities, along with other environmental factors, would continue to potentially impact economic conditions under the No Action alternative. These IPFs are expected to persist into the future, even if the No Action alternative were selected. The projected estimates in **Table 4.15-2** account for employment trends linked to ongoing patterns in OCS leasing activity and other key industries essential to the region. Among the biggest contributors to economic activity in the GOA are coastal tourism and recreation, commercial fishing and seafood harvesting, and commercial shipping.

However, the extent of these impacts is highly variable and shaped by a wide range of influencing elements. Other environmental factors also contribute to economic impacts in the GOA. Extreme weather events, relative sea level rise, changes in temperature and precipitation patterns, ocean acidification, and species range shifts, could contribute to ongoing economic impacts. The combination of these climate-related factors could substantially impact the GOA region's oil and gas operations, potentially leading to billions in economic losses through multiple channels (Carlin et al. 2023). Extreme weather events and sea level rise could require costly infrastructure modifications and more frequent maintenance of offshore structures, while also potentially increasing insurance premiums and operational downtime. Temperature and precipitation changes could affect worker safety conditions and equipment performance, potentially leading to reduced productivity and higher

operational costs (Al-Sarihi 2025). Ocean acidification might accelerate infrastructure corrosion, necessitating more frequent replacements, while species range shifts could trigger stricter environmental regulations and compliance costs (Needham et al. 2012). Together, these factors potentially could substantially reduce profit margins and investment returns in the region's oil and gas sector. Additional details on these factors are discussed in **Appendix B.4.2.9** and are expected to persist into the future.

Alternative A – No Action: Cancellation of a single oil and gas lease sale could potentially have impacts to economic conditions in the GOA region in both the short and long term. There could be short-term adverse impacts if operators scale back exploratory activities that were contingent on the availability of adjacent or nearby lease areas, in turn impacting the economics and employment of oil and gas support-related companies such as those summarized in **Table 4.15-4**. However, short-term adverse economic impacts from cancelling a single proposed OCS oil and gas lease sale would likely be **negligible** because production from existing leases (which is at a record high level [Energy Information Administration 2024]) would continue and would be expected to largely sustain current or very similar economic conditions. Cancellation of a single proposed OCS oil and gas lease sale could, however, have more notable impacts on future production as production from newly issued deepwater leases would typically occur approximately 10 years or more after lease issuance.

While short-term impacts may be minimal, over time the impacts could start to increase. For example, not holding an OCS oil and gas lease sale would prevent the receipt of OCS revenues from bonus bids, royalties, and rental payments associated with the forgone leases. The government would immediately lose (or potentially forego until a future lease sale) revenues from bonus bids, and rental receipts could temporarily decline as existing leases expire or transition into production status, where they no longer generate rental income (leases in production would generate royalties). The royalties, which constitute the largest share of revenues generated from OCS production, would only experience a slight decrease in the short-term given the length of time before production begins on new leases.

Additionally, the cancellation of a sale could potentially affect decommissioning activities. If operators intended to use revenues from production on newly acquired leases to support decommissioning efforts, cancelling a lease sale might result in funding constraints or delays in implementing decommissioning plans on existing leases. These impacts would depend on the specific circumstances of the sale cancellation, such as the size of the sale and the pre-existing decommissioning obligations for the area. Mitigation strategies, such as revisiting financial allocations or reassessing timelines, may help reduce any adverse effects. 30 CFR 556.900 et seq. provides discretion for BOEM to set the necessary financial assurance levels to minimize the risk that taxpayers, through the government, would incur the costs of decommissioning. This includes requiring supplementary financial assurance beyond initial requirements, when necessary, to cover future decommissioning liabilities (see **Appendix C.3.2**).

In the context of the GOA's long-term economic prospects, the magnitude of adverse effects from the absence of new leases over a multi-year period would depend on how industry responds

and whether lease sales in future years take place (**Chapter 2.2.1**). These impacts may gradually unfold over a period of 15 years or more, particularly in deepwater oil and gas production. For example, if undeveloped discoveries are perceived as less financially rewarding by operators, a perceived or actual lack of new leasing and exploration opportunities (e.g., cancellation of more than one lease sale) could potentially constrain satellite and tie-back options for major investment production hubs. Additionally, smaller deepwater discoveries could face financial challenges, or even bankruptcy, without access for tiebacks to a central production facility. Operators may re-evaluate capital investments in exploratory efforts and exercise greater scrutiny when making final investment decisions for new developments, in some cases possibly choosing to invest and develop in other countries rather than in Gulf of America OCS waters. This is particularly relevant in geologic basins where future production from new leases may no longer be feasible. Large deepwater projects often rely on subsequent discoveries to maintain capacity as initial field volumes decline, as evidenced by the prevalence of new leasing and investments around existing discoveries and infrastructure.

Precisely predicting the impact on revenue and employment due to the absence of new leases over multiple years is challenging, given the lack of historical data of a similar gap in sales and predictive models. Market demand for oil and gas and evolving U.S. policy goals, coupled with fluctuating prices further complicates this issue. Cancelling a single proposed OCS oil and gas lease sale, resulting in a multi-year gap with no new oil and gas leases issued, would create two areas of uncertainty. First, predicting how operators would respond and the indirect economic outcomes from those decisions becomes more challenging. Second, if operators defer or cancel investments in their discoveries because of greater economic uncertainty, then reasonably foreseeable OCS oil- and gas-related activities become more uncertain and baseline impacts (beneficial and/or adverse) may not be realized. The nature of the socioeconomic impacts of Alternative A would also depend on the extent to which other business opportunities would arise, for example in other energy industries. Considering these factors, the longer-term adverse impacts would likely be **minor adverse** given the number of existing active oil and gas leases either currently producing or in their primary term, at varying stages of exploration and development, and the additional lease sales included in the One Big Beautiful Bill Act (Pub. L. No. 119-21) signed into law on July 4, 2025. If the potential constraints and shifts in development strategies as discussed above were to occur, impacts could be up to **moderate adverse**, however the One Big Beautiful Bill Act includes two GOAR lease sales per year for 15 years (until 2040) which makes it unlikely that multiyear gaps in leasing would occur.

Summary: The cancellation of a single proposed lease sale under the No Action Alternative would limit any incremental economic growth beyond current conditions. Any adverse effects are projected to be **negligible** (short-term) and likely **minor** (long-term) in scale, mirroring baseline impacts. These limited adverse impacts are not expected to substantially detract from the overall economic dynamics in the region.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS oil and gas lease sale. This alternatives analysis focuses on the potential

environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table 4.15-8**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table 4.15-8. Impact Determinations for Routine and Accidental Impacts to Economic Factors from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives A-D.

Impact-Producing Factor	BOEM's Protective Measure1	Alternative A	Alternative B	Alternative C	Alternative D
Socioeconomic Changes and Drivers	N/A	**Negligible** (short-term) and **Minor** (long-term)	**Minor** to **Moderate Beneficial**	**Minor** to **Moderate Beneficial**	**Minor** to **Moderate Beneficial**
Unintended Releases into the Environment	N/A	N/A	**Minor** to **Moderate Adverse**	**Minor** to **Moderate Adverse**	**Minor** to **Moderate Adverse**
Response Activities	N/A	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**
Strikes and Collisions	N/A	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**

Note: Considering the estimates of ongoing OCS oil- and gas- activities (see **Table 3.3-2**), impacts from ongoing OCS oil- and gas- activities would be **negligible** and consistent with and comparable to the existing baseline and up to **minor** adverse in the long term.

[1] No programmatic protective measures related to economic factors for application at the OCS oil and gas lease sale stage are being contemplated in this Programmatic EIS.

Alternative B – Regionwide OCS Lease Sale

A proposed action could negatively affect various resources, as described in the other chapters of this Programmatic EIS. The corresponding adverse economic impacts are also discussed in their respective chapters. For example, routine OCS oil- and gas-related activities could cause adverse impacts to recreational fishing, commercial fisheries, recreational resources, land use and coastal infrastructure, and social factors. The following analysis focuses primarily on economics and employment for the energy sector within the GOA region and EIAs.

Socioeconomic Changes and Drivers: The Gulf of America OCS contributes approximately 15 percent to total U.S. oil production. The activities mentioned above exert considerable influence on the GOA region economy, both in terms of the incremental contribution of individual and cumulative effects of OCS oil and gas lease sales (**Chapters 3.3** and **3.6**). Extraction of oil, natural gas liquids, and natural gas generate expenditures on various goods and services, as well as generate and sustain jobs. Routine activities can generate employment, labor income, corporate profits and government revenues through bonus bids, rental payments, royalty payments, and GOMESA distributions, while also impacting the overall energy market as discussed in **Chapter 4.15.2.1**. The oil, natural gas, and natural gas liquids produced by routine OCS oil- and gas-related activities from the proposed action could help meet consumer demand. Increased

energy supply could put downward pressure on energy prices, although the relatively small scale of a single proposed OCS oil and gas lease sale relative to the overall energy market in the GOA region (**Chapter 3.3**) would make these price effects minimal. For example, if actual activities resemble the low-case scenario presented in **Chapter 3.3**, beneficial impacts would likely be **minor beneficial**, mostly sustaining existing economic conditions or resulting in a small but measurable economic improvement. If actual activities resemble the mid- to high-case scenario presented in **Chapter 3.3**, however, beneficial impacts could be up to **moderate beneficial**, resulting in a notable and measurable economic improvement.

In terms of employment across the GOA region, a single OCS oil and gas lease sale would help sustain approximately 13,840 jobs and generate $959 million in labor income and $1.516 billion in value added in the high scenario. In the mid scenario, it is expected to sustain roughly 5,459 jobs, $375 million in labor income, and $596 million in value added. In the low scenario, it is expected to sustain about 893 jobs, $62 million in labor income, and $100 million in value added. Considering all of these factors, the impacts of socioeconomic changes and drivers from the proposed action under Alternative B would range from **minor** to **moderate beneficial,** as it represents the continuation of ongoing oil and gas activities both in the short- and long-term and the sustainment or measurable improvement to GOA energy sector economics and employment.

Unintended Releases into the Environment: Impacts from unintended releases into the environment could have a wide range of impacts from relatively little impact related to small offshore spills up to affecting beach recreation, recreational fishing, commercial fishing, tourism, transportation routes, port facility operations, and oil and gas development for large coastal spills. However, it is unlikely that a single oil spill would shut down an entire industry, beach, waterway, or port facility based on the estimated spill rates in **Chapter 3.5**. **Table 3.5-2** shows that spills <500 bbl occur at a higher rate than those ≥500 bbl. Therefore, the expected impact of any spill would be small to correspond to the more likely scenario of a small spill. The other economic issues potentially resulting from an accidental event would be determined by actions or events that occur along with an oil spill. For example, a large oil spill could lead to decreased levels of oil and gas industry operations. This issue would be greatest felt in coastal Louisiana and Texas where OCS oil- and gas-related activity and employment is most concentrated. The direct effects of an oil spill on a particular industry could also ripple through that industry's supply chain; consumer spending by employees of these firms could also have effects to the broader economy. Because spills are more likely to be small (**Table 3.5-2**), their impacts would be more localized and short-term. However, the possibility of a larger spill remains, which could have more widespread or notable impacts. Therefore, the potential impacts from unintended releases would range from **minor** to **moderate adverse**.

Response Activities: Impacts from response activities would affect negatively or positively for the local economy. The influx of spill-response workers could contribute to filling short-term rental vacancies at hotels, apartments, and other properties that could provide housing, which could be a positive effect on land use and, by extension, on the local economies. Restaurants and hotels in the spill-response area could receive an influx of demand from cleanup workers that could offset losses

otherwise expected from tourism declines resulting from a spill. See **Chapters 4.14** and **4.12** for additional detail. Conversely, spill-response activities may strain local communities, resulting in the need for costly repairs or upgrades in community infrastructure. Spill response can generate large quantities of waste, which can strain existing waste disposal capacity, and additional use of waterways or roadways used for the vehicles servicing spill response may result in localized increased wear and tear. The severity of spill-response effects on the local economy would depend on the location and duration of the spill and cleanup efforts, as well as whether the event is a small spill or a larger spill. The likelihood of large spills is low and most spills are expected to be short-term and localized, with minimal response activities needed to return to pre-spill conditions (**Chapter 4.2**). Therefore, economic impacts from response activities would likely range from **negligible** to **minor adverse**.

Strikes and Collisions: Strikes and collisions could negatively affect the local economy. For example, if a vessel were to collide with a bridge, pier, or other structure, it could disrupt the transportation of goods, services, and people to and from work and schools. The collision could also result in an oil spill, which could negatively affect the economy. The severity of the effects that could ripple through the economy would be dependent on the location of the vessel collision, the size of the vessels involved, and whether the collision involves a bridge, pier, or other structure. Coastal vessel collisions could disrupt the flow of vessels coming from and returning to port. For example, any impediment to fishing vessels leaving or returning to port could reduce the fish sold at market, affecting the fisher's profitability and the seafood supply chain. The recreational fishing industry could also see negative effects if boat launches are closed or charters and rentals are unable to leave from a particular location. However, since strikes and collisions arising from a proposed action would likely be infrequent, localized, and in OCS waters away from shore, the impacts to economic factors would likely be **negligible** to **minor adverse**.

In summary, routine activities can generate employment, labor income, corporate profits and government revenues through bonus bids, rental payments, royalty payments, and GOMESA distributions, while also impacting the overall energy market as discussed in **Chapter 4.15.2.2** above. Based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the impacts from IPFs associated with Alternative B on economic factors would range from **moderate adverse** to **moderate beneficial** for specific IPFs as discussed above. Generally, the effects of accidental events are somewhat outweighed by those of routine activities, resulting in **minor adverse** to **moderate beneficial** overall impacts when considered all together. The overall economic impacts would range from **minor adverse** to **moderate beneficial** depending on the actual levels of resulting production, revenues, associated exploration and development activities, and accidental events that occur (**Chapter 3.3**). For example, in the low-case scenario for the Gulf of America EIAs, a single OCS oil and gas lease sale could support up to 689 jobs, $47 million in labor income, and $84 million in value added which would contribute 0.005 percent to the Gulf of America EIA's Gross Regional Product. In the high-case scenario within the Gulf EIAs, a proposed action could support up to 8,539 jobs, $575 million in labor income, and $1,054 million in value-added annually, and contribute 0.06 percent to the Gulf of America EIA's Gross Regional Product. The small percentage is notable due to its impact on

demographic trends and economic activity. In addition, the percentage impacts will likely be greater during periods of peak activity, such as when well drilling and structure fabrication occur. The geographic distribution of these impacts would be similar across the low-, mid-, and high-case scenarios, with most impacts occurring in the GOA region (**Table 4.15-7**). While the economic and employment impacts from a single OCS oil and gas lease sale represent a relatively small percentage of the overall economies of the 23 EIAs, the magnitude of even a small percentage change in OCS oil- and gas-related activity could have notable beneficial impacts within EIAs that depend heavily on the OCS oil and gas industry, like those along the Louisiana and Texas coasts.

Alternative C –Targeted OCS Lease Sale Area

Alternative C involves leasing a subset of the area considered in Alternative B by making blocks that would normally be subject to the Topographic Features, Live Bottom (Pinnacle Trend), and/or Blocks South of Baldwin County, Alabama, Stipulations; Wind Energy Areas; and Rice's whale core distribution area unavailable for lease. Therefore, the analysis for those IPFs (described above) covers the potential impacts of Alternative C. From a regional perspective, Alternative C still leaves substantial areas available for leasing across all water depths, resulting in economic impacts that are either similar or only slightly less than those of Alternative B. Most operators would adapt and relocate to other available lease areas, resulting in a minimal reduction in overall production when compared to Alternative B. However, some operators specializing in specific water depths could be disproportionately affected. The revenue, corporate profit, market, and adverse impacts would also be proportionately lower. The nature of potential accidental events would be the same or similar to Alternative B, although slightly fewer activities would likely lead to slightly fewer accidental events, and distancing would lead to less impacts to sensitive areas as spills could undergo increased weathering.

Economic Implications of Exclusion of the Proposed Rice's Whale Critical Habitat from OCS Oil and Gas Lease Sales: Exclusion of the proposed Rice's whale critical habitat (i.e., 100- to 400-m [328- to 1312-ft] isobath) could redirect developers towards potentially less profitable opportunities. The last four OCS oil and gas lease sales show moderate industry interest in the exclusion area, with only 31 blocks leased by both large and small operators in the area. If the Rice's whale critical habitat was not included as part of an OCS oil and gas lease sale, the long-term adverse impacts to economics could be greater. This is because the largest GOA fields have almost certainly been discovered and future discoveries are likely to be smaller fields. These smaller discoveries require co-development of subsea tiebacks in a hub and spoke type of development. Without potential future opportunities in the 100- to 400-m isobath (328- to 1312-ft), industry may view currently leased GOA acreage and existing facilities as less attractive for investment. Leases located on blocks that are fully or partially located in the excluded area currently contribute around 6 percent of oil and 11 percent of gas produced in the GOA region. Platform owners in the excluded area, representing 5 percent of active GOA structures, would face reduced use of available capacity. Moreover, current leaseholders, with 161 active leases in the area and 5.7 percent of GOA wells drilled since 2013, could see diminished opportunities for development of their current leases due to a lack of tie-back opportunities.

Alternative C should be viewed in light of the ongoing OCS Oil and Gas Program, as well the numerous forces that can affect energy markets and the overall economy. Overall, Alternative C would minimally reduce beneficial impacts when compared to Alternative B, as well as further reduce the potential for adverse impacts from accidental events in the excluded areas. The actual impacts would be roughly proportional to the amount of resulting oil and gas industry activity as described above. Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the impacts from IPFs associated with Alternative C on economic factors would range from **moderate adverse** to **moderate beneficial** for specific IPFs as discussed above, resulting in **minor adverse** to **moderate beneficial** overall impacts when considered all together.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D entails leasing a subset of the area considered in Alternative C by making additional areas unavailable for lease (**Chapter 2.2.4**). Therefore, the analyses for Alternative C (described above) cover the potential impacts of Alternative D from a regional perspective. While Alternative D further reduces the available areas for leasing, it is expected that production levels would be similar to Alternatives B and C as industry shifts to deeper water leases. Therefore, the overall economic impacts of Alternative D, from a regional perspective, would be very similar to the impacts of Alternative B or C.

However, a shift to deeper waters could have a disproportionate impact on operators that rely heavily on shallow-water operations (i.e., <200 m; 656 ft), as most acreage in this water-depth category would not be offered under Alternative D. Some of these impacts may be offset by shifting to other shallow-water locations (e.g., State waters or existing shallow-water leases), but this is unlikely to provide enough opportunity to substitute for all the adverse impacts that shallow-water focused companies might experience from a lease sale under Alternative D which is effectively the same as the cancellation of a single proposed OCS oil and gas lease sale for the excluded water depths.

The exclusion areas under this alternative could also impact revenue sharing with states required under Section 8(g) of the OCSLA, which mandates that the Federal Government's share of 27 percent of leasing and development within 3 nm (3.5 mi) of State boundaries. This analysis focuses exclusively on the implications of excluding these lease blocks from a single proposed OCS oil and gas lease sale and, thus, assumes these areas may be available for future lease sales. Consequently, the impacts of excluding them from a single OCS oil and gas lease sale may be limited as there would not be immediate impacts to production, and operators could make up production in the longer term if these blocks were available in future lease sales. If these blocks were also excluded from future lease sales; however, production within the 8(g) zone would likely decline over time which could, in turn, negatively impact the future revenue share appropriated to states. Therefore, based on the description of the IPFs above and the scenario projections for a single OCS oil and gas lease sale provided in **Chapter 3**, the impacts from IPFs associated with Alternative D on economic factors would range from **moderate adverse** to **moderate beneficial** for

specific IPFs as discussed above, resulting in **minor adverse** to **moderate beneficial** overall impacts when considered all together.

4.15.2.5 Cumulative Impacts

This cumulative analysis incorporates and builds on the evaluation of past and present effects under Alternative A, by also considering the potential effects from reasonably foreseeable future OCS oil and gas lease sales and reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect several economic dimensions such as corporate profit impacts, market dynamics, adverse effects from future operational activities, and potential adverse impacts stemming from future accidental events as described above in **Chapters 4.15.2.1** and **4.15.2.2**. Ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.15.1** and in further detail in Chapter 4.4.7.1 of the GOM Oil and Gas SID. As discussed under Alternative A, impacts from ongoing OCS oil and gas activities would be **negligible** in the short term and up to **minor** adverse in the long term. Additional impacts from reasonably foreseeable future sales would add a small but measurable amount to the past and present impacts from OCS oil and gas activities.

Cumulative OCS oil- and gas-related activities in the GOA region stem from ongoing and future industry trends, including structure and pipeline installations, well developments, and decommissioning efforts. These activities are expected to influence regional employment, investment patterns, and resource allocation. The introduction of new structures and pipelines in addition to the existing infrastructure in the Gulf of America's OCS would continue to generate employment and investment while keeping the region's economic dependencies, particularly within coastal communities that rely on energy-sector activity. When existing structures reach the end of their useful life, they must be decommissioned. The decommissioning of existing structures and eventually structures from this lease sale will drive additional employment.

If leasing activity remains consistent or expands, it could drive substantial cumulative economic impacts—boosting employment opportunities, enhancing infrastructure investments, and reinforcing the Gulf's position as a vital hub for U.S. energy production. Conversely, a slowdown or restriction in development could introduce noticeable effects, potentially dampening industry growth and limiting economic contributions to surrounding areas. By doing an analysis of the contribution of a single OCS oil and gas lease sale to future Gulf of America EIA Gross Regional Product (GRP) using the Woods and Poole (**Table 4.15-2**) and the LCIM data together, a single OCS oil and gas lease sale would range in contribution from 0.03 (high scenario) to 0.002 (low scenario) percent to the GRP of all the Gulf EIAs in 2060. Beyond infrastructure developments, variables like fluctuating energy markets, regulatory shifts, and technological advancements could shape long-term industry

trends. The magnitude of these impacts would be directly proportional to the level of offshore activity undertaken, as previously outlined in **Chapters 4.15.2.1** and **4.15.2.2**.

Non-OCS Oil- and Gas-Related Activities: Other reasonably foreseeable concerns that could contribute to cumulative impacts to economic factors, include changes to temperature, coastal erosion, sea-surface height, wind speed, and weather patterns, state oil and gas activities, coastal infrastructure projects, and other industries. These activities may introduce changes in transportation patterns, industrial operations, and community developments in the affected areas. Such effects may also interact with ongoing and future economic trends, potentially modifying baseline conditions. For example, estimates of jobs, labor income, and value added in Agerton et al. (2022) show that decommissioning could support economic benefits even in state waters where decommissioning is expected to increase, raising the baseline for the future. For a more detailed analysis, see **Appendix C**. The potential impacts from these factors are discussed in **Chapter 4.15.2.3** and are expected to continue. Environmental uncertainties—including ocean acidification, fluctuations in sea surface temperatures, and habitat alterations—may further shape cumulative economic impacts, posing additional challenges for long-term energy development and regional economic resilience in the GOA. Additional reasonably foreseeable effects from non-OCS oil and gas related activities include the development of new LNG deepwater ports and other infrastructure projects that could influence local and regional economic and environmental dynamics. Coastal tourism, commercial fisheries, and maritime trade also contribute substantially to the regional economy. Tourism, for example, is expected to continue to be an important economic driver, though more so in the EPA, where OCS oil- and gas-related activities are far less prevalent and activities related to future OCS oil and gas lease sales are not reasonably foreseeable (BOEM 2023d). These activities can be seen as a contributing factor rather than a primary driver. Regardless of the proposed action, the economic impact of non-OCS oil- and gas-related activities would continue to be shaped by these external variables.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small fraction of activity when compared to the existing OCS Oil and Gas Program in the GOA (see **Table 3.3.2-1**). In the context of past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities within the area of analysis and the substantial prevalence and influence of ongoing OCS oil- and gas-related activities to the regional economy (particularly Texas and Louisiana), the *incremental contribution* of a proposed GOAR oil and gas lease sale to cumulative impacts on economic factors would range from **minor** to **moderate beneficial**. New projects from an OCS oil and gas lease sale would more likely provide continued work for the existing workforce rather than create new jobs. Conversely, the incremental impacts from the cancellation of a single OCS oil and gas lease sale could result in **negligible** to **moderate adverse** cumulative effects to the GOA region's long-term economic prospects, depending on how industry responds (**Chapter 2.2.1**).

4.15.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on economic factors. This information primarily relates to the onshore geographic distributions of economic impacts arising from the OCS Oil and Gas Program, which would allow BOEM to better estimate the impacts from routine activities and cumulative impacts. This information is difficult to obtain since most data sources do not adequately differentiate between onshore and OCS oil- and gas-related activities. In addition, standard data sources do not trace revenue and corporate profit streams to ultimate expenditures. BOEM used reasonably accepted scientific methodologies to extrapolate from existing information in completing the relevant analysis and formulating the conclusions presented here. For instance, BOEM used the CIM and LCIM to quantitatively assess the potential economic impacts of the OCS Oil and Gas Program where possible. Given there has not been a 4-year span between OCS oil and gas lease sales in the GOA, the consideration of both short- and long-term impacts from Alternative A is difficult to estimate or predict with a high degree of confidence using existing data and models. In the post-pandemic phase, there is inflationary pressure affecting companies, which often leads to higher costs for raw materials, labor, and other inputs. As a result, they may need to allocate more funds to produce the same goods or provide equivalent services. However, the full extent of the consequences stemming from these increased expenses remains uncertain. Although the incomplete or unavailable information may potentially inform the decisionmaking process, BOEM has concluded that such information is not crucial for making a well-informed choice among alternatives, given the generally positive nature of the economic impact of the OCS Oil and Gas Program. Moreover, the substitute information employed in lieu of the unavailable data has been deemed acceptable for this analysis.

4.16 SOCIAL FACTORS

There is a strong relationship among the offshore oil and gas industry and the people and communities of the coastal regions of the five Gulf Coast States: Texas, Louisiana, Mississippi, Alabama, and Florida. The region is diverse in population, economic mix, available natural resources, and interaction with the offshore oil and gas industry. The oil and gas industry is widespread through the region but its density and composition vary geographically. This chapter describes the holistic and interconnected nature of human activities in the area and their interactions with offshore oil- and gas-related activities.

E.O.14154, *Unleashing American Energy* (Jan. 20, 2025), and a Presidential Memorandum, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (Jan. 21, 2025), require DOI to strictly adhere to NEPA, 42 U.S.C. 4321 et seq. Further, E.O.14154 and the 2025 Memorandum repeal E.O.s 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023), which had mandated federal agencies to address environmental justice. Because E.O.s 12898 and 14096 have been repealed, agencies are no longer required to consider environmental justice generally in their environmental analyses, among other issues. BOEM has complied with the requirements of NEPA, including DOI's regulations and procedures implementing NEPA at 43 C.F.R. 46 and 516 of the Departmental Manual in place during the time of the preparation of this Final Programmatic EIS, consistent with the President's January 2025 Order and Memorandum.

4.16.1 Affected Environment

The area of interest for social factors is the 133 coastal and near-coastal counties and parishes in the five Gulf Coast States. Population ranges in the counties/parishes of interest are provided in **Figure 4.16-1**.

In Louisiana, there is also a shifting distribution of populations within parishes, increasingly concentrated towards the north ends of coastal parishes, as residents move away from the coast due to factors such as land loss, flooding, and loss of population and infrastructure (Austin et al. 2014b; Austin et al. 2022). In the GOA region, the counties/parishes with the highest population density (persons per square mile) are Pinellas County, Florida (3,548); Harris County, Texas (2,742); Orleans Parish, Louisiana (2,308); Jefferson Parish, Louisiana (1,445); and Hillsborough County, Florida (1,420) (U.S. Census Bureau 2022a; 2022b). Three of the more populated counties/parishes that also have a high concentration of oil and gas industry are Harris County (Houston, Texas); and Orleans and Jefferson Parishes (Louisiana) (Dismukes 2024).

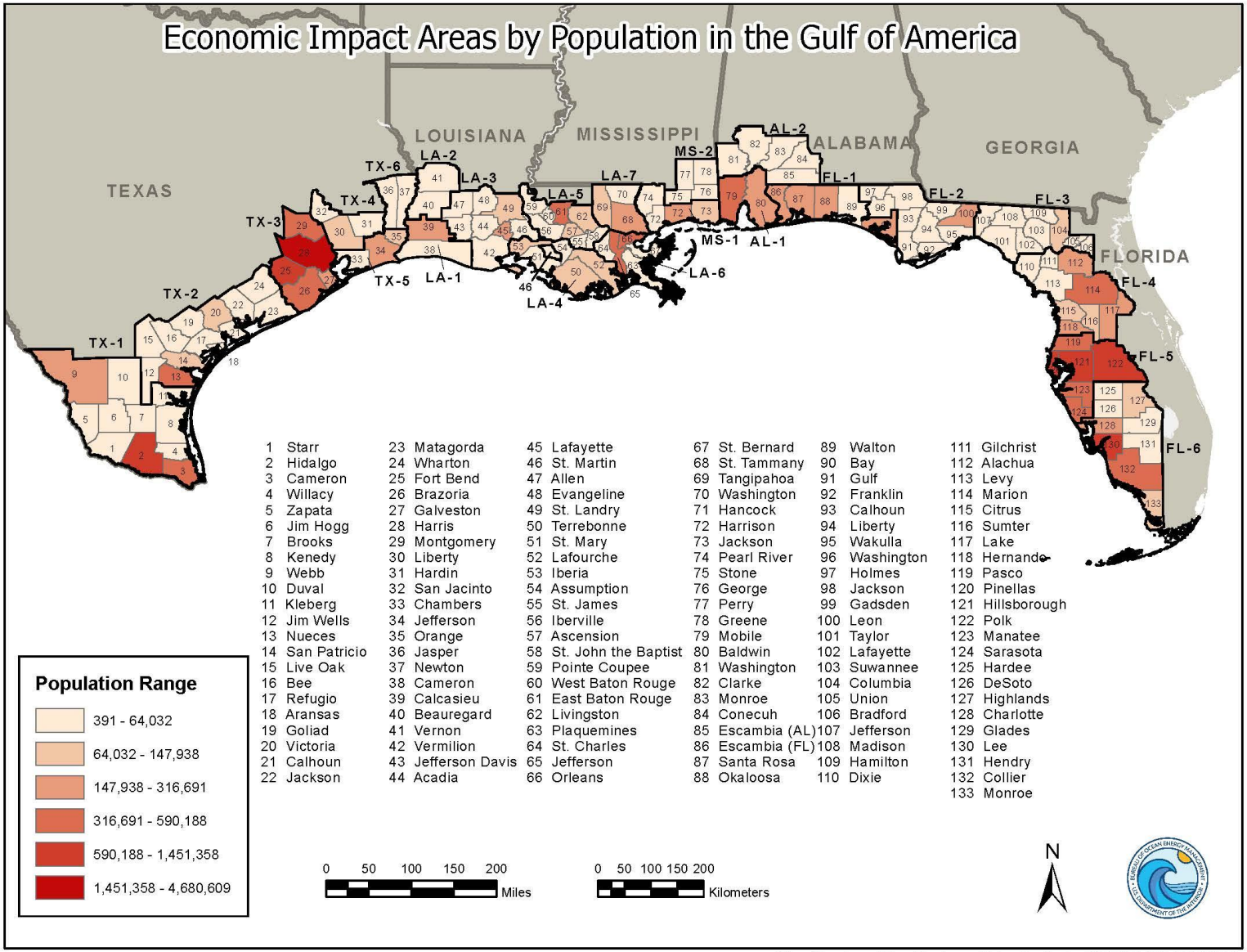

Figure 4.16-1. Population of BOEM's Economic Impact Areas in the Gulf of America.

4.16.2 Environmental Consequences

Social factors in the GOA region are affected by existing environmental conditions, natural processes and phenomena, and human-induced factors, such as harmful microorganisms, coastal land loss, major storm events, climate-related factors, and the coronavirus pandemic, as described in Chapter 4.4.6 of the GOM Oil and Gas SID. BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact social factors. Non-OCS oil- and gas-related activities have the potential to impact social factors (**Table 4.16-1**). Many of these IPFs can have direct, indirect, cumulative, or unknown benefits or adverse impacts to social factors and may be felt unevenly and by different social groups across the GOA region. These IPFs and their potential to affect social factors are discussed below and in greater detail in Chapter 4.4.6 of the GOM Oil and Gas SID.

Table 4.16-1. Impact-Producing Factors with the Potential to Impact Social Factors.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Air Emissions and Pollution	Unintended Releases into the Environment	Air Emissions and Pollution
Discharges and Wastes	Response Activities	Discharges and Wastes
Bottom Disturbance	Strikes and Collisions	Bottom Disturbance
Noise	-	Noise
Coastal Land Use/Modification	-	Coastal Land Use/Modification
Lighting and Visual Impacts	-	Lighting and Visual Impacts
Offshore Habitat Modification/ Space Use	-	Offshore Habitat Modification/ Space Use
Socioeconomic Changes and Drivers	-	Socioeconomic Changes and Drivers
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

There are several existing regulatory programs and requirements to reduce or minimize the effects of these IPFs to social factors in the GOA region and the resources influencing them and are enforced by BOEM, BSEE, and other agencies. The *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025a) overviews the complex interconnected regulatory regime that exists around GOA region activities. Lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements; therefore, the analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

4.16.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as

BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOAR).

Air Emissions and Pollution: Air emissions and pollution are regulated by BOEM and the USEPA, but they can still adversely affect human health as well as culturally and economically significant biological and archaeological resources tied to social factors. Air emissions and pollution are emitted by onshore facilities and waste and discharge disposal sites used to support OCS oil- and gas-related activities, as well as state oil and gas activities. These onshore facilities are often perceived as negative by neighboring communities due to concerns about unpleasant odors, human health risks, and reduced property values. **Chapter 4.1** of this Programmatic EIS and Chapters 2.2 and 4.4.1 of the GOM Oil and Gas SID contain additional information about onshore waste facilities. Continuation of these onshore facilities can adversely affect social factors and nearby communities.

Routine emissions from offshore facilities are typically done at a height that minimizes risk to workers on those facilities, although downwash could expose personnel on vessels in the surrounding areas, such as commercial and recreational fishers and those working on supply vessels (Carter et al. 2023; Dahan et al. 2022; NASA Earth Observatory 2017). The Gulf of America OCS is not a designated area for the NAAQS. However, the Clean Air Act (CAA) and OCSLA authorize the USEPA and DOI (through BOEM), respectively, to regulate offshore emissions of criteria and their precursor pollutants to the extent that they significantly affect the air quality of any state. Air pollutants released from offshore sources can reach coastal communities. **Chapter 4.1** (Air Quality) discusses the various air pollutants associated with routine oil- and gas-related activities and how BOEM and USEPA regulate them.

Noise: Noise can negatively affect animal behavior, which, in turn, could affect localized fishing activities, including subsistence fishing. Any notable adverse impacts to commercial (**Chapter 4.10**), recreational (**Chapter 4.11**), or subsistence fishing could have indirect adverse effects to social factors.

Socioeconomic Changes and Drivers: Socioeconomic changes and drivers associated with the existing OCS Oil and Gas Program have the potential to both negatively and positively affect social factors. These effects can vary in location and time, occur in varying degrees of intensity, can be simultaneous, or be one or the other depending on the specifics of any given situation, and are experienced at multiple, overlapping levels, including industry workers, support industry workers, families of workers, and the individuals and institutions that make up the communities at large. For example, Priest (2016) noted that the work structure of OCS oil- and gas-related industries (the long on-off schedules) augmented the continuation of the shrimping industry, an important identity marker in many coastal communities. Shrimping can also support resource sharing across social networks in what can commonly be referred to as subsistence practices, strengthening social ties and community identity and values (Regis and Walton 2022). Austin et al. (2002a); Austin et al. (2002b) describe the differences in sectors from the viewpoint of workers and their families; they found that impacts are experienced at many different levels and intensities depending on what sector of the industry is involved. For example, workers in the oil and

gas production sector enjoy more stable employment, while the drilling sector is volatile and provides less secure employment as it is more easily affected by fluctuations in oil and gas prices. Hemmerling et al. (2020) examined the relationship between the oil and gas industry and communities, noting that, while it has positive economic impacts, it has also increased community vulnerability to economic fluctuations.

Discharges and Wastes: Any notable degradation of water quality or habitat of species used commercially, recreationally, and for subsistence as a result of drilling discharges and produced waters could indirectly lead to negative effects to social factors. Some wastes from OCS oil- and gas-related activity are disposed of onshore in permitted facilities. This involves transportation routes and waste management facilities that can be perceived as negative by neighboring communities due to noxious or unpleasant odors, concerns about human health impacts from allowed or accidental releases, and reduced property values. Onshore facilities that support OCS oil- and gas-related activities (as well as non-OCS oil- and gas-related activities) would be issued general or individual permits from the USEPA, or a USEPA-authorized State program, that limit discharges specific to the facility type and the waterbody receiving the discharge. Other wastes generated at these facilities would be handled by local municipal and solid-waste facilities, which are also regulated by the USEPA or a USEPA-authorized State program. **Appendix B.2.2** has further discussion on discharges and waste related to routine oil- and gas-related activities; additionally, Chapter 2.2 of the GOM Oil and Gas SID contains a detailed description of offshore and onshore waste related to routine OCS oil- and gas-related activities and Chapter 4.4.1 of the GOM Oil and Gas SID contains a description of onshore waste disposal facilities and related regulations.

Bottom Disturbance: Bottom disturbance from routine OCS oil- and gas-related activities can adversely affect social factors by degrading habitats of species used commercially, recreationally, and for subsistence. Conversely, OCS oil- and gas-related structures could have positive effects by enhancing reef fish habitat and improving some fishing and diving opportunities. **Chapters 4.2, 4.3, 4.4, 4.5, 4.10, and 4.11** analyze direct and indirect impacts from bottom disturbance to resources that could potentially indirectly affect social factors. Where appropriate, mitigating measures for bottom disturbances related to these resources are also identified and incorporated in the analyses below.

Coastal Land Use/Modification: Coastal land use from routine OCS oil- and gas-related activities can have positive or negative effects on social factors. For example, building or expanding oil and gas infrastructure on a coastal parcel could benefit workers in the OCS oil and gas industry and the local economy; however, it could negatively affect people who may have used the land for other purposes, like recreation or subsistence, by preventing economic gains associated with those uses. The shape, size, and impact of associated infrastructure varies on the landscape, so these effects are not equally distributed across the area of interest but are predominantly concentrated around centers of the oil and gas industry.

Hemmerling et al. (2021) examined 30 years of changing trends in exposure to risk (calculated using data and methods derived from the USEPA) in Louisiana's coastal zone. They

considered the full range of petroleum-related industrial infrastructure: shipbuilding and repair yards; onshore production and storage facilities; gas processing plants; refineries and petrochemical plants; and gas and petroleum pipelines to name several. Hemmerling et al. (2021) found that, at the beginning of the period they examined, there was a general trend toward diminishing levels of risk exposure in coastal Louisiana and other rural areas. However, in the coastal zone, this trend reversed, and the risk of hazard exposure intensified as the offshore petroleum industry intensified and this wider range of upstream and downstream industrial activities began to concentrate in the area.

Lighting and Visual Impacts: The OCS oil- and gas-related lighting and other visual impacts may disrupt the sense of place of a community or its recreational, cultural, historic, and archaeological resources and economically or culturally significant species. Local communities may be particularly sensitive to these disruptions if they have culturally significant relationships with those resources or are dependent on income associated with them.

Offshore Habitat Modification/Space Use: While placement of OCS oil- and gas-related infrastructure prevents competing uses within those areas, it provides additional locations for recreational fishing and can have positive effects by enhancing reef fish habitat and improving some fishing and diving opportunities. The absence or removal through decommissioning of OCS oil and gas structures, however, eliminates or alters potential recreational fishing locations but increases or leaves available areas for other uses (e.g., commercial trawling) (see **Chapters 4.10** and **4.11**). Therefore, the effects of structure presence or removal can be viewed as both negative or positive depending on the user group (e.g., commercial and recreational anglers).

4.16.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA). Impacts from accidental events affect social factors directly through the disruption of everyday life and livelihoods (e.g., area closures due to spills) and through potential impacts to many of the resources described in other chapters (e.g., impacts to species utilized for seafood could influence socioeconomics and/or result in human health impacts).

Unintended Releases into the Environment: Much of the oil spilled offshore evaporates or is dispersed by currents, so it has a low probability of contacting coastal areas (Ji and Schiff 2023) but may negatively affect offshore activities, such as fishing, recreation, or transportation, by not allowing these activities to take place in the affected area or by negatively affecting the health or survival of the fish or other organisms in the area of the spill. Effects of unintended releases can be compounded if the spill impedes time-limited processes, such as fishing seasons or cultural events like fleet blessings, fishing rodeos, or other coastal-related festivals and gatherings.

A catastrophic event of a magnitude similar to the *Deepwater Horizon* explosion, oil spill, and response is not reasonably foreseeable and not part of the proposed action. See **Appendix B.3.1** for the range of potential spills (by size category) included as part of the reasonably foreseeable scenario for this analysis. For a detailed discussion of a low-probability, catastrophic oil spill, refer to the GOM Catastrophic Spill Event Analysis technical report (BOEM 2021b). Additionally, BOEM and others have sponsored research that has enhanced our understanding of the effects of catastrophic spills on social factors.

Specifically, regarding the ongoing social effects and understanding of the catastrophic *Deepwater Horizon* oil spill, ongoing research of that spill indicates that the recovery of fishermen has been uneven, full recovery has not yet been attained, and the coastal fishing communities in Louisiana have been faced with the most lasting negative impacts (Halmo et al. 2019). Research on coastal restoration activities following the *Deepwater Horizon* oil spill indicates that coastal restoration, the path a State was on before the catastrophe, influences how restoration will be conducted, leading to variability in processes and projects undertaken (Austin and Phaneuf 2020). Research is ongoing on the health impacts of the *Deepwater Horizon* oil spill; these include a variety of both physical and mental impacts to cleanup workers and community members (Croisant et al. 2017; Crossett et al. 2013; Gam et al. 2018; Kwok et al. 2017; McGowan et al. 2017; Nugent et al. 2019; Peters et al. 2017; Rung et al. 2016; Rung et al. 2017; Rung et al. 2019; Rusiecki et al. 2018; Sandifer et al. 2021; Strelitz et al. 2018). Evidence indicates that exposure to dispersants was associated with increased prevalence of neurological symptoms among U.S. Coast Guard spill responders (Krishnamurthy et al. 2019).

A follow up to an earlier ethnographic study (Austin et al. 2014a; Austin et al. 2014b) on the *Deepwater Horizon* oil spill in multiple GOA region communities found that, half a decade later, the oil-spill event persisted in having social impacts across the region (Austin et al. 2022). The social effects from the spill were enmeshed with other cumulative and ongoing effects in the region, including those from hurricanes, chronic land loss, dynamic economic conditions (especially among the seafood industry), and shifting demographics. Because of this, the specific effects of the spill were varied across the region, depending on local contexts. Additionally, the vast amount of continued research on the topic helped to keep the spill fresh in the minds of local communities and politicians. Also, the sheer amount of data surrounding heterogenous efforts, methodologies, and impacts contributed to uncertain conclusions about the spill and distrust among locals regarding continued research interests. Overall, uncertainty remained one of the greatest social impacts from the spill. As funding from the spill continues to be distributed, to both local peoples and to regional coastal protection and restoration efforts, the aftermath of the spill continues to impact the region.

Response Activities: Spill response can have both negative and positive effects on social factors. Businesses and individuals involved in response activities (other than the responsible party) could see short-term economic gain, while those whose livelihoods or business plans are disrupted by the spill and its cleanup could see losses. Response activities can disrupt normal social and economic functioning, creating disruption and loss. Institutions may be unable to fulfill their normal functions because of their attention to the spill response.

Strikes and Collisions: Vessel collisions could adversely affect social factors. Collisions may affect local populations because they can result in oil or chemical spills, as discussed above, and may interrupt fishing, transportation, and cultural activities along waterways or adjacent roadways.

4.16.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence social factors in the GOA region through the following IPFs: air emissions and pollution; discharges and waste; bottom disturbance; noise; coastal land use/modification; lighting and visual impacts; offshore habitat modification/space use; socioeconomic changes and drivers; and other environmental factors. These potential cumulative impacts to social factors are summarized below and discussed in greater detail in Chapter 4.4.6.2.1 of the GOM Oil and Gas SID.

Air Emissions and Pollution: Air pollutants are released by human activity (i.e., industrial activity, combustion engines, agriculture, and consumer products) and include those regulated under the CAA. Many can also be released by non-human activity like wildfires, high winds, natural seeps, decay of solid waste, and lightning. These releases can negatively affect human health, degrade habitats of culturally and economically significant plant and animal species, damage cultural and archaeological resources, impede visibility, contribute to ocean acidification, and impact weather, climate, and humanmade materials.

In recent years Louisiana's GOA region has experienced both increased releases of toxic chemicals from petrochemical plants (increasing the hazards to which nearby communities are exposed) and a decreased budget and staffing of the State regulatory and enforcement agency that monitors air quality (Schleifstein 2019a; 2019b). As discussed in **Chapters 4.1.1** and **4.1.2.4**, urban areas are likely to experience the highest effects from cumulative air emissions and pollution. Downstream facilities, particularly refineries and petrochemical plants, are discussed in more detail in Chapter 4.1.1 of the GOM Oil and Gas SID. Cumulative impacts on air quality are discussed in more detail in **Chapter 4.1**.

Discharges and Wastes: Discharges and wastes can have both adverse and beneficial effects on social factors. Point- and nonpoint-source pollution of liquid and solid waste (including plastics and microplastics, for example, see **Chapter 4.2** of this Programmatic EIS) from multiple sources (e.g., industrial, agricultural, and urban) can pollute the air and water used by people, causing acute and chronic effects, and can contaminate the habitat of species used for subsistence, including subsistence fishing, making them unavailable or unsafe for use. Conversely, dredged material disposal often benefits surrounding land by shoring up areas undergoing subsidence and making improvements that can be used for parks, recreation, and fishing.

Varying water quality from municipal water supplies can have far-reaching impacts for coastal communities, as has recently been demonstrated in Plaquemines Parish, Louisiana. In June 2023, the parish's drinking water began to be impacted by a "saltwater wedge" that was moving up

the Mississippi River because of the river's low water volume (Louisiana Department of Health 2023). A Federal disaster was declared on September 27, 2023 (The White House 2023). The USACE began barging water to Plaquemines Parish and three desalination units were also installed in the parish, while neighboring parishes of Orleans and Jefferson began making plans in case the wedge moved farther upriver, such as beginning to install pipelines for new intakes (Chavez 2023). Increased sodium in the water can affect individuals with "kidney problems, hypertension, infants and pregnant women," can cause heavy metal intrusion from lead and galvanized steel pipes, damage appliances with water hookups, as well as affect agriculture, livestock, and the seafood industry (e.g., ice for shrimp boats had to be shipped in from outside the impacted areas to shrimp docks) (Kenning 2023). The full impacts, including community health, infrastructure, or economic damages have yet to be determined. Plaquemines Parish is of particular interest to BOEM due to its historical and contemporary connections to the offshore oil and gas and supporting industries, as well as other OCS activities more generally (Austin et al. 2014a; Austin et al. 2014b). These oil and gas supporting industries both rely on and impact municipal water sources, making these cumulative stressors an important consideration.

As an example, on July 27, 2024, a pipeline in Crescent Midstream's pump station in Raceland, Louisiana, which is part of Crescent Midstream's Bonefish pipeline system connecting to OCS pipeline infrastructure upstream and refineries downstream, released over 800 bbl of crude oil into Bayou Lafourche (Larose 2024b; Pipeline and Hazardous Materials Safety Administration 2024). This impacted several miles of Bayou Lafourche, causing the bayou to be shut down until August 14, 2024 (Larose 2024a), temporarily impacting any recreational and commercial fishermen that would have used that portion of the bayou (the inshore shrimp season began on August 5, 2024; LeBreton 2024). At least 20 wildlife individuals were killed from the spill and a notice to conserve water was issued because the spill occurred upstream of Lafourche Parish's municipal water intake (USEPA 2024e). The response team numbered at least 140 individuals and included air monitoring stations from USEPA (USEPA 2024c). The pipeline system continued to be impacted by the shutdown after cleanup efforts and this shutdown may have longer term economic impacts, though the case is still open (Pipeline and Hazardous Materials Safety Administration 2025).

Bottom Disturbance: Bottom disturbance from activities such as dredging, trawling, and marine construction can have negative and positive effects on social factors. It can disrupt habitat (through turbidity and sedimentation or physical displacement) for species, including oysters and other shellfish, making them unavailable for consumption or commerce. Conversely, the installation of production structures related to State oil and gas activities, as well as artificial reef placement could enhance reef fish habitat and thus improve fishing and diving opportunities by congregating some fish populations near the structures.

Noise: Anthropogenic noise from non-OCS oil- and gas-related sources including State oil and gas activities, industrial activity, and construction, can negatively affect animal behavior (see **Chapters 4.3-4.9**), which could indirectly affect social factors if notable disruptions to aspects like catch rates or cultural practices were to occur.

Lighting and Visual Impacts: Artificial lighting can be installed for public safety and to facilitate nighttime industrial work, enjoyment of outdoor spaces, and fishing after dark, creating positive effects. However, it can also contribute to light pollution and be disruptive to certain species and other human uses of nighttime spaces, such as recreation (including star gazing, camping, and fishing). Visual impacts can possibly disrupt the sense of place of a community or its cultural, historic, and archaeological resources.

Coastal Land Use/Modification: Coastal land use, whether residential, commercial, or agricultural, and the zoning ordinances or planning documents that constrain or promote it can have negative and positive effects on people, habitats, and the environment, depending on how they stand to benefit or not from various proposed projects. Land use decisions can be controversial and simultaneously considered positive by some stakeholders and negative by others.

Those who rely on subsistence fishing can also be particularly impacted by coastal land use policies. This can have subsequent impacts on social factors, because subsistence practices are deeply embedded in the social fabric of coastal Louisiana communities. Recent research on subsistence in Louisiana noted that subsistence practitioners rarely consider their activities as "subsistence", see their activities as important markers of identity and heritage, and that subsistence products move across wide social networks, including family and friends, community members, and as part of community events (Regis and Walton 2022; Regis et al. 2022a; Regis et al. 2022b; Regis et al. 2022c). McCall and Greaves (2022) make similar conclusions about subsistence activities, noting that they contribute to cultural identity, place attachment, and that the products move about in a wider social system of sharing and delayed reciprocity within informal economies. See Chapter 4.4.4 of the GOM Oil and Gas SID for more on subsistence fishing in the region.

Offshore Habitat Modification/Space Use: Offshore habitat modification/space use can negatively and positively affect communities and society in the area of analysis. There are many competing interests for offshore land and water, including commercial and recreational fishing (which at times compete with each other), aquaculture, State offshore oil and gas and renewable energy development, operation, and decommissioning, marine minerals (including sediment for coastal restoration projects), coastal restoration projects, military activities, transportation, tourism and recreation, protected areas (including cultural resources, marine protected areas, and critical habitat), and other industries.

Socioeconomic Changes and Drivers: Socioeconomic drivers have arguably the largest effect on social factors, both positive and negative. The contraction and expansion of key industries contribute to the economies, onshore and offshore land use, visual impacts, and subjective experience of living in the area. As industries expand and contract, they may compete directly or indirectly for land, workers, public perception, and government funding or assistance. Competition for workers is recognized as a significant challenge for industries, particularly those with unpredictable or cyclical employment needs, such as oil and gas and shipbuilding and fabrication (Austin et al. 2002a; Austin and Woodson 2014; McGuire et al. 2014).

Other Environmental Factors: Other environmental factors include harmful microorganisms, coastal land loss, major storm events, and climate-related factors. How these factors impact communities is uneven and depends on many other variables, though research is still ongoing to understand the impacts and variation. See Chapter 4.4.6 of the GOM Oil and Gas SID for additional information on recent research regarding the effect these factors are having on various communities.

The incidence of harmful algal blooms is expected to continue, causing additional indirect stress to social factors by causing or exacerbating die-offs of fish, shellfish, corals, and aquatic plants (Obenour et al. 2013; Rabalais et al. 2002; Turner et al. 2005; Turner et al. 2012) of significant economic or cultural value. Red tide, cyanobacteria, and vibrio, among others can pose dangers for humans and other animals who come into contact with or ingest them, causing disruptions in fishing and water and beach access. This can interfere with people's use and enjoyment of the natural environment and contribute to negative cumulative effects to GOA coastal populations.

Coastal land loss from erosion, subsidence, sea-level rise, and storm surge is one of the greatest threats to the stability and future of coastal populations, especially in Louisiana. Figures 4.4.6-7 and 4.4.6-8 of the GOM Oil and Gas SID illustrate projections for future land loss in Louisiana. Louisiana has created a Coastal Master Plan focused on resolving the land loss crisis (Coastal Protection and Restoration Authority 2023). As of 2022, Louisiana's Coastal Protection and Restoration Authority had overseen over $20 billion in allocated State and Federal funds with 92 projects in construction, 41 projects in engineering and design, and 9 projects in planning stages (Coastal Protection and Restoration Authority 2022a; 2022b). Restoration projects would also impact habitats, communities, and residents. In 2022, the USACE released their Final EIS for the Mid-Barataria Sediment Diversion Project in Plaquemines Parish, Louisiana. The Final EIS identified minor to moderate, permanent, adverse impacts on the economy, populations, property and housing values, tax revenues, public service, and community cohesion for the communities surrounding the proposed project; and moderate to major, permanent, adverse impacts to shrimp and oyster fisheries (Lipsman 2019; 2020; McCall and Greaves 2022; USACE 2022).

High-intensity storms, coupled with higher sea levels, are reasonably foreseeable and likely to cause additional stress to social factors cumulatively. The Gulf Coast of Texas, Louisiana, Mississippi, Alabama, and Florida have experienced multiple hurricanes in recent years. Of these, Category 4 Hurricanes Laura (with Delta following), Ida, Ian, Idalia, Helene, and Category 5 Hurricane Milton, were particularly devastating, prompting multi-year regionwide recoveries in southwestern Louisiana, southeastern Louisiana, and southwestern, central, and northwestern Florida. The impacts to coastal communities, including infrastructure, residences, businesses, and demographics were substantial and the cumulative impacts of multiple disasters makes it difficult to fully distinguish one from another in isolation (National Academies of Sciences, Engineering, and Medicine 2024). See **Appendix B.4.2.9** of this Programmatic EIS and Chapter 3.3.1 of the GOM Oil and Gas SID for more information on major storms affecting the Gulf Coast.

Climate-related factors can alter many different facets of life across the area of analysis. For example, a study of residential property in Florida and risk from climate-related factors found that Florida is at risk of increased flooding and property devaluation related to climate impacts. These risks are unevenly distributed, and five of the nine counties expected to see the most devaluation are along the Gulf Coast. Additionally, all of the counties expected to see the highest percentage of homes exposed to flooding are along the Gulf Coast (Woetzel et al. 2020). Sea-level rise could substantially shift U.S. population distribution. Using a scenario of 1.8-m (5.9-ft) sea-level rise between 2010 and 2100, Hauer predicts that Florida and Louisiana are likely to lose the most population from sea-level rise-induced migration (2.5 million and 0.5 million, respectively), with Texas likely to gain the most population (nearly 1.5 million), while Alabama and Mississippi experience slight gains (Hauer 2017). See Chapter 4.4.6 of the GOM Oil and Gas SID for more on the effects of climate-related factors to social factors in the GOA region.

4.16.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct impacts to social factors would occur as a result of the proposed action (i.e., a single proposed OCS oil and gas lease sale). Impacts to social factors from the cancellation of a single OCS oil and gas lease sale would be **negligible** (mostly stemming from possible economic impacts; see **Chapter 4.15**). In areas where the oil and gas industry is deeply embedded in the cultural fabric (e.g., coastal parishes of Louisiana), the importance of this industry can go beyond employment and economics (Davidov 2022; Priest 2016). For example, a lack of new leasing could impact people who hold cultural values connected to oil- and gas-related industries if they become disassociated from them because of a loss of employment or income. However, because a regionwide lease sale would represent a small percent of the overall Cumulative OCS Oil and Gas Program production in the GOA (**Table 3.3-1**), cancellation of a single OCS oil and gas lease sale would not be expected to result in a notable adverse impact to regional employment or other social factors. There are ongoing OCS oil- and gas-related activities associated with previous lease sales, and other non-OCS oil- and gas-related activities that would continue to potentially affect social factors under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would still potentially affect social factors through air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, noise, lighting/visual impacts, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions as summarized above in **Chapter 4.16.2.1** and **4.16.2.2**. Ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.16.1** and in further detail in Chapter 4.4.6.1 of the GOM Oil and Gas SID. Ongoing impacts can range from **minor beneficial** to **moderate adverse** but are widely distributed

and expected to have limited regional impacts because of the existing extensive and widespread support system for the petroleum industry and its associated labor force. This range represents, on one end, maintaining employment in oil- and gas-related industries (which has both positive and negative impacts on social factors like family stability and traditional subsistence practices), to, on the other end, the impacts of accidental events like major collisions or large spills and subsequent response activities that could temporarily impact several counties/parishes.

***Non-OCS Oil- and Gas-Related Activities*:** The IPFs associated with past and present non-OCS oil- and gas-related activities would be expected to persist into the future, even if the No Action alternative were selected. Non-OCS oil- and gas-related activities affecting coastal communities across the GOA are immensely varied and too numerous to detail in full. Non-OCS oil- and gas-related activities would have potential direct and indirect impacts to social factors through air emissions and pollution; discharges and waste; bottom disturbance; noise; coastal land use and/or modification; lighting and visual impacts; offshore habitat modification and/or space use; socioeconomic changes and drivers; and other environmental factors as summarized above in **Chapter 4.16.2.3**. Socioeconomic changes and drivers have arguably the largest effect on social factors, both positive and negative, as the associated events and processes are diverse and encompassing of nearly all facets of social and economic life. The sum of non-OCS oil- and gas-activities are far more influential on the social factors across the region than the impacts from ongoing OCS oil- and gas-related activities.

Comparison of Impacts Under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a regionwide lease sale. This alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced or altered by the geographic constraints under Alternatives C and D. The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (No Action) would also be applicable under Alternatives B through D.

Analyzing the impacts of routine OCS oil- and gas-related activities on people and communities is complex because they are experienced at multiple, overlapping levels (e.g., industry workers, families of workers, and the communities at large). The affected environment encompasses 133 counties across five states, containing an array of diverse demographics, cultures, economies, histories, and so on. Impacts occur in varying degrees of intensity. The interactions of industry and community are complex, resulting in a myriad of impacts, some positive and some negative. This complex relationship between the oil and gas industry and communities evolves over time, as do the subsequent impacts to these communities. Effects from OCS oil- and gas-related activities can be experienced as positive or negative, depending on the specifics of any given situation and parties affected, covering a broad spectrum of factors such as employment stability, wages and opportunities for advancement, economic rewards in exchange for work (benefits), work scheduling patterns and how these dictate time spent off the job or with families, industry cycles and fluctuations in OCS oil- and gas-related activity levels, demographic shifts (in-migration and out-migration),

commuter and truck traffic, commodity (oil/gas) price fluctuations, expansions of existing infrastructure, and construction of new infrastructure.

Social factors cover a broad range of human dimensions, and impacts are experienced differently depending on specific location, people involved, situational context, and so on. Therefore, assigning specific impact determinations for each IPF category associated with *routine* activities would necessarily be a subjective exercise. However, **Table 4.16-2** does show the impact determinations for accidental events that could affect social factors for each action alternative analyzed. The impacts of Alternative A are not shown in **Table 4.16-2** because an oil and gas lease sale would not occur and the impacts for all IPFs from the proposed action would be avoided.

Table 4.16-2. Impact Determinations for Routine and Accidental Impacts to Social Factors from a Single Proposed OCS Oil and Gas Lease Sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure	Alternative B	Alternative C	Alternative D
Routine Activities	N/A	**Minor Beneficial** to **Negligible Adverse**	**Minor Beneficial** to **Negligible Adverse**	**Minor Beneficial** to **Negligible Adverse**
Unintended Releases into the Environment	N/A	**Negligible** to **Moderate Adverse**	**Negligible** to **Moderate Adverse** but could reduce the chance of spills reaching adjacent coastal areas, especially in Texas and western Louisiana	**Negligible** to **Moderate Adverse** but could reduce the chance of spills reaching adjacent coastal areas, especially in Texas and western Louisiana
Response Activities	N/A	**Negligible** to **Moderate Adverse**	**Negligible** to **Moderate Adverse** but could reduce the chance of spills reaching adjacent coastal areas (and subsequent response activities), especially in Texas and western Louisiana	**Negligible** to **Moderate Adverse** but could reduce the chance of spills reaching adjacent coastal areas (and subsequent response activities), especially in Texas and western Louisiana
Strikes and Collisions	N/A	**Negligible** to **Moderate Adverse**	**Negligible** to **Moderate Adverse**	**Negligible** to **Moderate Adverse**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **negligible**. Ongoing impacts can range from **minor beneficial** to **moderate adverse** but are widely distributed and expected to have limited regional impacts because of the existing extensive and widespread support system for the petroleum industry and its associated labor force.

Alternative B – Regionwide OCS Lease Sale

Within the regionwide lease sale area under Alternative B, air emissions and pollution, discharges and wastes, bottom disturbance, noise, coastal land use and/or modification, offshore

habitat modification and/or space-use, lighting and visual impacts, and socioeconomic changes and drivers could potentially impact social factors as described above in **Chapter 4.16.2.1**.

The potential impacts resulting from routine activities occur within the larger socioeconomic context of the GOA region. Routine activities resulting from a single lease sale would be incremental in nature, not expected to change existing conditions, and positive in their contribution to the sustainability of current industry, related support services, and associated employment. Existing onshore oil and gas infrastructure is expected to be sufficient to handle development associated with a proposed action (**Appendix B.2.5**) and, thus, impacts from coastal land use would most likely be experienced from existing routine uses and not from novel construction. Based on the analysis of the IPFs above and the scenario projections for a single lease sale provided in **Chapter 3**, the overall impact of routine activities resulting from a single lease sale on social factors would be **minor beneficial** to **negligible adverse**. The minor beneficial impact is because a lease sale could contribute to increased economic opportunity in upstream industries, such as fabrication yards, that could potentially influence social factors, but the impacts would be localized and ultimately unknowable at the time of an oil and gas lease sale.

Unintended Releases into the Environment: Oil spills that occur in coastal or nearshore waters have a greater chance of directly affecting people and communities, with impacts ranging from **negligible** to potentially **moderate adverse** in some communities. Based on historical oil-spill occurrence rate data, the majority of oil spills (>95%) have been less than 1 bbl (Anderson et al. 2012; Ji and Schiff 2023) and dissipate quickly and, thus, have **negligible** impacts with no effect or no measurable or detectable impacts on the social factors of an affected community (either geographically based or a community of practice). However, if the affected activity or community would have to adjust somewhat to account for disruptions due to notable and measurable adverse impacts or if remedial or mitigating measures are necessary before the affected community can return to conditions prior to an accidental event, then the impact would be **moderate adverse**. For example, in 2021 a large oil spill involving a pipeline occurred on the OCS off the coast of Orange County, California, resulting in beach closures, impacting a Pacific Airshow, initiating response efforts, and prompting ongoing restoration activities (all of which can directly and indirectly affect social factors) (NOAA 2023a). Conversely, on November 16, 2023, an underwater pipeline ruptured approximately 31 km (19 mi) off the coast of Louisiana, releasing potentially over a million gallons of crude oil before being sealed to prevent further leakage of oil (NOAA 2023d). There were no reported use of dispersants during response activities (NOAA 2023c) and there have been no reported wildlife or shoreline impacts (USCG 2023); investigation of the spill is ongoing.

Similarly, the impacts of chemical and drilling-fluid spills would range from **negligible** to **moderate adverse** depending on the location and characteristics of the event, with the likelihood of negative impacts increasing closer to shore.

Response Activities: Spill-response activities are expected to have **negligible** to **moderate adverse** impacts to various people and communities depending on the location and scale of the event and associated response activities. Small-scale, non-catastrophic spill events involve

varying degrees of spill response and containment. For example, businesses and individuals involved in a response (other than the responsible party) could see economic gain, while those whose livelihoods or business plans are disrupted by the spill, and its cleanup, would need to adjust their plans and could see economic losses (Austin et al. 2014a; Austin et al. 2014b).

Strikes and Collisions: Vessel collisions could affect local populations as they often result in oil or chemical spills and may interrupt transportation along waterways or roadways if a bridge is involved.

Unintended releases into the environment, response activities, and strikes and collisions associated with a proposed OCS oil and gas lease sale are not likely to be of sufficient scale or duration to have adverse and disproportionate long-term impacts for people and communities in the analysis area. **Appendix B.3** further discusses the potential of accidental events from a proposed OCS oil and gas lease sale.

Based on the description of the IPFs above and the scenario projections for a single proposed oil and gas lease sale in **Chapter 3**, the overall impacts from routine OCS oil- and gas-related activities would range from **minor beneficial** to **negligible**, be widely distributed, and expected to have a limited impact because of the existing extensive and widespread infrastructural and economic support system for the petroleum industry and its associated labor force. The overall impact conclusion for accidental events on social factors range from **negligible** to **moderate adverse**.

Alternative C –Targeted OCS Lease Sale Area

Alternative C aims to concentrate leasing activities into a smaller footprint to potentially reduce impacts to ecologically sensitive areas and to preserve additional flexibility for marine spatial planning. These geographic constraints could change the spatial distribution of activities when compared to Alternative B but would not be expected to meaningfully change the types of activities or their overall levels. Therefore, the potential spatial redistribution of activity under Alternative C would not change the degree of overall effects to social factors because most impacts relevant to social factors occur onshore or nearshore, far from the OCS, and are widely distributed across the GOA region. The IPFs and resulting impacts from routine activities would be **minor beneficial** to **negligible adverse**, similar to Alternative B. The IPFs from accidental events would also be similar to Alternative B, ranging from **negligible** to **moderate adverse**, although the removal of the wind energy areas, SSRAs, and other blocks (**Figure 2.2-2**) could reduce the probability of some accidental events being experienced in adjacent coastal areas, especially in Texas and western Louisiana. Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale in **Chapter 3**, the overall impacts from IPFs associated with Alternatives C on social factors would range from **minor beneficial** to **moderate adverse**, be widely distributed, and expected to have a limited impact because of the existing extensive and widespread support system for the petroleum industry and its associated labor force.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D aims to concentrate leasing activities into an even smaller footprint than Alternative C to potentially reduce impacts to additional ecologically sensitive areas and further preserve flexibility for marine spatial planning. These geographic constraints could change the spatial distribution of activities when compared to Alternatives B and C but are not expected to meaningfully change the types of activities or their overall levels. Therefore, the potential spatial redistribution of activity under Alternative D would not change the degree of overall effects to social factors because most impacts relevant to social factors occur onshore or nearshore, far from the OCS, and are widely distributed across the GOA region. The IPFs and resulting impacts from routine activities would be **minor beneficial** to **negligible adverse**, similar to Alternative B. The IPFs from accidental events are also unchanged from Alternative B, ranging from **negligible** to **moderate adverse**, although the removal of the wind leasing call area, waters shoreward of the 20-m (66-ft) isobath, and SSRAs (**Figure 2.2-3**) could reduce the probability of some accidental events being experienced in adjacent coastal areas, especially in Texas and western Louisiana. Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale in **Chapter 3**, the overall impacts from IPFs associated with Alternatives D on social factors would range from **minor beneficial** to **moderate adverse**, be widely distributed, and expected to have a limited impact because of the existing extensive and widespread support system for the petroleum industry and its associated labor force.

4.16.2.5 Cumulative Impacts

This cumulative analysis incorporates and builds on the evaluation of past and present effects under Alternative A by also considering the potential effects from reasonably foreseeable future OCS oil and gas lease sales and reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect social factors through future routine activities and potential accidental events as described above in **Chapters 4.16.2.1** and **4.16.2.2**. Ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Chapter 4.16.1** and in further detail in Chapter 4.4.6.1 of the GOM Oil and Gas SID. Ongoing impacts can range from **minor beneficial** to **moderate adverse** but are widely distributed and expected to have limited regional impacts because of the existing extensive and widespread support system for the petroleum industry and its associated labor force. Future lease sales would add small to notable, measurable impacts to the past and present impacts depending on issues like the size and frequency of accidental events, how many leases are developed in the future, and future changes in industry labor organization. Effects from future routine activities would be widely distributed and expected to have limited regional impacts given the already well-established petroleum industry and associated labor force in the region, although potential accidental events could have more pronounced impacts in particular locales. Thus the range of effects represents on the one hand, employment in oil- and gas-related industries (which has both positive and negative

impacts on social factors like family stability and traditional subsistence practices), to, on the other hand, the impacts of potential accidental events like major collisions or large spills and subsequent response activities that could temporarily impact several counties/parishes. Impacts from cumulative OCS oil and gas activities are expected to be similar to effects experienced from ongoing oil and gas activities, except with an increased level of activities associated with upstream industries and their support sectors, though, this still represents a status quo in activity for the region for the last several decades.

Non-OCS Oil- and Gas-Related Activities: Air emissions and pollution; discharges and waste; bottom disturbance; noise; coastal land use/modification; lighting and visual impacts; offshore habitat modification/space use; socioeconomic changes and drivers; and other environmental factors associated with non-OCS oil- and gas-related activities are discussed in **Chapter 4.16.2.3** and are expected to continue into the future and similar levels. Like with impacts from ongoing non-OCS oil- and gas-related activities discussed above in **Chapter 4.16.2.4**., socioeconomic changes and drivers have arguably the largest effect on social factors, both positive and negative, as the associated events and processes are diverse and encompassing of nearly all facets of social and economic life. Therefore, there is no meaningful difference expected in the types or intensity of impacts from ongoing compared to cumulative non-OCS oil- and gas-related activities – the sum of non-OCS oil- and gas-activities are far more influential on the social factors across the region than the impacts from cumulative OCS oil- and gas-related activities.

Incremental Contribution of the Proposed Action: BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA region as having potentially substantial effects on social factors. A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion of activity when compared to the existing OCS Oil and Gas Program in the GOA region (**Table 3.3-2**). See **Chapter 4.16.3.2** for a further analysis of impacts under Alternative A (No Action) wherein a single proposed lease sale would not take place. Ongoing non-OCS oil- and gas-related factors, which include all human activities, natural events, and processes, contribute more to cumulative impacts than do factors related to OCS oil- and gas-related activities alone because of the analysis area's complex socioeconomic framework.

The spatial distribution of activities could vary across action alternatives; however, the overall types of activities and the estimated levels of those activities would be similar. In the context of past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities and cumulative impacts to social factors within the area of analysis, the *incremental contribution* of an OCS oil and gas lease sale to cumulative impacts is expected to be **minor adverse** for Alternative B, C, or D, as impacts from a single proposed OCS oil and gas lease sale would not disrupt the normal or routine functions of an affected activity or community. The petroleum industry as a whole in the GOA region has matured over nearly a century and is well-developed, expansive, extensive, and deeply intertwined in the regional communities and economies of the five Gulf Coast States. For much of the GOA region, offshore lease sales and offshore development are part of the routine fabric of communities. An OCS oil and gas lease sale would not be expected to result in a notable

increase to any ongoing or reasonably foreseeable cumulative impacts experienced by social factors in the area of analysis. Using existing infrastructure would lessen the impacts of bottom disturbance, land-use, lighting, and routine discharges, and impacts from additional noise and vessel traffic resulting from a single proposed OCS oil and gas lease sale, so these impacts are not expected to be noticeable (by coastal communities) above future baseline conditions. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Chapters 4.16.2.1** through **4.16.2.4** above.

4.16.3 Incomplete or Unavailable Information

There is information relevant to people and communities regarding the impacts of the *Deepwater Horizon* explosion, oil spill, and response that cannot be obtained within the timeframe contemplated for this Programmatic EIS because long-term health impact studies and the Natural Resource Damage Assessment restoration process are ongoing. Because long-term health impacts to coastal populations may be relevant to understanding the impacts from the *Deepwater Horizon* explosion, oil spill, and response to current and future baseline conditions, BOEM will continue to incorporate new information as it becomes available while analyzing the most reliable information currently available. BOEM has used existing information and reasonably accepted scientific methodologies to extrapolate from available information in completing the relevant analysis, including information that has been released after the *Deepwater Horizon* explosion, oil spill, and response and studies of past oil spills, which indicate that a low-probability, catastrophic oil spill, which is not part of the proposed action, may have adverse impacts on residents in GOA coastal communities. For example, (Austin et al. 2014b; Austin et al. 2022) probed the socioeconomic and sociocultural effects of the spill on specific GOA region communities, and the synthesis of these results give insights to the overall regional impacts (refer also to Accidental Events in **Chapter 4.16.2.2** above). Research into possible long-term health impacts of the *Deepwater Horizon* explosion, oil spill, and response continues (Abramson et al. 2010; D'Andrea and Reddy 2018; Substance Abuse and Mental Health Services Administration and CDC 2013; The National Institute of Environmental Health Sciences 2023).

Information on the long-term effects of recent hurricanes, such as Hurricane Ida, is also currently unavailable. Major hurricanes in the GOA region have prompted demographic shifts and economic impacts. Studies of past hurricane impacts and responses, as well as the most currently available information on these recent hurricanes, is considered (**Appendix B.4.12**). Additionally, more specific connections between the potential health risks of personnel working on vessels in proximity to offshore facilities, as well as coastal communities' exposure to air pollutants related to routine oil- and gas-related offshore emissions, could be better explored in future research, especially in terms of location specificity and population exposure risks. See **Chapter 4.1** for more information on potential air pollutants related to routine oil- and gas-related activities. While relevant to this analysis, BOEM has determined that such information is not essential to a reasoned choice among alternatives based on the discussion above. BOEM has used the reliable scientific

information available to date and reasonably accepted scientific methodologies to extrapolate from existing information. Therefore, the incomplete or unavailable information, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

4.17 SUMMARY OF CUMULATIVE IMPACTS

A single proposed OCS oil and gas lease sale would represent only a small portion of all activity in the GOA region and a small incremental contribution to overall Cumulative OCS Oil and Gas Program activities forecasted through 2093 (**Table 3.3-2**). The cumulative impacts from the proposed action are expected to be similar under all of the action alternatives because the overall range of activity levels are expected to fall within the range of low and high levels of forecasted activity. The past and present cumulative impacts were considered as part of the baseline environmental conditions and impacts were evaluated under the No Action Alternative for each resource. The summary below highlights key points regarding future baseline conditions and the most relevant potential cumulative effects from reasonably foreseeable OCS oil- and gas-related and non-OCS oil- and gas-related activities.

The physical, ecological, and human aspects within the GOA region are under increased pressure from accelerating environmental stressors like sea level rise, higher sea surface temperatures, risk of increased storm intensity, and continued population increase with its accompanying coastal development (Intergovernmental Panel on Climate Change 2018). Much of the cumulative effects in the Western and Central GOA can be attributed to riverine nutrient loads (mainly from agriculture), ocean acidification, pollution derived from commercial vessels and ports, coastal development, and an expansive, mature onshore and offshore oil and gas program. Modifications from oil and gas development and other human activities, including building levees and canals and constructing buildings and roads, have substantially altered the natural landscape. The hypoxic zone near the mouth of the Mississippi River has persisted for years and is expected to continue (Rabalais and Turner 2019).

The OCS oil and gas industry in the GOA region has matured over several decades, is well-established, expansive, and deeply intertwined in the regional communities and economies of the Gulf Coast. Oil and gas extraction and associated infrastructure is a significant factor behind population growth and many of the modifications to the GOA land- and seascape over the past century (National Academies of Sciences, Engineering, and Medicine 2018). Industries that support the OCS oil and gas program, like shipyards, fabrication yards, transportation, and other services, also support the oil and gas industry onshore, in State waters, and elsewhere around the globe. This complex infrastructure is summarized in **Appendix B** of this Programmatic EIS, with additional detail in Chapter 2 and Chapter 4.4.1 (Land Use and Coastal Infrastructure) of the GOM Oil and Gas SID (BOEM 2023b).

While BOEM acknowledges past and present OCS oil- and gas-related activities as a substantial contributor to cumulative effects from the overall oil and gas industry across the entire

region, deciphering Gulf of America OCS oil- and gas-related effects from the effects of onshore and State oil and gas activities and other industries is difficult, if not impossible. Furthermore, potential impacts that may arise from downstream support activities cannot be directly influenced by BOEM's decisionmaking given that BOEM has no regulatory authority over onshore activities, including their location. However, many other Federal and State agencies regulate onshore oil- and gas-related infrastructure through air and wastewater discharge permitting and stream and wetland permitting. Through these permitting processes, the agencies are required to consider impacts for their proposed actions. For more detail on state oil and gas activities, see Chapter 2.3.2.3 of the GOM Oil and Gas SID and for more detail on carbon sequestration activities in coastal Texas and Louisiana, see **Appendix B.4.2.5**.

Overall, total OCS oil and gas production is expected to rise over the short-term but decrease and stabilize at a lower level over the next few decades (BOEM 2023a). It is reasonable to assume that GOAR oil and gas lease sales would likely continue to be proposed for at least the next 10 years as described in **Chapter 3.3.2**. Impacts from past and ongoing OCS oil and gas activities are discussed in Alternative A for each resource throughout **Chapter 4**. Based on the scenario projections in **Chapter 3.3**, it is reasonable to assume that the future effects from the Cumulative OCS Oil and Gas Program would likely be similar to those discussed as part of ongoing OCS oil and gas activities under existing conditions. Due to the growth of oil and gas development in deepwater areas, oil and gas service activities for OCS operations have been heavily centralized at Port Fourchon, Louisiana, which services around 90 percent of all deepwater rigs and structures in the GOA.

Multiple existing IPFs and stressors are likely to affect GOA region resources in the coming decades, including, but not limited to, invasive species, nutrient runoff and pollution, marine traffic, coastal development, military and other Federal activities, climate-related factors, as well as ongoing and future OCS oil- and gas-related activities associated with an expansive, mature regional oil and gas program. For example, noise from deep-penetration seismic surveys or decommissioning may disturb or injure marine mammals, sea turtles, and fish. Lingering effects from the *Deepwater Horizon* explosion, oil spill, and response, as well as increased ocean temperature and acidity, may challenge many marine and estuarine communities, including coral reefs and other hard-bottom benthic communities. Commercial and recreational fishing may impact some benthic communities, levels of harvested fish species, and bycatch. Rising demand for sand and increased dredging may degrade benthic communities and may disturb, injure, or kill sea turtles. Coastal and estuarine habitats along the Gulf Coast would continue to be subjected to runoff and pollution, which may degrade water quality. Increases in vessel traffic, coastal development, and sea-level rise may influence coastal erosion. Coastal habitats and communities (particularly wetlands) are threatened by subsidence, erosion, sediment starvation, and sea-level rise. Tourism is expected to continue to be an important driver, though more so in the EPA, where OCS oil- and gas-related activities are far less prevalent and activities related to future OCS oil and gas lease sales are not reasonably foreseeable (BOEM 2023d).

As noted in the 2024-2029 National OCS Oil and Gas Program Programmatic EIS, the WPA and CPA have low levels of expected impacts resulting from future oil and gas leasing, when compared to existing background levels (BOEM 2023d). The historical data and trends in **Chapter 3** and **Appendix C** highlight the drastic decommissioning of wells and structures over the last 20 years. BOEM expects fewer new facilities across the GOA shelf and deepwater environment as a result of future OCS oil and gas leasing when compared to historical trends, with a steady trend towards more deepwater activity and less shallow water activity. As a result, total cumulative structures and facilities present in the Gulf of America OCS are expected to continue decreasing annually. Additionally, even though continued consumer demand for oil and gas is likely, new advances in upstream and downstream technology could potentially change the level of projected OCS oil- and gas-related activities for future OCS oil and gas lease sales and how they are conducted. Using existing infrastructure lessens the impacts of bottom/land disturbance, lighting, and routine discharges on various resources, and impacts from additional noise, vessel traffic, and visible infrastructure are not expected to be noticeable (by humans) above future baseline conditions. Furthermore, additional mitigating measures to reduce or minimize any potentially significant impacts of concern can and may be applied during post-lease reviews.

The presence of a well-developed oil and gas industry and robust regulatory oversight in the GOA region leads to a low relative addition to overall cumulative effects from a single OCS oil and gas lease sale. Based on the analyses above and incorporated by reference from the 2024-2029 National OCS Oil and Gas Program Programmatic EIS, a single proposed OCS oil and gas lease sale would not be expected to result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by most resources in the area of analysis, including coastal communities and habitats, benthic communities and habitats, pelagic communities and habitats, fish and invertebrates; birds; commercial fisheries; recreational fishing; recreational resources; cultural, historical, and archaeological resources; land use and coastal infrastructure; and social factors.

The incremental contribution of an OCS oil and gas lease sale's impacts to air quality could result in **moderate** to **major** cumulative air quality impacts if notable and measurable levels of ozone (O_3) caused by the proposed action were to reach the Houston-Galveston-Brazoria area, thus slowing down the long-term ability of the area to recover from the chronic nonattainment status for ozone (O_3) currently experienced. Several existing regulatory programs and requirements are in place, however, to reduce or minimize cumulative impacts to air quality in the GOA region at all stages of OCS oil and gas development (**Table 4.1-2**). Therefore, additional or worsened significant cumulative impacts to air quality as a result of a single OCS oil and gas lease sale and the ongoing OCS oil and gas program, though possible, are not likely. Overall, global emissions would likely increase in each activity level under the action alternatives (see **Appendix K**). However, BOEM acknowledges the limitations and uncertainty in the modeling and acknowledges the incremental contribution to global GHGs might have to future climate-related factors.

There is the potential for a large spill (e.g., ≥1,000 bbl) to result in up to **moderate** cumulative impacts to water quality depending on the characteristics of the spill, baseline conditions at the time of the event, and weather and oceanographic conditions, among other variables. The

effects of the *Deepwater Horizon* explosion, oil spill, and response were factored into BOEM's analysis of past events and existing baseline conditions for each resource. See the GOM Catastrophic Spill Event Analysis technical report (BOEM 2021b) for an assessment of potential impacts resulting from a low-probability catastrophic spill in the GOA similar in nature to the *Deepwater Horizon* explosion, oil spill, and response, which is not part of the proposed action and not considered reasonably foreseeable.

Incremental impacts from an OCS oil and gas lease sale due to noise, entanglement, unintended releases (oil spills), and vessel strikes could potentially result in **moderate** to **major** cumulative impacts to marine mammals and sea turtles if not mitigated. However, with the application of mitigating measures, stipulations, and consultation requirements (see **Tables 4.8-2** and **4.9-2**), these impacts would likely be **negligible** to **moderate** and not expected to result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts to marine mammals or sea turtles. The exception would be if a vessel associated with activities from an OCS oil and gas lease sale were to strike an ESA-listed species and result in population-level effects to the extent that the viability of the population was diminished. The A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA) and other vessel speed and monitoring requirements would prevent or mitigate potential vessel interactions with Rice's whales in the northeastern GOA and other ESA-listed species. Additional mitigating measures through ESA consultation may also be applied as necessary as part of OCS oil and gas lease sale stipulations or during post-lease reviews.

Generally, a single OCS oil and gas lease sale would have a **minor** to **moderate beneficial** contribution to cumulative economic impacts given the substantial prevalence and influence of OCS oil- and gas-related activities to the regional economy (particularly in Louisiana and Texas). New projects from a single OCS oil and gas lease sale would likely sustain the existing workforce more so than create a substantial level of new jobs.

If the Alternative A, the no action alternative, is selected (i.e., cancellation of a single, proposed OCS oil and gas lease sale), there would be no new incremental impacts to most resources from the proposed action. Although the intensity of stressors like commercial fisheries and shipping traffic would be expected to continue over time, the lack of new OCS oil and gas activity from a single oil and gas lease would remove the potential for compounding or synergistic effects from the proposed action to most resources. As long as future sales remain reasonably foreseeable, canceling a single sale would not result in a notable reduction in cumulative effects to environmental resources from the ongoing and cumulative OCS oil and gas program over the 40-70 year analysis period. Conversely, the incremental impacts from the cancellation of a single OCS oil and gas lease sale could result in **minor** to **moderate adverse** cumulative effects to the GOA region's long-term economic prospects, depending on how industry responds (**Chapter 2.2.1**).

4.18 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts associated with Alternatives B-D are summarized below. All OCS oil- and gas-related activities involve temporary and exclusive use of relatively small areas of the OCS over the lifetimes of specific projects. Lifetimes for these activities can be days, as in the case of seismic surveys, or decades, as in the case of a production structure or pipeline. No activities in the OCS Oil and Gas Program involve the permanent use of large areas of the OCS. However, certain allowances can be granted on a case-by-case basis to decommission in place by BSEE's Regional Field Operations Regional Supervisor if the equipment is determined not to be an obstruction (30 CFR 250.1700(b)). Cumulatively, however, a multitude of individual projects results in a major use of OCS space. Mitigating measures (**Chapter 2.3**) are applied when appropriate to reduce the impacts of a proposed action (a single proposed OCS oil and gas lease sale). Unavoidable adverse impacts have been identified for many of the resources described in this chapter and are summarized below. For a full analysis of each resource analyzed in this Programmatic EIS, see **Chapters 4.1** to **4.16**.

***Air Quality*:** Unavoidable effects on air quality would result from air emissions and pollution from sources identified in **Table B.2-1**, as well as unintended releases into the environment like spills, uncontrolled releases of gases, and emergency response activities (e.g., surface burning activities). Additionally, the unavoidable effects on air quality may persist throughout the lifespan of leases awarded under any of the action alternatives, since oil and gas production is a source of emissions that can be regulated to minimize impacts but cannot be eliminated.

***Greenhouse Gas Emissions*:** Unavoidable impacts to the climate could occur through emissions related to the life cycle of the produced hydrocarbons. The contribution of the greenhouse gases from a single proposed action would contribute to climate-related factors globally (see **Appendix K**).

***Water Quality*:** Unavoidable impacts to water quality would result from routine OCS oil- and gas-related activities, such as drilling, construction, pipelaying, decommissioning, and discharges of permitted drilling muds and cuttings. These activities would increase turbidity locally, mainly affecting waters near offshore infrastructure. Discharges of produced waters and other waste materials could also elevate hydrocarbon and trace metal concentrations nearby, though regulations aim to minimize, not eliminate, these impacts.

Accidental spills, including those from vessels, wells, or pipelines, would be managed through prevention and response plans. Spill impacts depend on factors like volume, location, and response methods. While most spills are small and localized, they may still temporarily affect water quality. In addition to these acute events, there is concern that there could be chronic, low-volume leaks from aging or abandoned oil and gas infrastructure. As offshore infrastructure ages, it may become increasingly susceptible to corrosion and damage from extreme weather events. These conditions could increase the likelihood of structural failure and leakage, particularly when decommissioning activities are delayed (GAO 2024). BOEM and BSEE are currently conducting

studies to better characterize these potential impacts. The removal of infrastructure to date, however, has substantially reduced the potential environmental and safety risks associated with BOEM's ongoing oil and gas program in the GOA (see **Appendix C.3**). Furthermore, BSEE's regulatory oversight of offshore oil and gas operators and activities includes both preparations and reporting requirements for hurricanes, tropical storms, and severe weather, which can be found at: https://www.bsee.gov/reporting-and-prevention/hurricane. Also, if BSEE determines a pipeline or facility previously approved and DIP could now interfere with other uses of the OCS, or cause undue or serious harm or damage to the human, marine, or coastal environment, BSEE reserves the right to mandate its removal in accordance with 30 CFR 250 (Q).

Chronic discharges from onshore oil and gas infrastructure and vessel traffic also contribute to cumulative degradation of water quality, particularly in coastal and nearshore environments. While existing regulations help mitigate these effects, they do not fully eliminate the risk. Additionally, decommissioning activities, such as pipeline removal or infrastructure abandonment, can disturb seafloor sediments and potentially release legacy contaminants, resulting in localized impacts to water quality (**Chapter 4.2.3**).

These impacts are mitigated through regulations outlined in **Table 4.2.2**. Point-source discharges from support facilities are regulated by state, federal, and local authorities.

Coastal Communities and Habitats: Some unavoidable impacts would occur during pipeline and other related coastal infrastructure construction and decommissioning (including pipeline DIP or removal), such as the alteration or loss of coastal habitat, or damage to coastal vegetation during decommissioning processes. State and Federal permitting agencies discourage the placement and expansion of facilities in wetlands and may require mitigation of impacts from construction and decommissioning activities. Unavoidable impacts resulting from dredging, wake erosion, and other secondary impacts related to channel use and maintenance would also occur as a result of a proposed action. If an oil spill contacts coastal wetlands, adverse impacts could be notable in localized areas. In heavily oiled areas, wetland vegetation could experience suppressed productivity for several years; in more lightly oiled areas, wetland vegetation could experience die-back for one season. Much of the wetland vegetation would recover over time, but some wetland areas could be converted to open water. Oil spills and response activities could result in adverse impacts to beaches if the sand is removed and not replaced, and a beach could experience several years of small surface residue balls (also called tarballs) washing ashore over time.

Benthic Communities and Habitats: Unavoidable adverse impacts to benthic communities and habitats would occur if unintended releases to the environment and subsequent response activities were to contact sensitive benthic resources. The vulnerability of benthic habitats to an accidental release of oil or other contaminants from a surface vessel, well, pipeline, etc. would depend on the combination of several components: spill location (surface or subsurface); spill volume; and applied spill-response methods. The majority of accidental spills are small in volume (**Chapter 3.5.1.1**, under the subheading Offshore Spills <1,000 bbl), and the impacts from a single, non-catastrophic spill would be localized and only impact a small portion of the overall resource

population in the GOA (i.e., a small number of individual organisms). However, due to their relatively small numbers and restricted habitat, the impacts from unintended releases to the environment to ESA-listed corals and designated coral critical habitat would be greater than for other benthic species.

Unavoidable adverse impacts would also occur to benthic resources if pipelines DIP were to move from their as-built location and cause bottom disturbance. Pipeline movement has been documented in the GOA following hurricanes as a result of increased pressure on the seafloor, storm associated bottom currents, and/or sediment transport, with the majority occurring in depths of less than 61 m (200 ft) (e.g., Det Norske Veritas 2006; 2007; Gearhart II et al. 2011; Tian et al. 2015); however, movement at greater depths has been noted. Further, pipeline movements have been recorded of up to thousands of meters (feet) (e.g., Det Norske Veritas 2007; Tian et al. 2015). A recent study found little statistically-significant displacement amongst 20 pipeline segments over a three-year period; however, there were issues with the survey methodology (Bender et al. 2024).

***Pelagic Communities and Habitats*:** Unavoidable adverse impacts would take place if an oil spill occurred and contacted plankton or *Sargassum* at the surface. There would be some adverse impacts on organisms contacted by oil, dispersant chemicals, or emulsions of dispersed oil droplets and dispersant chemicals that, at this time, are not completely understood. However, the basin-wide distribution and abundance of plankton and *Sargassum* in the northern GOA would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides) once the plume dissipates (i.e., evaporate, weathers, and biodegrades). Further, plankton have a naturally high mortality rate and *Sargassum* has a yearly cycle that promotes quick recovery.

Fishes and Invertebrates: Underwater sound produced from a variety of OCS oil- and gas-related activities (e.g., vessel traffic, seismic surveys, and explosive decommissioning) would result in some level of unavoidable impact. Communication masking, behavioral change, recoverable injury, and/or mortality to exposed individuals are possible impacts regardless of whether the activity is distanced from hard bottom habitats (e.g., exposed individuals in soft bottom and pelagic habitats would still experience impacts). Bottom disturbance is not mitigated for soft bottom habitats, and impacts to these habitats from the construction and placement of infrastructure would be unavoidable. Decommissioning activities would result in further bottom disturbance. However, soft bottom habitats are very common in the GOA and recover relatively quickly. The placement of structures on the OCS, and their associated lighting, would result in unavoidable impacts to fish and invertebrate community assemblages (e.g., aggregations at offshore structures) and dynamics (e.g., feeding interactions). The decommissioning of these structures, either by removal or DIP, may result in further alterations to associated communities and dynamics. Depending on a multitude of factors (e.g., exposure level and duration, life stage, and mobility), unintended releases into the environment could result in mortality, decreased fitness, or behavioral changes of exposed fishes and invertebrates and their prey.

***Birds*:** Unavoidable adverse impacts would take place through artificial lighting and if unintended releases into the environment and subsequent response activities were to contact birds

or their habitats. Attraction to artificial lighting could impose energetic costs to individual birds, as well as collision risk with structures, which could result in injury or mortality (Longcore and Rich 2004). Structures proposed for decommissioning would have very limited lighting and delayed decommissioning of these structures would provide no net positive or negative effect to birds. If a large oil spill occurs and contacts bird habitats, some birds could experience lethal and sublethal impacts from oiling, and birds feeding or resting in the water could be oiled and die. Oil spills and oil-spill cleanup activities could also affect the food sources for bird species. Depending on the time of year, large oil spills could decrease the nesting success of species that concentrate nests in coastal environments due to direct impacts of the spill and also disruption from oil-spill cleanup activities.

***Marine Mammals*:** Unavoidable adverse impacts from routine OCS oil- and gas-related activities, such as seismic surveys, noise, water quality and habitat degradation, helicopter disturbance, vessel collision, and discarded trash and debris, could occur. Accidental vessel strikes could be lethal to individuals. Depending on the population status, these unavoidable adverse impacts could lead to irreversible losses or reduced viability of the species (**Chapter 4.19.2.1**). A large oil spill would temporarily degrade habitat if spilled oil, dispersant chemicals, or emulsions of dispersed oil droplets and dispersant chemicals contact free-ranging pods or calving grounds.

***Sea Turtles*:** Unavoidable adverse impacts from routine OCS oil- and gas-related activities could occur from seismic surveys, water quality and habitat degradation, helicopter disturbance, vessel collision, and discarded trash and debris. An oil spill could temporarily degrade habitat if spilled oil, dispersant chemicals, or emulsions of dispersed oil droplets and dispersant chemicals contact free-ranging individuals or groups, calving grounds, or nesting sites.

Threatened and Endangered Species: On May 20, 2025, NMFS published its Biological and Conference Opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's Oil and Gas Program Activities in the Gulf of America (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b), which contain protocols BOEM implements for ESA compliance. Because a proposed OCS oil and gas lease sale does not in and of itself make any irreversible or irretrievable commitment of resources that would foreclose the development or implementation of any reasonable and prudent measures to comply with the ESA, BOEM may proceed with publication of this Programmatic EIS and finalize a decision among these alternatives, as described in Section 7(d) of the ESA (also see **Appendix G.7**). Unavoidable loss of individuals that are ESA-listed species may occur from an accidental vessel strike or after a large oil spill from the acute impact of being oiled or the chronic impact of oil having eliminated, reduced, or rendered suboptimal the food species upon which they were dependent (**Chapter 4.19.2.1**). On March 28, 2025, the FWS sent BOEM a letter with its evaluation of the new information and data, and its determination that nothing considered during the reinitiated consultation changed the conclusions of the 2018 BiOp.

***Commercial Fisheries and Recreational Fishing*:** Unavoidable adverse impacts from routine operations are loss of open ocean or bottom areas desired for fishing by the presence or construction of OCS oil- and gas-related facilities and pipelines, which could be prolonged in a

localized area if that infrastructure experiences a delayed decommissioning or is decommissioned in place. Loss of gear could occur from bottom obstructions around structures, exposed pipelines, and subsea production systems, and this risk could be perpetuated through delayed decommissioning or DIP. The loss of gear from unwanted interactions with OCS oil and gas infrastructure is relatively uncommon, however, and is partially mitigated for commercial fishermen through NMFS' Fishermen's Contingency Fund. For example, based on NOAA Contingency Fund data from 2015-2024, a total of 107 initial claims were filed. Of those, only 66 (an average of 6-7 claims per year across the entire Gulf of America OCS) received presumption of causation correlated to oil and gas infrastructure as determined through NOAA's independent review. To mitigate those presumed effects, all 66 claimants were compensated for lost or damaged gear (Fritz 2025). Additionally, impacts to commercial fisheries from structures are reduced by USCG's requirements for indicating the location of fixed structures on nautical charts and for lights, sound-producing devices, and radar reflectors to mark fixed structures and moored objects help minimize the risk of collisions as well as the USCG's Local Notices to Mariners which informs mariners about the addition or removal of drilling rigs and structures, locations of aids to navigation, and defense operations involving temporary moorings.

The removal of an offshore structure at the end of its life cycle could also have negative impacts on recreational fishing proportional to how important that structure was as a target for recreational fishers, though this is often mitigated by the Rigs-to-Reefs Program. Of the 308 structure decommissioning applications submitted to BSEE as of March 2025, about 35 percent (109 applications) proposed either reefing in place or relocating through the rigs-to-reefs program (BSEE 2025c). If a large oil spill occurs, it is unlikely that fishermen would want, or be permitted, to harvest fish in the area of an oil spill, as spilled oil could coat or contaminate commercial fish species, rendering them unmarketable.

***Recreational Resources*:** Unavoidable adverse impacts from OCS oil- and gas-related activities may result in the accidental loss overboard of equipment or debris that may eventually come ashore on frequented recreational beaches. A large oil spill could make landfall on recreational resources, leading to local or regional economic losses and stigma effects, causing potential users to avoid the area after acute impacts have been removed. Some recreational resources become temporarily soiled by weathered crude oil, and small surface residue balls (also called tarballs) may come ashore long after stranded oil has been cleaned from shoreline areas. Impacts on recreational resources from a large oil spill may, at the time, seem irreversible, but the impacts are generally temporary. Beaches fouled by a large oil spill would be temporarily unavailable to the people who would otherwise frequent them, but only during the period between landfall and cleanup of the oil. An indefinite lag period would follow during which stigma effects recede from public consciousness. The removal of structures during decommissioning can reverse the positive effects of structure presence for recreational resources by reducing recreational opportunities such as fishing and diving.

***Archaeological Resources*:** Unavoidable adverse impacts from routine OCS oil- and gas-related activities could lead to the loss of unique or significant archaeological resources. It is BOEM's policy to not approve any exploration plan or development operations coordination

document plan with known or potential archaeological resources within 152 m (500 ft) of the planned activity. BOEM will also not approve a pipeline application with known or potential archaeological resources within the pipeline corridor or right-of-way (the 61-m [200-ft] corridor in which the pipeline is to be constructed). For decommissioning activities, all known or potential (i.e., sidescan-sonar targets) archaeological resources sitting atop the seafloor, must be investigated before site clearance activities take place. If the presence of archaeological resources is confirmed, exceptions to the site clearance requirements at that location would be considered as described in NTL No. 2019-G05. Complete archaeological data recovery (excavation) would be required if BOEM decided that a permitted activity must take place that would cause an adverse impact to an archaeological resource.

Economic and Social Factors: Unavoidable adverse impacts from routine operations follow trends in supply and demand based on the commodity prices for oil, gas, and refined hydrocarbon products. Declines in oil and gas prices can lead to activity ramp downs by operators until prices rise. Decline in oil- and gas-related activity due to market fluctuations could have negative repercussions to social factors for those families and communities involved in oil and gas-related businesses. A large oil spill would cause temporary increases in economic activity associated with spill-response activity. An increase in economic activity from the response to a large spill could be offset by temporary work stoppages that are associated with spill-cause investigations and would involve a transfer or displacement of demand to different skill sets. Large spills and subsequent closures could impact the ability to pursue resource exploitation activities related to those areas closed, such as commercial, recreational, and subsistence fishing. Appreciation of sites of cultural importance could also be disrupted, which could, in turn, have negative impacts on social factors.

4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES.

Irreversible or irretrievable commitment of resources refers to impacts or losses to resources that cannot be reversed or recovered (e.g., when a species becomes extinct or when wetlands are permanently converted to open water). A lease itself does not approve the irretrievable production of hydrocarbons. All OCS oil- and gas-related activities would require additional BOEM reviews and approvals prior to any “on water” activities that would result in an irreversible or irretrievable commitment of resources. In addition, the Secretary retains discretion under OCSLA to, among others, cancel or suspend plans, activities, and permits at any time, so as to protect the environment (see 43 U.S.C. 1334(a)). Therefore, BOEM does not view an OCS oil and gas lease sale as an irreversible or irretrievable commitment of resources. Nevertheless, at BOEM’s discretion, this chapter discloses potential irreversible or irretrievable commitments of resources that could result from any approved OCS oil- and gas-related activities associated with an OCS oil and gas lease sale.

4.19.1 Coastal Communities and Habitats

An irreversible or irretrievable loss of wetlands and associated biological resources could occur if wetlands are permanently lost because of impacts caused by dredging and construction

activities that displace existing wetlands or from oil spills severe enough to cause permanent die-back of vegetation and conversion to open water.

4.19.2 Biological Resources

An irreversible loss or degradation of ecological habitat caused by cumulative activity tends to be incremental over the short term. Irretrievable loss may not occur unless or until a critical threshold is reached. It can be difficult or impossible to identify when that threshold is, or would be, reached.

4.19.2.1 Protected Species

Irreversible loss of individuals that are protected species (marine mammals, sea turtles, birds, and fish) could occur from an unintended vessel strike or after a large oil spill. Impacts could arise from the acute effects of being oiled or the chronic effects of oil having eliminated, reduced, or rendered suboptimal the food species upon which they were dependent. Whether the loss of individuals would lead to a permanent loss of that species that cannot be reversed or recovered would be dependent on the population status/condition of that species at the time of the loss of individuals. It can be difficult or impossible to identify or predict when that threshold is, or would be, reached.

4.19.2.2 Fishes and Invertebrates, Deepwater Benthic Communities and Habitats, Commercial Fisheries, and Recreational Fishing

Irreversible loss of any fish or invertebrate populations (or extinction of any fish or invertebrate species) is not expected.

Irreversible loss of benthic communities and habitats (including ESA-listed corals and designated coral critical habitats) may be caused by unintended large oil spills or unmitigated bottom disturbance. Irreversible loss of commercial fisheries, and recreational fishing, may be caused by structure removals or from unintended large oil spills.

4.19.3 Archaeological Resources

Any loss of discovered or undiscovered archaeological resources on or below the seafloor of the OCS in developed areas would be an irreversible and irretrievable commitment of resources.

4.19.4 Oil and Gas Development

Subsequent development and extraction of hydrocarbons as a result of a proposed action represents an irreversible and irretrievable commitment by the removal and consumption of non-renewable oil and gas resources.

4.19.5 Loss of Human and Animal Life

Any loss of human and animal life from unpredictable and unexpected acts of humans and nature (e.g., unavoidable accidents, accidents caused by human negligence or misinterpretation, human error, and adverse weather conditions) would be an irreversible and irretrievable commitment of resources. Some normal and required operations, such as structure removal, can kill sea life in proximity to explosive charges or by removal of the structure that served as the framework for invertebrates living on it and the fish that lived with it.

4.19.6 Permanent Taking of Seafloor

Should infrastructure by abandoned or DIP, it would permanently occupy the area of the seafloor within the infrastructure's footprint and the seafloor would not return to its natural state. In addition, the infrastructure may deteriorate over time and then not be structurally sound to remove, if it were necessary to do so.

4.20 Relationship Between the Short-Term Use of Human's Environment and the Maintenance and Enhancement of Long-Term Productivity

The short-term impacts on various components of the environment in the vicinity of the lease sale area are related to long-term impacts and the maintenance and enhancement of long-term productivity.

4.20.1 Short-Term Use

Short-term refers to the total duration of OCS oil- and gas-related activities (40-70 years as defined in this Programmatic EIS). Extraction and consumption of offshore oil and natural gas is a short-term benefit. Depleting a non-renewable resource now removes these domestic resources from being available for future use.

The specific impacts of an OCS oil and gas lease sale vary in kind, intensity, and duration according to the activities occurring at any given time (**Chapter 3**). Initial activities, such as seismic surveying and exploration drilling, result in short-term, localized impacts. Development drilling and well workovers occur sporadically throughout the life of an OCS oil and gas lease sale but also result in short-term, localized impacts. Activities during the production life of a structure or subsea development may result in chronic impacts over a longer period of time (over 25 years), potentially punctuated by more severe impacts as a result of accidental events or permanent impacts from development. Structure removal is also a short-term activity with localized impacts, including removal of artificial habitat for encrusting invertebrates and fish living among them and site clearance trawling of the seafloor. Many of the impacts on physical, biological, and socioeconomic resources discussed in **Chapter 4** are considered to be short term (being greatest during the construction, exploration, and early production phases). These impacts would be further reduced by the mitigating measures discussed in **Chapter 2.3**.

The OCS oil and gas development in the GOA region has enhanced some recreational and commercial activities. An OCS oil and gas lease sale could increase these incidental benefits by the presence of offshore development. As mineral resources become depleted, structure removals would occur and may result in a decline in these activities, but this could be offset by the Rigs-to-Reefs Program.

The short-term exploitation of hydrocarbons for the OCS Oil and Gas Program in the GOA may lead to long-term impacts on biologically sensitive resources and areas if an oil spill occurs. A spill and spill-response activity could temporarily interfere with commercial and recreational fishing, beach use, and tourism in the area where the spill makes landfall and in a wider area based on stigma effects. The proposed leasing may also result in onshore development and population increases that could cause very short-term adverse impacts to local community infrastructure, particularly in areas of low population and minimal existing industrial infrastructure.

4.20.2 Relationship to Long-Term Productivity

Long-term refers to an indefinite period beyond the termination of oil and gas production. Over a period of time after peak oil production has occurred in the GOA, a gradual easing of the specific impacts caused by oil and gas exploration and production would occur as the productive reservoirs in the GOA have been discovered, produced, and become depleted. However, infrastructure that has been decommissioned in place may still remain after OCS operations have ceased. That infrastructure has varying impacts to the resources of the GOA (detailed across **Chapter 4**) that would continue indefinitely.

After the completion of oil and gas production, a gradual ramp-down to economic conditions without OCS oil- and gas-related activity would be experienced, while the marine environment is generally expected to remain at or return to its normal long-term productivity levels. Primary productivity varies in the GOA from eutrophic coastal and estuarine waters to the oligotrophic deep ocean. Production on the shelf off the Mississippi River and within estuaries is approximately 300 grams carbon per m^2/yr. On the shelf, at a distance from the Mississippi and Atchafalaya Rivers or where upwelling is sparse, production is approximately 200 grams carbon per m^2/yr. Production is much lower in the surface waters over the deep GOA basin. Therefore, primary production in the GOA is dominated by processes along the margins of the GOA (Turner and Rabalais 2019). The interaction of numerous physical and chemical processes makes it difficult to understand the control of primary production, tease out trends, and relate any species or habitat responses to such production (Lohrenz et al. 1999). A more thorough discussion of primary production in the GOA is in BOEM's *Biological Environmental Background Report for the Gulf of Mexico OCS Region* (BOEM 2021a).

A major variable in the long-term productivity of the GOA environment is the influence of climate-related factors. The potential contributions to climate-related factors from a proposed leasing program, as well as substitute sources of energy in the absence of new OCS leasing are analyzed in **Appendix K**. GHGs were identified as one of the key drivers of climate-related factors, and

estimates of GHG emissions from the proposed action are presented. Planet-wide physical, chemical, and biological changes are substantially affecting the world's oceans, lands, and atmosphere. Observed harms of climate-related factors that can affect long-term environmental productivity were summarized based on an extensive literature review by Gevondyan et al. (2023) and include (1) effects of sea-level rise on shoreline degradation and erosion, (2) damages caused by increased severe weather effects, (3) ocean acidification effects, (4) impacts on the health of the environment, (5) impacts on the formation of hypoxic zones, (6) effects on marine life and fisheries, and (7) damages to historically significant heritage sites (Gevondyan et al. 2023). This Programmatic EIS includes specific descriptions of the impacts from climate-related factors on the resources of the GOA (**Chapters 4.1-4.17**) and includes GHG emissions estimates from a single OCS oil and gas lease sale in the GOA (**Appendix K**).

Major ecosystem services (i.e., positive benefits provided by ecosystems to humans) managed within the context of the GOA's large marine ecosystem include recreational and commercial fisheries, oil and gas production, and recreational resources (BOEM 2021a). To help sustain the long-term productivity of the GOA ecosystem, BOEM continues to improve the knowledge and mitigation practices used in offshore development to enhance the safe and environmentally responsible development of OCS oil and gas resources. The OCS Oil and Gas Program also provides for structures to be used as site-specific artificial reefs and fish-attracting devices for the benefit of commercial and recreational fishers, sport divers, and spear fishers.

APPENDIX A

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A REFERENCES

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APPENDIX B

IMPACT-PRODUCING FACTOR DESCRIPTIONS

B IMPACT-PRODUCING FACTOR DESCRIPTIONS

B.1 INTRODUCTION

This appendix provides more detailed descriptions of IPFs associated with a representative proposed oil and gas lease sale in the GOAR under any of the action alternatives. **Chapter B.2** describes the IPFs that may result from routine OCS oil and gas development activities. **Chapter B.3** describes accidental events which have the potential to occur throughout the lifetime of a lease. Finally, **Chapter B.4** describes cumulative activities from both the Cumulative OCS Oil and Gas Program scenario and non-OCS oil- and gas-related activities in the GOA region that could potentially affect biological, physical, and socioeconomic resources. See Chapter 2 of the GOM Oil and Gas SID for additional detailed descriptions of these IPFs. As described below, this information is incorporated by reference.

B.2 ROUTINE ACTIVITY IMPACT-PRODUCING FACTORS

BOEM identified the following IPF categories that commonly occur as a result of oil and gas exploration, development, production, and decommissioning on the Gulf of America OCS as discussed in **Chapter 3.2**.

B.2.1 Air Emissions and Pollution

The activities associated with OCS oil and gas leasing that emit air emissions include: (1) use of G&G survey vessels, (2) use of drilling and production vessels, and associated vessels, (3) use of support helicopters, (4) pipelaying operations, (5) flaring and venting, and (6) decommissioning of facilities and pipelines. Emissions from these activities would occur during exploration, development, production, and decommissioning activities. **Table B.2-1** lists the phase types and related equipment that are sources of emissions. For more information on how air emissions from OCS oil- and gas-related activities are reviewed and permitted, see Chapter 5.6 of the GOM Oil and Gas SID.

Table B.2-1. Sources of Emissions from OCS Oil- and Gas-Related Activities.

Phase Type	Source Type of Emissions	Potential Air Pollutants
Geological and Geophysical Surveys (including ancillary activities)	Diesel or gasoline engines	PM, CO, SO_2, NO_x, NH_3, VOCs, Pb, GHGs, and some HAPs
Exploration	Diesel or gasoline engines; fugitives (i.e., leaks from equipment components); losses from flashing (i.e., unrecovered gas); mud degassing; natural gas engines; natural gas, diesel, or dual fuel turbines; pneumatic controllers; and pneumatic pumps	PM, CO, SO_2, NO_x, NH_3, VOCs, Pb, GHGs, and some HAPs

Phase Type	Source Type of Emissions	Potential Air Pollutants
Development	Diesel or gasoline engines; fugitives (i.e., leaks from equipment components); losses from flashing (i.e., unrecovered gas); mud degassing; natural gas engines; natural gas, diesel, or dual fuel turbines; pneumatic controllers; and pneumatic pumps	PM, CO, SO_2, NO_x, NH_3, VOCs, Pb, GHGs, and some HAPs
Production	Diesel or gasoline engines; fugitives (i.e., leaks from equipment components); losses from flashing (i.e., unrecovered gas); mud degassing; natural gas engines; natural gas, diesel, or dual fuel turbines; pneumatic controllers; pneumatic pumps; amine units; boilers/heaters/burners; cold vents; glycol dehydrator units; loading operations (i.e., losses of vapors from tanks); and storage tanks	PM, CO, SO_2, NO_x, NH_3, VOCs, Pb, GHGs, and some HAPs
Decommissioning, Abandonment, and Removal Operations	Diesel or gasoline engines	PM, CO, SO_2, NO_x, NH_3, VOCs, Pb, GHGs, and some HAPs

CO = carbon monoxide; GHG = greenhouse gas; HAP = hazard air pollutant; NH_3 = ammonia; NO_x = nitrogen oxide; Pb = lead; PM = particulate matter; SO_2 = sulphur dioxide; VOC = volatile organic compound.

B.2.2 Discharges and Wastes

The primary operational wastes and discharges generated during offshore oil and gas exploration and development are drilling fluids, drill cuttings, various waters (e.g., bilge, ballast, fire, and cooling), deck drainage, sanitary wastes, and domestic wastes. During production activities, additional waste streams include water-based drilling mud and cuttings, produced water, produced sand, and well-treatment, workover, and completion fluids. Minor additional discharges may include desalination unit discharges, blowout preventer fluids, boiler blowdown discharges, excess cement slurry, several fluids used in subsea production, and uncontaminated fresh water and salt water. From the above list of wastes and discharges generated during offshore oil and gas activities, select ones are highlighted below to reflect new information and updates since the publication of the GOM Oil and Gas SID. The annual volume of produced waters has been updated through 2022, categorized by depth. Further, a joint industry study (AECOM and Marine Ventures International 2021) was published, which focused on well treatment, completion, and workover fluids discharged in the Gulf. Accidental oil spills and other types of unintended releases that can occur as a result of existing or future oil and gas operations in the GOA region are addressed separately in **Chapter 3.5** and **Appendix B.3.1**. For more detailed descriptions of discharges and wastes, refer to Chapter 2.2 of the GOM Oil and Gas SID.

B.2.2.1 Regulatory Framework for Oil and Gas Wastes and Discharges

B.2.2.1.1 Offshore Regulations

National Pollutant Discharge Elimination System

Discharges associated with oil- and gas-related activities in the Gulf of America OCS waters are permitted by the USEPA through the issuance of NPDES permits under the CWA, which primarily governs the discharge of pollutants into navigable waters and establishes water quality standards. Discharges to state waters are generally regulated by USEPA-authorized State program, but can be regulated directly by the USEPA if a state program is not authorized. Facilities in coastal waters, territorial seas, and onshore must also comply with the CWA in order to protect the environment.

The USEPA issues general and individual NPDES permits for a 5-year period. These permits are subject to renewal for subsequent 5-year periods. General permits are written for a specific industrial category within a limited geographic area. The general permit allows for streamlining of the permitting process for similar activities. Individual permits enhance the protection of sensitive resources while still allowing the development of energy resources. Individual permits provide more opportunity for USEPA evaluation and input to OCS oil and gas facility developments. Additional information may be found in the *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025).

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA), which is also under the authority of the USEPA, regulates the management of hazardous and non-hazardous waste, ensuring safe handling, treatment, and disposal from both onshore and offshore operations. Exploration and production wastes generated directly from offshore oil and gas activities are typically exempt from hazardous waste regulations under RCRA. This exemption is due to their distinct characteristics, the specialized regulatory frameworks that govern them, and the industry's established practices. Exploration and production waste and any hazardous waste must be assessed to determine if they fall under RCRA or NPDES jurisdiction. See Chapters 5.1.1 and 5.11 of the GOM Oil and Gas SID (BOEM 2023a) and BOEM's *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025) for more information about the CWA, RCRA, and BOEM 's and BSEE's approval processes and compliance programs pertaining to OCS oil- and gas-related discharges and wastes.

Plugged-and-Abandoned wells are sometimes repurposed as injection wells for wastewater disposal. Additionally, solid waste disposal beneath the seabed and offshore storage of materials from oil and gas development in the GOA region involves exempt exploration and production wastes under RCRA. These exempt wastes include drilling fluids, produced waters, and byproducts from oil, gas, or sulfur extraction. The exemption covers both sub-seabed disposal and offshore storage of exploration and production wastes with naturally occurring radioactive materials (NORM) above background levels. BSEE oversees these regulations, which are detailed in 30 CFR 250 and further

clarified in NTL No. 2009-G35. For more details, see Chapter 1.3.3.5.1 and Chapter 3.2.5 of the GOM Oil and Gas SID.

B.2.2.1.2 Onshore Management of Offshore-Generated Wastes

While many wastes from offshore oil and gas operations are discharged at sea under NPDES permits as described above, some wastes may need to be transported to shore for treatment and disposal in accordance with applicable regulations. The transportation of offshore-generated wastes to onshore facilities represents an important component of the overall waste management system for offshore oil and gas operations. Onshore facilities that receive and process these offshore-generated wastes must comply with different regulatory requirements than those governing offshore discharges. These facilities are issued general or individual permits from the USEPA or USEPA-authorized State programs that limit discharges specific to the facility type and the waterbody receiving the discharge. Point source discharges (such as pipe outfalls) and nonpoint sources (such as rainfall run-off from paved surfaces) are both regulated under these permits. Other wastes generated at these onshore facilities would be handled by local municipal and solid-waste facilities, which are also regulated by the USEPA or a USEPA-authorized State program.

B.2.2.1.3 Management of Vessel Generated Wastes

Vessels supporting offshore oil and gas operations may also generate discharges incidental to normal vessel operation, such as bilge water, ballast water, graywater, and deck washdown. Incidental vessel discharges are currently regulated by the USEPA through VIDA. VIDA establishes national standards for discharges incidental to the normal operation of primarily non-military and non-recreational vessels 79 ft (24 m) or greater in length into the waters of the United States or the waters of the contiguous zone. While VIDA regulations are being finalized, vessels must still comply with the 2013 VGP for specific waste discharges into offshore waters. The USCG is tasked with developing implementation, compliance, and enforcement regulations for those standards, which are expected to be finalized within two years after USEPA finalizes the performance standards in 2024 (USEPA 2023). The USEPA manages the issuance of the VGP. For further details, see Chapter 2.2.1 of the GOM Oil and Gas SID.

B.2.2.2 Offshore Operational Discharges and Wastes

B.2.2.2.1 Produced Water

Produced waters are a complex mixture, primarily consisting of formation water extracted during oil and gas recovery, but they may also contain injection water (seawater injected into reservoirs), well-treatment, completion, and workover compounds added downhole, and chemicals used in the separation process. These waters can include dissolved inorganic salts, hydrocarbons, trace metals, naturally occurring radioactive substances, and dissolved gases (Ahmadun et al. 2009; Neff et al. 1992). The composition of produced water varies depending on the geologic formation and the specific oil and gas extraction processes. It is the largest volume waste stream from oil and gas production. BOEM has reexamined the information for discharges and wastes presented in

Chapter 2.2.1.3 of the GOM Oil and Gas SID. The information is provided below on the volume of produced water in the OCS.

The effects of produced water on water quality are region-specific due to differences in local water chemistry, marine ecosystems, and discharge practices. Evidence suggests that the effects of produced water discharges may be limited to 1-2 km from the discharge source, depending on oceanographic conditions, particularly with current drilling techniques (Bakke et al. 2013). No two produced water waste streams are alike. Therefore, understanding the local characteristics of each region is essential for accurately assessing environmental risks and mitigating potential impacts.

BOEM maintains records of the volume of water produced from each leased block on the OCS and its disposition—injected on lease, injected off lease, transferred off lease, or discharged overboard. The amount discharged overboard for the years 2012-2023 is summarized by water depth in **Table B.2-2**. The total volume for all water depths during this 11-year period ranged from 356.6 to 537 million barrels of water, with the largest contribution (45-88 percent) coming from operations on the shelf.

Table B.2-2. Annual Volume of Produced Water Discharged by Depth (millions of barrels).

Year	Shelf (0-60 m)	Shelf (60-200 m)	Slope (200-400 m)	Deepwater (400-800 m)	Deepwater (800-1,600 m)	Ultra-Deepwater (1,601-2,400 m)	Ultra-Deepwater (>2,400 m)	Total
2012	240.8	109.1	20.8	35.0	71. 5	32.3	0.1	509.6
2013	248.8	104.2	20.0	33.1	76.0	36.9	0.3	519.3
2014	248.8	97.2	18.5	35.7	79.5	50.0	1.0	530.7
2015	244.0	102.1	15.0	40.8	83.2	50.6	1.3	537
2016	232.5	100.6	15.8	38.7	86.9	55.4	1.0	530.9
2017	212.1	93.4	14.7	33.4	82.8	65.6	1.6	503.6
2018	199.5	93.3	14.7	32.1	73.5	72.2	1.7	487.0
2019	181.5	82.7	15.5	29.3	80.3	84.7	2.3	476.3
2020	121.7	53.8	11.5	24.0	70.5	74.6	2.8	358.9
2021	107.6	52.9	9.3	21.7	76.5	84.9	3.5	356.6
2022	123.5	55.4	8.8	26.3	90.1	91.2	3.3	398.6
2023	116.4	57.4	9.4	29.1	104.1	105.9	3.9	426.2

Source: Gravois (2024).

B.2.2.2.2 Well-Treatment, Workover, and Completion Fluids

Well-treatment fluids are chemicals applied during the oil and gas extraction process. A wide variety of chemicals are used, including corrosion and scale inhibitors, bactericides, paraffin solvents, demulsifiers, foamers, defoamers, and water treatment chemicals (Boehm et al. 2001). Completion fluids are used to displace the drilling fluid and protect formation permeability. Workover fluids are used to maintain or improve existing well conditions and production rates on wells that have been in production. Workover operations include casing and subsurface equipment repairs, re-perforation, acidizing, and stimulating via hydraulic fracturing. A 2001 study discusses completion,

stimulation, and workover chemicals that are used in the GOA. This study lists and defines the types of chemicals used as well as providing examples for each category of chemical (Boehm et al. 2001, Table 3).

The USEPA Regions 4 and 6 allow the discharge of well-treatment, completion, and workover fluids if they meet the conditions of the NPDES permits. These regions prohibit the discharge of well-treatment, completion, and workover fluid with additives containing priority pollutants (e.g., benzene, toluene, lead, and mercury; the full list of priority pollutants can be found in Appendix A of 40 CFR 423). Additives containing priority pollutants must be monitored and those records kept. The well-treatment, completion, and workover fluids commingled with produced waters have technology-based and water quality-based limits. The well treatment, completion, and workover fluids not commingled with produced waters discharged have technology-based effluent limits. Further details can be found in **Chapter 4.2.2.1** as well as Chapter 2.2.1.4 of the GOM Oil and Gas SID.

Additional details on well-treatment, completion, and workover discharges can be found in the joint industry study on well-treatment, completion, and workover effluents discharged to the GOA (AECOM and Marine Ventures International 2021). The study was conducted to fulfill the requirements of the USEPA's general Gulf of America NPDES permits at that time. It revealed that discharges from well-treatment, completion, and workover fluids were brief and small in volume, with the median discharge duration being 1 hour and the median volume being 473 bbl, representing a very small fraction of the produced water discharged during the same period. The total volume of all well-treatment, completion, and workover discharges from 2019-2021 was estimated to be only 0.01% of the produced water discharges (AECOM and Marine Ventures International 2021). Given the brief duration and small volume of these discharges, the study concluded that they are unlikely to pose a greater environmental risk than produced water discharges. However, it also found that the toxicity of completion fluids was linked to calcium concentrations, while the toxicities of workover and treatment fluids were associated with total organic carbon, dissolved organic carbon, and total suspended solids (AECOM and Marine Ventures International 2021).

Another possible, but limited, waste stream associated with completion fluids is radioactive tracer beads. Radioactive tracers embedded in ceramic beads are sometimes used to monitor fluid flow patterns in wellbores and surrounding formations, assess fractures in oil wells, evaluate permeability, and conduct injection profiling during offshore oil and gas operations (U.S. Nuclear Regulatory Commission 2023b). The radioisotopes do not leach from the beads and and have a short half-life of 70 to 84 days. Nearly all the tracer material would remain in formation, while a minor amount would be entrained with the slurry of proppant and well completion fluids that is returned to the surface (U.S. Nuclear Regulatory Commission 2023a). These beads are not covered by NPDES permits but are instead regulated by the Nuclear Regulatory Commission (NRC). The use of these short-lived radioactive tracers operations have been assessed and determined to have no significant environmental impacts (88 FR 85330 ; U.S. Nuclear Regulatory Commission 2023b). Operations must comply with the regulations outlined in 10 CFR 20.1301, 10 CFR 20.1302, and 10 CFR 20.2001(a)(3) concerning the discharge of effluents containing low levels of radioactive

materials. To ensure compliance, the NRC has set a dose limit of 1 mSv/year (0.1 rem/year) for safety.

B.2.2.2.3 Drilling Muds and Cuttings

Drilling fluids, or drilling muds, play a crucial role in drilling operations by facilitating the removal of cuttings, maintaining well pressure, and cooling the drill string. These fluids consist of water-based fluids (WBFs) and nonaqueous-based fluids (OBFs and synthetic-based fluids, SBFs), which are regulated under the USEPA NPDES permitting process. WBFs are commonly used in offshore operations and are allowed for discharge under certain conditions, though they can cause increased turbidity and sediment changes. SBFs, developed in the 1990s due to their lower toxicity and faster biodegradation rates, are preferred for deeper drilling. While the discharge of SBF muds is prohibited under the USEPA Region 4 and Region 6 NPDES general permits, SBF-wetted cuttings can be discharged if they comply with toxicity and biodegradation standards. Research has indicated that SBFs disperse, settle, and biodegrade with minimal environmental impact (Boland et al. 2004). Additionally, barite, a common weighting agent in drilling fluids, is monitored for trace metal impurities, with USEPA regulations ensuring low concentrations to mitigate environmental risks (Crecelius et al. 2007; Neff 2002). Overall, advancements in drilling fluid technologies aim to improve operational efficiency while reducing ecological impacts. For further details, refer to Chapter 2.2.1.1 of the GOM Oil and Gas SID.

B.2.3 Bottom Disturbance

Bottom disturbance can be caused by activities associated with offshore oil and gas exploration, development, production, and decommissioning. The largest impact-producing factors include drilling, subsea infrastructure (including pipeline and umbilical installations), and anchor emplacement and infrastructure removals (including site clearance trawling). Some decommissioned structures, with reef-in-place permit approval, may be partially removed or toppled in place in their current OCS block locations. In addition, decommissioned structures may be fully removed or transported to a pre-approved reef site. While production structures are generally removed, it is anticipated that the majority of pipelines and other appurtenances or types of equipment (e.g., manifolds, pipeline end terminals, umbilical lines, etc.) would be allowed by BSEE to remain on the seafloor (i.e., decommissioned in place), as allowed under certain conditions in 30 CFR part 250 and which includes additional NEPA review by BOEM (refer to Chapter 5.2.7.3 of the GOM Oil and Gas SID). However, as of October 2016, BSEE typically requires removal of decommissioned pipelines in SSRAs. Similarly, pipeline-related infrastructure (e.g., manifolds and end terminations) in water depths less than 600 ft (182 m) are typically removed and obstructions cleared given the potential for obstruction or interference with other uses of the OCS, like commercial trawling fisheries.

BOEM's NTL No. 2009-G04 states that bottom disturbing activities (including surface or near-surface emplacement of platforms, wells, drilling rigs, pipelines, umbilicals, and cables) must avoid, to the maximum extent practicable, significant OCS sediment resources. Therefore, additional impacts from bottom disturbances associated with pipeline, umbilical, or other appurtenance installation and decommissioning (whether abandoned-in-place or removed) as a result of a

proposed action, would be reduced. Although additional bottom disturbances would be minimized, there would be permanent impacts associated with decommissioned in-place subsea infrastructure. Based on current industry practices and the application of lease stipulations, NTLs, conditions of approval, and other regulatory requirements, it is anticipated that wells would be drilled on soft seabed and that sensitive benthic features on hard bottoms or with topographic relief would be avoided. Chapters 2.3 and 2.3.1 of the GOM Oil and Gas SID provide detailed descriptions of activities associated with these IPFs, including detail on decommissioning in place or by removal.

B.2.4 Noise

Noise is generated from offshore oil- and gas-related activities including G&G surveys, vessels, helicopters and aircraft traffic, drilling and production operations, pipeline trenching, construction, and decommissioning. Noise from these activities is described in more detail in Chapter 2.4 of the GOM Oil and Gas SID. Sound sources can generally be divided into two categories, impulsive and non-impulsive.

B.2.4.1 Impulsive Sound Sources

Impulsive noises are generally considered powerful sounds with relatively short durations, broadband frequency content, and rapid rise times to peak levels. Impulsive or pulsed sounds associated with offshore oil- and gas-related activities include impact pile driving (structures and well casings), seismic airguns, some HRG sources (e.g., sub-bottom profilers and sparkers), and explosive severance methods for decommissioning.

Airgun noise frequency ranges from 10 to 5,000 Hz, with most acoustic energy concentrated below 250 Hz. Airguns are the most common impulsive sound source used by the offshore oil and gas industry. Impact pile driving also generates a high energy acoustic pulse with each hammer strike, which operates at a rate of 15-60 blows per minute and requires 500-5,000 strokes to drive the pile into the seabed (Jiménez-Arranz et al. 2020b). In addition, structures may be removed with explosives placed inside structure legs or conductors 15 to 25 ft (4.6 to 7.6 m) below the seafloor, creating short-term, but potentially substantial impulsive noise. Frequencies for additional sources are provided in Chapter 2.4 and Figure 4.3.6-3 of the GOM Oil and Gas SID.

B.2.4.2 Non-Impulsive Sound Sources

Non-impulsive noise associated with offshore oil- and gas-related activities generally includes all other noise and includes continuous anthropogenic noise from vessels, aircrafts, drilling and production, pipe-laying, and mechanical severance methods for decommissioning. The noise generated by vessels generally increases with vessel size and vessel speed (Jiménez-Arranz et al. 2020a). The primary sources of vessel noise are the propeller and machinery. Machinery noise can be continuous or transient and can vary in intensity.

Helicopters and fixed-wing aircraft generate noise from their engines, airframe, and propellers, which can be substantial in the air when flying near sensitive areas such as national

parks and wildlife refuges, or near surfacing marine mammals or other sensitive species. Noise from passing aircraft is more localized in water than it is in air, however, and typically is limited to frequencies <1,000 Hz (Richardson et al. 1995).

The main sources of sound during offshore drilling and production include machinery and drilling equipment such as pumps, compressors, and generators; mechanical noise from the drill; dynamic positioning and propulsion systems; and associated aircraft and vessel support. Mechanical (i.e., non-explosive) severance methods, such as tungsten-carbide blade, diamond wire or hydraulic sheer cutters to remove decommissioned structures and caissons, create non-impulsive noise as opposed to the impulsive sound created from explosives. Vessel and helicopter traffic would also occur in the vicinity of structures and pipelines undergoing decommissioning.

Offshore pipe-laying uses plow and jet burial, which generates continuous, transient, and variable sound levels typically 20-1,000 Hz in frequency range (Nedwell and Edwards 2004). Pipe-laying activity itself is unlikely to have a noticeable contribution to the sound field. The largest contribution comes instead from the pipe-laying vessel(s), supply ships and tugs, moving anchors, trenching and backfilling (Johansson and Andersson 2012). During pipe-laying, up to 10 vessels can operate in the same area, which would also contribute to the overall sound levels (Jiménez-Arranz et al. 2020a). Pipe-laying vessels used for pipeline decommissioning activities would also contribute to overall sound levels.

B.2.5 Coastal Land Use/Modification

Coastal infrastructure, for the purposes of BOEM's analysis, refers specifically to onshore oil- and gas-related infrastructure that provides support for offshore OCS oil- and gas-related activities. Many of these impacts occur in counties and parishes along the GOA region. BOEM aggregates 133 GOA counties and parishes into 23 EIAs based on economic and demographic similarities among counties/parishes (**Figure B.2-1**).

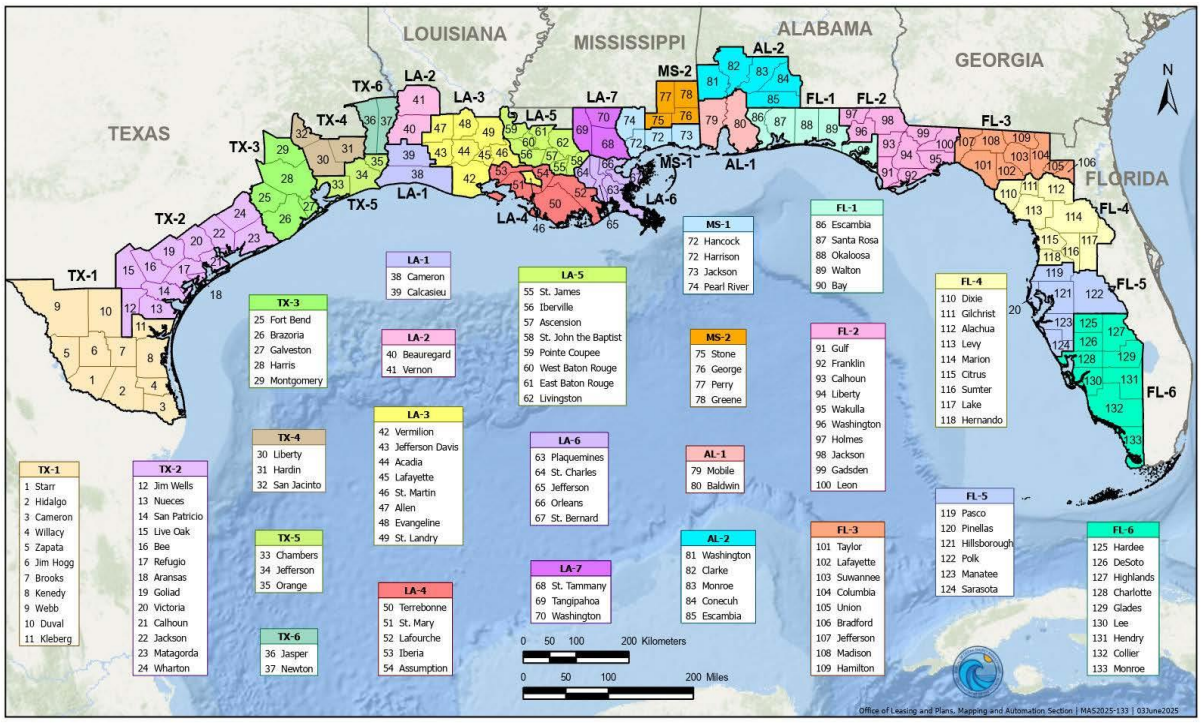

Figure B.2-1. Economic Impact Areas in the Gulf of America Region.

Oil and gas exploration, production, development, and decommissioning activities on the OCS are supported by an expansive and mature onshore infrastructure industry. It includes large and small companies providing an array of services from construction facilities, service bases, and waste disposal facilities to crew, supply, and product transportation, as well as processing facilities (Dismukes 2024). Companies are engaged in various contract work such as geological and geophysical exploration, drilling, derrick building, repairing and dismantling of oil and gas fields, building oil and gas well foundations, excavating mud pits, gas well rig building, repairing and dismantling, and well completions and stimulation. Existing onshore oil and gas infrastructure is expected to be sufficient to handle development associated with a proposed action. Should there be some expansion at current facilities, the land in the analysis area is sufficient to handle such development. While a proposed OCS oil and gas lease sale and subsequent OCS oil- and gas-related activity would contribute to the continued need for maintenance dredging of existing navigation channels. A mature network of navigation channels already exists in the analysis area; therefore, new navigation channel construction as a direct result of a future proposed OCS oil and gas lease sale is not likely (Dismukes 2011).

The activities and factors outlined in Chapter 2.5.1 of the GOM Oil and Gas SID and Dismukes (2024) reflect the already well-established industrial infrastructure network in the GOA region and fluctuations in OCS oil- and gas-related activity levels.

B.2.6 Lighting and Visual Impacts

As described in Chapter 2.6 of the GOM Oil and Gas SID, this IPF broadly addresses the extent to which offshore activities (both OCS oil- and gas-related and other factors) introduce infrastructure presence and produce light emissions that (1) create annoyance or interfere with activities; (2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment; or (3) provide safety and security by illuminating dark areas. Visual effects can be difficult to define and assess because they involve subjectivity.

The placement or removal of infrastructure, both offshore and onshore, could alter the existing landscapes and seascapes. Depending on the location of offshore blocks leased and whether or not those blocks are successfully explored and developed, nearby coastal areas could experience the introduction of new infrastructure and increased activity both offshore and onshore that could alter the visual aesthetics of the existing coastal landscapes and seascapes. Many of these potential impacts arise from new structures and activities visible during the day, but potential impacts could also arise from the lighting used on structures, service vessels, and coastal infrastructure, including night sky disturbances, especially for visitors at State or National parks (see Chapters 2.7.2.1 and 4.4.5.2 of the GOM Oil and Gas SID).

B.2.7 Offshore Habitat Modification/Space Use

As described in Chapters 2.7 and 2.7.1 of the GOM Oil and Gas SID, habitats and other specific areas of the OCS offer environmental, recreational, economic, historical, cultural, and/or social values in the same geographic area. Modification and/or use of these areas can be divided based on which space or habitat is being used, i.e., the space above the water (airspace), the water column, and the seafloor.

The placement or removal of OCS oil and gas infrastructure can create alterations to the existing land- and seascapes (i.e., the physical habitat) including seabed, water column, and/or sea surface habitats. The OCS oil- and gas-related operations that can potentially create, remove, modify, or occupy space or habitat(s) include G&G surveys, bottom surveys, pipelines and subsea system installation, maintenance and removal, and the installation of surface or subsurface bottom-founded production structures with anchor cables and safety zones. Service-vessel and helicopter traffic in support of OCS oil and gas development would also occupy space above the water surface.

B.2.8 Socioeconomic Changes and Drivers

As described in Chapters 2.8 and 2.8.1 of the GOM Oil and Gas SID, this IPF broadly addresses the extent to which OCS oil- and gas-related activities produce socioeconomic changes. Because people plan for, instigate, avoid, and react to changes in myriad ways, socioeconomic considerations are also drivers of change in the offshore oil and gas industry and elsewhere in society. Changes, in turn, cause additional changes with their own impacts. These impacts are often

interpreted subjectively and can be perceived as positive, negative, or neutral, often simultaneously, for multiple reasons and by multiple groups of people.

The oil and gas industry is one element in the socioeconomic landscape of the GOA region. The GOA region's socioeconomic landscape is rich and varied, representing diverse peoples, cultures, ways of life, and industries. Six economic sectors depend on the ocean, including living resources (e.g., seafood), marine construction, marine transportation, offshore mineral extraction (mostly made up of offshore oil and gas activities), ship and boat building, and recreation and tourism.

Offshore oil and gas activity in the GOA contributes substantially to regional employment and incomes arising from industry expenditures, government revenues, corporate profits, and other market impacts. The GOA region's ocean economy is dominated by offshore mineral extraction, which puts this region at the top in terms of gross domestic product when compared to the marine economy of other U.S. regions analyzed by NOAA (NOAA 2019). Likewise, the GOA ocean economy has above-average wages, which is largely due to the high wages found in the offshore mineral extraction sector (NOAA 2019). The heavy presence of the oil and gas industry also contributes to the culture and sense of place in many communities in the GOA region, many of which are concentrated along the adjacent coasts. As many offshore fields reach the end of their economic life, decommissioning is becoming a larger part of the oil and gas industry sector. This shift could create more decommissioning jobs, as well as new vessel designs, specialized cutting tools, and underwater drones to streamline the process—all of which are expected to be substantial economic factors in terms of oil and gas industry costs and revenues over the next 40-70 years. A study estimates that approximately 10,500 jobs per year could be supported by state and federal offshore plug-and-abandonment activities, generating $632 million in labor income and contributing $1.185 billion in value added to GDP (Agerton et al. 2022).

B.3 ACCIDENTAL EVENT IMPACT-PRODUCING FACTORS

While industry practices and government regulations minimize the risks, the potential for oil spills and other accidental events as a consequence of routine activities or operations throughout the lifetime of a lease still exists. Accidental events are unauthorized events. They are examined separately due to their potential to occur and cause significant human and environmental impacts. Types of reasonably foreseeable accidental events include releases into the environment (e.g., oil spills, loss of well control, accidental air emissions, pipeline failures, chemical and drilling fluid spills, and trash and debris), strikes and collisions (e.g., helicopter, service vessels, structures, and protected species), and response activities. Substantial preventative measures and Federal regulatory requirements from prevention to accident response are summarized below and described in greater detail in Chapter 2.9 of the GOM Oil and Gas SID.

B.3.1 Unintended Releases into the Environment

B.3.1.1 Oil Spills and Oil-Spill Analysis Summary

The following sections discuss aspects of oil spills relevant to potential oil and gas exploration and development activities in OCS planning areas along the Gulf Coast. Oil-spill events cannot be predicted but the probability of occurrence can be estimated using historical spill rates and projected volumes of oil production and transportation. BOEM uses the OSRA model to estimate the probabilities of future oil spills and their estimated trajectories (Ji and Schiff 2023). The model uses the most recent historical oil-spill occurrence rates (ABS Consulting Inc. 2016) combined with the aforementioned projected oil production and transportation volumes. Recent modeling with a higher-resolution ocean circulation dataset simulating the *Deepwater Horizon* oil spill shows promise for future implementation of OSRA trajectory estimations (Chassignet 2025; Ntaganou et al. 2024). Improvements to estimated probabilities and trajectories from this dataset would be incremental as ocean currents are just one of the several variables required for an OSRA model run. Additional work would also be required to integrate these data into OSRA because a larger dataset would bring computational challenges that would need to be resolved prior to model integration. In addition to the analysis of offshore spills provided by the OSRA report, this chapter also summarizes information pertaining to coastal spills and historical trends in OCS spills (refer to Chapter 2.9.1.1. of the GOM Oil and Gas SID).

The OSRA report provides occurrence and impact probability estimates for two spill size categories, >1,000 bbl and >10,000 bbl, which are discussed in this chapter along with historical spill rates. Spills <1,000 bbl are not analyzed in the OSRA model for two reasons: (1) the data on spills <1,000 bbl has the potential for greater error owing to the difficulty in estimating and consistently reporting small volumes spills; (2) Spills <1,000 bbl are unlikely to persist long enough in the environment for adequate trajectory simulations since physical and chemical processes (e.g., weathering) begin affecting the oil once it spills into an ocean environment. In addition, the persistence of crude oils varies as their chemical compositions differ, primarily governed by the geologic conditions under which they were formed, the formations through which they migrated, and the reservoirs where they accumulated. Taken together, this makes an OSRA model analysis of spills >1,000 bbl and >10,000 bbl more robust than would be possible with spills <1,000 bbl.

Numerous oils collected from the GOA (U.S. waters) are included in Environment Canada (2022) oil properties database, which provides details of chemical composition. The American Petroleum Institute gravity is a common measure of the relative density of crude oil and is expressed in degrees (°API) with water having a value of 10° API. An API >10° indicates that the oil will float on water. The database includes API gravities and GOA oils are in the range of 15° to 60°. **Table B.3-1** describes the properties and persistence of oil by component groups.

Table B.3-1. Properties and Persistence by Oil Component Group.

Properties and Persistence	Light Weight	Medium Weight	Heavy Weight
Hydrocarbon Compounds	Up to 10 carbon atoms	10-22 carbon atoms	>20 carbon atoms
API º	>31.1º	31.1º-22.3º	<22.3º
Evaporation Rate	Rapid (within 1 day) and complete	Up to several days; not complete at ambient temperatures	Negligible
Solubility in Water	High	Low (at most a few mg/L)	Negligible
Acute Toxicity	High due to monoaromatic hydrocarbons (BTEX)	Moderate due to diaromatic hydrocarbons (naphthalenes – 2 ring PAHs)	Low, except due to smothering (i.e., heavier oils may sink)
Chronic Toxicity	None, does not persist due to evaporation	PAH components (e.g., naphthalenes – 2 ring PAHs)	PAH components (e.g., phenanthrene, anthracene – 3 ring PAHs)
Bioaccumulation Potential	None, does not persist due to evaporation	Moderate	Low, may bioaccumulate through sediment sorption
Compositional Majority	Alkanes and cycloalkanes	Alkanes that are readily degraded	Waxes, asphaltenes, and polar compounds (not significantly bioavailable or toxic)
Persistence	Low due to evaporation	Alkanes readily degrade, but the diaromatic hydrocarbons are more persistent	High; very low degradation rates and can persist in sediments as tarballs or asphalt pavements

API = American Petroleum Institute; BTEX = benzene, toluene, ethylbenzene, and xylene; mg/L = milligram per liter; PAH = polycyclic aromatic hydrocarbons.
Sources: Lee et al. (2015); Michel (1992).

Analysis of Offshore Spills ≥1,000 bbl

Oil spill occurrence rates (i.e., the number of spills based on the amount of oil handled over a particular period of time) in the OCS are a fundamental component to analysis of spills ≥1,000 bbl. **Table B.3-2** shows the most recent published spill occurrence rates (ABS Consulting Inc. 2016) for multiple size categories and across three spill sources: platform, pipeline, and both combined. These values are expressed as the number of spills per billion barrels of oil handled (spills/BBO), derived from the distribution of oil spills by spill sources from 2001 through 2015. Spill size categories broken down more than those in **Table B.3-2** are available in the ABS Consulting Inc. (2016) report. There is an inverse relationship between spill size and spill occurrence rate: as spill size increases, the spill occurrence rate decreases (ABS Consulting Inc. 2016). Note that these oil-spill rate data do not predict the future probabilities of oil spills. Rather, the OSRA model provides these estimates for its two spill size categories (>1,000 bbl and >10,000 bbl) as probabilities of one or more spills occurring, as discussed below.

Table B.3-2. Previously Reported Spill Rates in OCS Offshore Waters from an Accident Related to Rig/Platform and Pipeline Activities.

Spill Size Category (bbl)	Spill Source	Spill Rate (spills/BBO)
10-<50	Combined	16.6
50-<500	Combined	12.5
500-<1,000	Combined	1.6
≥1,000-9,999	Platform	0.25
≥10,000	Platform	0.13
≥1,000-9,999	Pipeline	0.38
≥10,000	Pipeline	0.07

[1] Spill rates are from the most recent update on oil-spill occurrence rates for offshore oil spills in the Gulf of America (ABS Consulting Inc. 2016).

The probabilities for offshore oil spill occurrences (>1,000 bbl and >10,000 bbl) resulting from a single representative proposed GOA oil and gas lease sale and the Cumulative OCS Oil and Gas Program can be found in the latest OSRA report (Ji and Schiff 2023). These probabilities are provided with ranges that correspond to the low and high regionwide forecasted oil production. For spill volumes ≥1,000 bbl, the probability of one or more spills occurring ranged from 3 percent (low production estimate) to 37 percent (high production estimate) for a single proposed OCS oil and gas lease sale and 30 percent to 99 percent for the Cumulative OCS Oil and Gas Program (see Table A-1 of Ji and Schiff 2023). For offshore oil spills ≥10,000 bbl, the probability ranged from 1 percent to 14 percent for a single proposed OCS oil and gas lease sale and from 11 percent to 78 percent for the Cumulative OCS Oil and Gas Program (see Table A-2 of Ji and Schiff 2023). The estimated probability for pipeline spills that are ≥10,000 bbl ranged from <0.5 percent to 5 percent for a single proposed OCS oil and gas lease sale, and 1 percent to 9 percent for platforms. For the Cumulative OCS Oil and Gas Program, these estimates are 4 percent to 41 percent and 7 percent to 63 percent, respectively. The OSRA model also estimates the chance of oil spills occurring during the production and transportation of a specific volume of oil over the lifetime of the analyzed scenario. The analysis period for a single OCS oil and gas lease sale is 40 years and for the Cumulative OCS Oil and Gas Program it is 70 years. The estimation process uses a spill rate constant, based on historical spills ≥1,000 bbl and ≥10,000 bbl, expressed as a mean number of spills per billion barrels of oil handled. The low estimate and high estimate of projected oil production for a single representative proposed OCS oil and gas lease sale (**Table 3.3-1**) for each alternative and for the Cumulative OCS Oil and Gas Program (2024-2093) are used for this analysis. For the most recent comprehensive analysis of OCS spill-rate methodologies and trends in the GOA, refer to ABS Consulting Inc. (2016), which will be updated by a contracted report on oil spill occurrence rates to cover years after 2015 (BOEM 2023c).

On November 16, 2023, an underwater pipeline ruptured approximately 19 mi (31 km) off the southeast coast of Louisiana and has since been sealed to prevent further leakage of oil. Since November 21, 2023, no new or continuous oil discharge has been reported (NOAA 2023b). The investigation is ongoing, and the maximum potential spill volume for the incident is approximately 26,000 bbl, with indication that it is at least 10,000 bbl in size. Dispersants were not reported to have

been used in response activities (NOAA 2023a), and there have been no reported wildlife or shoreline impacts (USCG 2023). The USCG provided a final update on April 8, 2024 confirming a successful line integrity test after a completed repair to the pipeline system in February 2024 (USCG 2024).

Offshore Spills <1,000 bbl

BOEM does not provide future estimates or probabilities for spills <1,000 bbl because these are not analyzed by the OSRA model, as explained above. However, they are worth noting because spills <1,000 bbl are the most commonly occurring spills and comprise over 98 percent of platform spills that have occurred from 1974 through 2015 and over 96 percent of pipeline spills from 1964 through 2015 (ABS Consulting Inc. 2016). Between 2001 and 2015, the average spill size for pipeline spills was 77 bbl. About 65 percent of platform spills had volumes between 1 and 5 bbl, and about 53 percent of pipeline spill volumes were between 1 and 5 bbl. Aggregated data from 2016-2022 reported by BSEE's Offshore Safety Improvement Branch (which does not distinguish spill source and has limited spill size categories) show that most spills were less than 50 bbl (BSEE 2023).

Coastal Spills

Spills that occur in State offshore waters and/or navigation channels, rivers, and bays (coastal waters) from barges and pipelines carrying OCS-produced oil are referred to as coastal spills (refer to Chapter 2.9.1.1 of the GOM Oil and Gas SID). These spills occur at shoreline storage, processing, and transport facilities supporting the OCS oil and gas industry. BOEM projects that most (>90%) oil produced following a proposed action under Alternative B, C, or D would be brought ashore via pipelines to oil pipeline shore bases, stored at these facilities, and eventually transferred via pipeline or barge to GOA region coastal refineries. Because oil is commingled at shore bases and cannot be directly attributed to a particular OCS oil and gas lease sale, this analysis of coastal spills addresses those that could occur before the oil arrives at the initial shoreline facility. It is also possible that non-OCS oil may be commingled with OCS oil at these facilities or during subsequent secondary transport.

The number of spills that have occurred in GOA coastal waters between January 2002 and July 2015 are detailed for each state in Table 2.9.1-2 of the GOM Oil and Gas SID, although the data made available for researchers by USCG has not been updated past 2015 (USCG 2015). When limited to just offshore oil- and gas-related spill sources such as platforms, pipelines, MODUs, and support vessels, the number and most likely spill sizes to occur in coastal waters in the future are expected to resemble the patterns that have occurred in the past as long as the level of energy-related commercial and recreational activities remain the same. The coastal waters of Louisiana, Texas, Mississippi, Alabama, and Florida have had a total of 165, 7, 3.2, 0.2, and 0 spills <1,000 bbl/yr, respectively. Assuming future trends would reflect past historical records, it is also predicted that Louisiana would be the state most likely to have a spill ≥1,000 bbl occur in water 0-3 mi (0-5 km) offshore. In July 2024, there was a coastal gas condensate spill within Texas state waters in High Island Block 98. The USCG National Response Center Report No. 1405015 (BSEE 2024) indicates

about 5 gallons were spilled due to a leaking pipeline riser. The riser was repaired in July 2024 (Schiff 2024).

Trends in OCS Spills

The overall trend with oil-spill occurrences in the GOA shows a decrease since the 1970s, especially with regards to operational spills that are unrelated to hurricanes (ABS Consulting Inc. 2016; Chapter 2.9.1.1 of the GOM Oil and Gas SID). Catastrophic spills are rare. The volume of the *Deepwater Horizon* oil spill in 2010 was so large that it overwhelmed the rest of the record of total oil-spill volume (ABS Consulting Inc. 2016; Anderson et al. 2012) and is considered an outlier (Ji et al. 2014). For this reason, the previously mentioned oil-spill occurrence rate reports provide statistical estimates that exclude the *Deepwater Horizon* oil spill. However, it is still considered in the baseline for impact analyses in **Chapter 4**. In accordance with CEQ guidelines to provide decisionmakers with a robust environmental analysis, the GOM Catastrophic Spill Event Analysis technical report (BOEM 2021) provides an analysis of the potential impacts of a low-probability catastrophic oil spill, which is not part of a proposed action and not likely expected to occur, to the environmental and cultural resources and the socioeconomic conditions analyzed in **Chapter 4**.

The dominant factor for the overall decrease in spill occurrences since the 1970s possibly stems from fewer equipment failures, driven by technological improvements and regulations in design and safety of new and existing GOA structures (ABS Consulting Inc. 2016). For example, NTL No. 2007-G26 provided guidance in the design of new OCS platforms and related structures to better withstand hurricane conditions, which have played a significant role in past oil-spill occurrences. From 2001 through 2015, hurricanes were the primary cause of most pipeline spills and caused 4 of the 20 pipeline spills classified as large from 1974 through 2015. Most platform spills were operational (non-hurricane) spills except for the years 2005-2009 where the major cause was multiple hurricane events. For spills after 2015, aggregated data on industry activities from BSEE (for years 2010-2022), which includes data for spill volumes >1-50 bbl and >50 bbl, shows that spill occurrences continue to have low frequency and follow the overall trend since the 1970s (BSEE 2023). For the years 2016-2022, an average of approximately 8 spills >1 bbl but <50 bbl occurred per year, and one spill occurred annually on average for spills > 50 bbl. BOEM has developed a study profile that will contract a new report that updates oil-spill occurrence rates after 2015 and through 2024 that will also be the basis of future oil spill risk analysis (BOEM 2023c).

B.3.1.2 Chemical and Drilling Fluid Spills

Chemicals and synthetic-based drilling fluids are used in offshore oil and gas drilling and production activities and may be spilled to the environment due to equipment failure, inclement weather, accidental collision, or human error.

Chemicals are stored and used to condition drilling muds during production and in well completions, stimulation, and workover procedures. The chemicals that are used in the largest volumes, well completion, workover, and treatment fluids, generally are spilled in the largest volumes. Zinc bromide ($ZnBr_2$), a treatment fluid, is of particular concern because it is persistent

(nondegradable) and is comparatively toxic (Chapter 2.2.1.4 of the GOM Oil and Gas SID). The only two chemicals that could potentially impact the marine environment are $ZnBr_2$ and ammonium chloride (NH_4Cl) (Boehm et al. 2001). NH4Cl transforms to produce NH_3, which is toxic to fish and other marine life. Other common chemicals spilled include methanol (CH_3OH) and ethylene glycol ($C_2H_6O_2$), which are used in deepwater operations to prevent gas hydrates formation. These alcohol-based chemicals are nonpersistent (degradable) and exhibit comparatively low toxicity.

Synthetic-based fluid (SBF) has typically been used since the mid-1990s for the deeper well sections because of its superior performance. The synthetic oil used in SBF is relatively nontoxic (compared to crude oil) to the marine environment and has the potential to biodegrade. However, SBF is considered more toxic than water-based drilling fluid, and spills of SBF are categorized separately from water-based fluid releases. Accidental riser disconnections can result in the release of large quantities of drilling fluids like SBFs.

Refer to **Table B.3-3 and Table B.3-4** for information on spill statistics for chemicals and SBFs for the period of 2013-2023 (BSEE 2024). BSEE reports spill statistics for chemicals and SBFs in categories of 10-49 bbl (small spills) and >50 bbl (large spills). **Table B.3-3 and Table B.3-4** show the total annual spill volumes in barrels of product lost for SBFs and chemicals in both spill size categories. The number of spill incidents per year are listed with the mean spill volume in barrels for a given year.

Table B.3-3. Number and Volume of Chemical Spills that Occurred from 2013 to 2022 in Two Spill Size Categories: Spills Between 10 and 49 Barrels (shaded) and Spills >50 Barrels.

Spill Size (bbl)	Year	Total Product Lost (bbl)	Number of Spills	Mean Spill Volume (bbl)
10-49	2013	20	1	20
10-49	2014	0	0	0
10-49	2015	41	1	41
10-49	2016	78	3	26
10-49	2017	0	0	0
10-49	2018	35	1	35
10-49	2019	0	0	0
10-49	2020	0	0	0
10-49	2021	19	1	19
10-49	2022	42	2	21
10-49	2023	103	4	26
>50	2013	0	0	0
>50	2014	66	1	66
>50	2015	628	2	314
>50	2016	1,274	2	637
>50	2017	0	0	0
>50	2018	713	3	238

Spill Size (bbl)	Year	Total Product Lost (bbl)	Number of Spills	Mean Spill Volume (bbl)
>50	2019	0	0	0
>50	2020	0	0	0
>50	2021	88	1	88
>50	2022	608	2	304
>50	2023	65	1	65

Table B.3-4. Number and Volume of Synthetic-Based Fluid Spills that Occurred from 2013 to 2022 in Two Spill Size Categories: Spills Between 10 and 49 Barrels (shaded) and Spills >50 Barrels.

Spill Size (bbl)	Year	Total Product Lost (bbl)	Number of Spills	Mean Spill Volume (bbl)
10-49	2013	51	2	26
10-49	2014	0	0	0
10-49	2015	12	1	12
10-49	2016	0	0	0
10-49	2017	29	1	29
10-49	2018	0	0	0
10-49	2019	0	0	0
10-49	2020	15.6	1	16
10-49	2021	30	1	30
10-49	2022	32.9	2	16
10-49	2023	35	2	17.5
>50	2013	0	0	0
>50	2014	323	1	108
>50	2015	2,712	2	904
>50	2016	175	2	175
>50	2017	165	0	83
>50	2018	2,270	3	757
>50	2019	139	0	46
>50	2020	192	0	96
>50	2021	65	1	65
>50	2022	0	0	0
>50	2023	0	0	0

During decommissioning, effluent resulting from flushing pipelines is captured and transported to shore for disposal, since release of this effluent is not an authorized discharge under the existing USEPA Region 6 General Permit. When decommissioning in place, pipelines must ultimately be flushed and filled with uninhibited seawater. However, this is not required during a decommission and removal procedure, which requires flushing and then the removal of the structural components for onshore disposal. In some cases, umbilicals containing operational fluids may be

abandoned in place if BSEE approves a variance submitted by the operator if flushing is not possible.

Losses of Well Control

All losses of well control are required to be reported to BSEE. In 2006, BOEM and BSEE's predecessor (the Minerals Management Service) revised the regulations for loss of well control incident reporting, which were further clarified in NTL No. 2019-N05, "Increased Safety Measures for Energy Development on the OCS." The failure reporting requirement, codified in 30 CFR 250.730(c) of BSEE's well control rule, went into effect on July 28, 2016. Additionally, on September 28, 2018, BSEE published revisions to the 2018 Oil and Gas Production Safety Systems Rule, which became effective on December 27, 2018 (83 FR 49216). On May 2, 2019, BSEE published revisions to the 2019 Well Control and Blowout Preventer Rule, which became effective on July 15, 2019; and on August 23, 2023, BSEE published a final rule revising certain regulatory provisions published in the 2019 final well control rule for drilling, workover, completion, and decommissioning operations, which became effective on October 23, 2023 (88 FR 57334). BSEE's regulations, including reporting requirements and equipment standards, help to minimize the chance of losses of well control.

The current definition for loss of well control is as follows:

- uncontrolled flow of formation or other fluids (the flow may be to an exposed formation [an underground blowout] or at the surface [a surface blowout]);
- uncontrolled flow through a diverter; and/or
- uncontrolled flow resulting from a failure of surface equipment or procedures.

Not all loss of well control events would result in a blowout as defined above, but it is most commonly thought of as a release to the human environment. A loss of well control could occur during any phase of development, i.e., exploratory drilling, development drilling, well completion, production, or workover operations. A loss of well control could occur when improperly balanced well pressure results in sudden, uncontrolled releases of fluids from a wellhead or wellbore (Neal Adams Firefighters Inc. 1991; PCCI Marine and Environmental Engineering 1999). For more information regarding losses of well control, refer to Chapter 2.9.1.4 of the GOM Oil and Gas SID.

Shallow water flows are another form of well control loss. Shallow water flows can occur when the drill bit encounters shallowly buried sediments having layers or zones with elevated pore pressures. If the drilling mud is not weighted sufficiently to contain the pore pressure, water and loose sediment can travel uphole and exit at the seafloor around the uncemented well annulus. Shallow water flows are not a phenomenon that could release oil or gas into the environment. They can, however, destabilize the well head or drilling platform, sometimes to a degree that requires plugging the well and re-spudding in a different location.

B.3.1.3 Accidental Air Emissions and Hydrogen Sulfide (H_2S)

Accidental air emissions and pollutants could include the release of oil, condensate, or natural gas; chemicals used offshore; pollutants from the burning of these products; fire; or H_2S release. The air pollutants could include CAPs, volatile and semivolatile organic compounds, H_2S, and CH_4. Emissions sources related to accidents from OCS operations can include well blowouts, oil spills, pipeline breaks, tanker accidents, and tanker explosions. Accidental air emissions are described in further detail in Chapter 2.9.1.5 of the GOM Oil and Gas SID.

Sulfur may be present in oil as elemental sulfur, within gas as H_2S, or within organic molecules, all three of which vary in concentration independently. Safety and infrastructure concerns include irritation, injury, and even lethality to workers who are exposed to H_2S from leaks; exposure to sulfur oxides produced by flaring; equipment and pipeline corrosion; and outgassing and volatilization from spilled oil. For more information on OCS oil- and gas-related sulfur impacts, refer to Chapter 2.10.1.6 of the GOM Oil and Gas SID.

B.3.1.4 Trash and Debris

In the United States, about 80 percent of marine debris washes into the ocean from land based sources and 20 percent is from ocean sources (USEPA 2017). The OCS oil and gas industry makes up only a small part of those sources. Some trash items, such as glass, pieces of steel, and drums with chemical or chemical residues, can be a health threat to local water supplies and, as a result, also to biological, physical, and socioeconomic resources; beachfront residents; and to users of recreational beaches. The discharge of marine debris by the offshore oil and gas industry and supporting activities is subject to a number of laws and treaties. These laws and treaties include the Marine Debris Research, Prevention, and Reduction Act; the Marine Plastic Pollution Research and Control Act; and the MARPOL Annex V treaty. Regulation and enforcement of these laws is conducted by a number of agencies, such as the USEPA, NOAA, and USCG. The USEPA works with the International Maritime Organization to develop and implement legal standards that address vessel source pollution and ocean dumping. The BSEE Marine Trash and Debris Prevention Program is intended to reduce the contribution of the oil and gas industry to marine debris. Lessees are encouraged to use caution when handling and transporting small items and packaging materials, particularly those made of nonbiodegradable, environmentally persistent materials such as plastic or glass that can be lost in the marine environment and washed ashore. Additional guidance for operators is provided in NMFS' Biological Opinion (NMFS 2025b) and associated Attachments and Appendices (NMFS 2025a). The various trash and debris laws and regulations would likely minimize the discharge of marine debris from OCS operations.

Occasionally during OCS oil-and gas-related operations, including decommissioning, equipment may be dropped to the seafloor. If this happens within the planned construction or operation site, the bottom-disturbing impacts are conservatively considered as part of the routine impacts considered in the **Chapter 4** resource analysis. However, equipment drops that may occur during transport are considered as accidental and are analyzed as such. For example, trawlers may drop items during site clearance activities and if the trawling vessel is drifting it can sometimes end

up outside the trawl area and proposed anchor radius area (plus the 500 ft buffer) cleared by BOEM in the activity application. The trawlers will trawl the drop locations (200 ft by 200 ft area) to pick up the dropped item.

B.3.2 Response Activities

In the event of a spill, particularly a loss of well control, there is no single method of containment and removal that would be completely effective. It is likely that larger spills under the right conditions would require the simultaneous use of all available cleanup methods (i.e., source containment, mechanical spill containment and cleanup, dispersant application, and *in-situ* burning). There are many situations and environmental conditions that necessitate different approaches. Spill cleanup is a complex and evolving technology. Each new tool then becomes part of the spill-response tool kit. Each spill-response technique or tool has its specific uses and benefits (Fingas 1995). Offshore removal and spill-containment efforts to respond to an ongoing spill offshore would likely require multiple technologies, including source containment; mechanical spill containment and cleanup; *in-situ* burning of the slick; and the use of chemical dispersants. Even with the deployment of all of these spill-response technologies, it is likely that, with the operating limitations of today's spill-response technology, not all of the oil can be contained and removed offshore.

The sensitivity of the contaminated shoreline is the most important factor in the development of cleanup recommendations. Shorelines of low productivity and biomass can withstand more intrusive cleanup methods such as pressure washing. Shorelines of high productivity and biomass are very sensitive to intrusive cleanup methods and, in many cases, the cleanup is more damaging than allowing natural recovery. Refer to Chapter 2.9.2 of the GOM Oil and Gas SID for more information on specific spill-response activities. For information on the effects of response activity, refer to **Chapter 4** of this Programmatic EIS.

The USCG is the lead response agency for oil spills on the OCS. Ultimately, and only when deemed necessary, the removal methods used during any spill will be determined by the USCG's Federal On-Scene Coordinator and representatives of the Regional Response Team or National Response Team. As a result of the Oil Pollution Act of 1990, BSEE is also tasked with several oil-spill response duties and planning requirements. Within BSEE, the Oil Spill Preparedness Division addresses all aspects of offshore oil-spill prevention, planning, preparedness, and response. BSEE implements regulations found at 30 CFR 250 and 30 CFR 254. Based on requirements for oil-spill response plans (OSRPs) established in Section 311 of the Federal Water Pollution Control Act (33 U.S.C. 1321), BSEE reviews and approves all OSRPs and requires lessees to conduct the training, equipment testing, and periodic drills listed in the OSRP. The BSEE also conducts unannounced drills to ensure compliance with OSRPs. Additional information about the Oil Spill Preparedness Division can be found at http://www.bsee.gov/About-BSEE/Divisions/OSPD/index/. All spills must be reported to the USCG via the National Response Center (see the https://www.epa.gov/emergency-response/national-response-center), and all spills ≥1 bbl must be reported to BSEE. BSEE conducts investigations into spills, may assess civil and criminal penalties,

oversees spill source control and abatement operations, and conducts research into spill response in the marine environment.

BOEM implements regulations found at 30 CFR 550.219 and 30 CFR 550.250 by receiving and reviewing worst-case discharge information and OSRPs (or references to regional OSRPs) that are submitted for exploration plans, development and production plans, and development operations coordination documents on the OCS. BOEM implements regulations found at 30 CFR 553 by managing the Oil Spill Financial Responsibility Program, which requires industry to show financial responsibility to respond to possible spills. BOEM requires that an operator must either submit an initial OSRP to BSEE Oil Spill Preparedness or reference an existing BSEE-approved OSRP prior to approval of an operator-submitted exploration, development, or production plan.

B.3.3 Strikes and Collisions

Strikes are defined as a vessel or aircraft unintentionally hitting a resource or habitat. Collisions are defined as a vessel or aircraft unintentionally hitting another vessel, aircraft, or structure. Both strikes and collisions can occur as a result of routine OCS oil- and gas-related activities, accidental events, or other events that are not associated with OCS oil- and gas-related activities. Whatever the cause of the strike or collision, the result is an accidental event. The leading causes, not all inclusive, of recent helicopter accidents were engine related, loss of control or improper procedures, helideck obstacle strikes, controlled flight into terrain, and other technical failures (Helicopter Safety Advisory Conference 2015). For more information on strikes and collisions, see Chapter 2.9.3 of the GOM Oil and Gas SID.

B.4 Cumulative Activity Impact-Producing Factors

Cumulative effects result from “the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.1(g)). Cumulative impacts on a given resource, ecosystem, or human community may result from single actions or a combination of multiple actions over time. These may be additive, less than additive (countervailing), or more than additive (synergistic). The scope of a proposed action is important to consider in a broader context that accounts for the full range of actions and associated impacts taking place within the GOA, currently and into the foreseeable future. Repeated actions, even minor ones, may produce significant impacts over time. Many of the past and present actions and trends that would contribute to cumulative impacts under the action alternatives could also contribute to cumulative impacts under the No Action Alternative (Alternative A).

B.4.1 Cumulative OCS Oil and Gas Program

The existing OCS oil and gas program as a whole in the GOA region has matured over several decades, is well-established, expansive, and deeply intertwined in the regional communities and economies of the Gulf Coast. The cumulative OCS oil and gas program is a significant contributing factor to many of the alterations to the land- and seascape over the past century that

shaped the GOA region into the existing environmental baseline we know today. While BOEM acknowledges the existing OCS oil- and gas-program as a significant contributor to cumulative effects across the Gulf region, teasing out the Gulf of America OCS oil- and gas-related effects from the effects of other oil and gas activities onshore and in State waters, in conjunction with other industries is difficult, if not impossible. Industries that support the existing OCS oil and gas program, such as shipyards, fabrication yards, transportation, and other service providers, also support oil and gas development onshore, in State waters, and elsewhere around the globe. This infrastructure is summarized in **Chapter 2** and **Chapter 4.4.1** (Land Use and Coastal Infrastructure), with additional information in Chapter 4.4.1 of the GOM Oil and Gas SID.

The Cumulative OCS Oil and Gas Program scenario includes all activities (i.e., routine activities projected to occur and accidental events that could occur) from past, present, and future proposed GOA oil and gas lease sales. This includes projected activity from past OCS oil and gas lease sales for which exploration or development has either not yet begun or is continuing (i.e., ongoing activities scenario), activities resulting from a single representative proposed OCS oil and gas lease sale, and activities that would result from future proposed OCS oil and gas lease sales that would be held as a result of current or reasonably foreseeable National OCS Oil and Gas Programs. This equates to a 70-year timeframe (2024-2093) and includes a 40-year analysis period (2024-2063) for a single representative proposed OCS oil and gas lease sale. Recent development trends show that almost all activities from a single OCS oil and gas lease sale occur within a 40-year period, though some may extend up to 50 years. Therefore, BOEM used a 40-year analysis period for the single lease sale scenario but, since some could extend up to 50 years, BOEM conservatively used a 70-year time period for the cumulative scenario. **Table 3.3-2** presents projections of the major activities and impact-producing factors related to future Cumulative OCS Oil and Gas Program activities.

It is reasonable to assume that OCS oil and gas lease sales would continue to be proposed as a result of current or future National OCS Oil and Gas Programs for many years to come in the GOA region based on resource availability and existing infrastructure. For the purposes of conducting impact analyses of reasonably foreseeable OCS Oil and Gas Program activities in the GOA, continued leasing activity is assumed to occur, resulting in activities that could occur over the next 70 years. However, forecasting long-term cumulative activity levels (e.g., exploration wells, production wells, and pipelines) is increasingly speculative due to uncertainty related to oil prices, resource potential, transitioning to a cleaner national energy strategy, and the cost of development and resource availability (e.g., drilling rig availability) versus the amount of acreage leased from an OCS oil and gas lease sale.

There is a trend toward more exploration and development drilling in deepwater areas (depths greater than 200 m). BOEM expects fewer new facilities across the GOA shelf environment as a result of future OCS oil and gas leasing when compared to historical trends, with deepwater facilities yielding most future oil production. For context, at the end of 2024, deepwater accounted for 71.4 percent of active leases, 95.78 percent of oil production, and 86.48 percent of gas production, but only 4.9 percent of total installed production facilities (**Table B.4-1**). The types of facilities used to

produce oil and gas from active leases changes with water depth. In shallow water, fixed-leg platforms and caissons are dominate, while in deeper water spars, tension-leg platforms (TLPs), semi-submersibles, and floating production storage and offloading systems (FPSOs) are most commonly used. In fiscal year 2024, GOA deepwater had one spar decommissioned and one semi-submersible installed.

Table B.4-1. Active Leases, Facilities, and Production by Water Depth in the GOA as of Fourth Quarter (Q4) of 2024.

Water Depth (meters)	Number of Active Leases	Percentage of Active Leases	Number of Installed Production Facilities	Percentage of Installed Production Facilities	Structure Types	Q4 Oil Production	Q4 Gas Production
0 to 200	662	28.6%	1366	95.1%	1071 Fixed Leg Platforms 288 Caissons, 6 Well Protectors, 1 MOPU	4.2%	13.5%
201 to 400	40	1.7%	17	1.2%	17 Fixed Leg Platforms	0.9%	1.1%
401 to 600	64	2.8%	5	0.3%	1 Fixed Leg Platform 2 Compliant Towers, 2 TLP	2.1%	3.5%
601 to 800	67	2.9%	2	0.1%	1 SPAR, 1 MOPU	0.8%	1.1%
801 to 1000	150	6.5%	9	0.6%	1 SPAR, 1 Semi Submersible 6 TLP, 1 Mini TLP	7.6%	15.1%
>1000	1,331	57.5%	38	2.6%	14 SPAR, 14 Semi Submersible 2 FPSO, 6 TLP, 2 Mini TLP	84.4%	65.7%
Total	2,314	-	1,437	-	-	-	-

Due to the growth of oil and gas development in deepwater areas, oil and gas service activities for OCS operations have been heavily centralized at Port Fourchon, Louisiana, which services approximately 90 percent of all deepwater rigs and structures in the GOA. Shallow water operations are older and generally have decreasing economic reserves, leading to a greater number of facilities being decommissioned than installed over the last several years. This trend highlights a shift in focus from installation to decommissioning in shallow water areas. Deepwater decommissioning is expected to remain steady or increase slightly in the future. The overall active or non-decommissioned structure inventory has steadily declined over the past decade as production continues to shift toward deeper water, a trend that is expected to continue over the next 70 years.

Although BOEM has analyzed historical information and current trends in the oil and gas industry, BOEM cannot predict future OCS oil- and gas-related activities with a high-level of certainty. The ongoing, single OCS oil and gas lease sale, and cumulative scenarios are only approximate since future factors such as the contemporary economic marketplace, the availability of support facilities, and pipeline capacities are all unknowns. Notwithstanding these unpredictable factors, the scenarios used in this Programmatic EIS represent the best assumptions and estimates

of a set of future conditions that are considered reasonably foreseeable and suitable for presale impact analyses. The scenarios do not represent BOEM's recommendation, preference, or endorsement of any level of leasing or offshore operations, or of the types, numbers, and/or locations of any onshore operations or facilities for future OCS Oil and Gas Programs.

B.4.2 Non-OCS Oil- and Gas-Related Activities

The non-OCS oil- and gas-related activities considered in this chapter are defined as other past, present, and reasonably foreseeable future activities occurring within the same geographic range and within the same timeframes as the projected routine activities and potential accidental events discussed above, but they are not related to the Cumulative OCS Oil and Gas Program. Chapter 2 of the GOM Oil and Gas SID summarizes non-OCS oil- and gas-related activities that could potentially affect an environmental or socioeconomic resource in addition to OCS oil- and gas-related activity.

While the scenario developed for the Cumulative OCS Oil and Gas Program scenario forecasts 70 years of activities, the scenarios developed as part of this chapter vary in the length of time projected depending on what would be considered reasonably foreseeable based on the data available and the ability to predict future actions without being speculative.

B.4.2.1 Air Emissions and Pollution

Offshore sources of air pollution not related to OCS oil- and gas-related activities that cause degradation to air quality come from natural (biogenic and geogenic) and anthropogenic sources. Natural offshore sources include, but are not limited to, lightning, sea salt, bacterial processes, and natural oil seeps. Anthropogenic offshore sources include, but are not limited to, commercial vessels (including cruise ships, container ships, and lightering services), military vessels and aircraft, commercial and recreational fishing vessels, site assessment and site characterization activities for offshore wind developments (BOEM 2023b), and the Louisiana Offshore Oil Port.

Onshore sources of air pollution from non-OCS oil- and gas-related activities include power generation, industrial processing, manufacturing, refineries, waste disposal, pesticides, fertilizers, commercial and home heating, and motor vehicles. Natural sources include, but are not limited to, lightning, pollen, dust, and other biogenic and geogenic sources.

B.4.2.2 Discharges (including Nonpoint Sources) and Wastes

Discharges and wastes from non-OCS oil- and gas-related events may derive from discharge from State oil and gas activities, shipwrecks, military activities, dredged material disposal, land-based nonpoint source pollution, and natural seeps. Additional sources may also include historical chemical weapon disposal and historical waste dumping. For more information regarding discharges and wastes associated with offshore and onshore OCS oil- and gas-related activity, refer to Chapter 2.2 of the GOM Oil and Gas SID.

Oil- and gas-related activities in State waters may also cause discharges and wastes similar to those already described above for OCS oil- and gas-related activities. State environmental agencies, such as the Louisiana Department of Environmental Quality (LDEQ) and the Texas Commission on Environmental Quality (TCEQ), have the authority to issue oil and gas related permits for various types of discharges (LAG 330000, TXG 310000, WQG 280000) (Louisiana Department of Environmental Quality 2021; Texas Commission on Environmental Quality 2024a; 2024b). These permits cover a range of oil and gas facilities, including onshore stripper wells, coastal facilities, and territorial sea facilities, with specific regulations based on their distance from shore.

Dredged material is described in 33 CFR 324 as any material excavated or dredged from navigable waters of the United States. Materials from maintenance dredging are primarily disposed of offshore on existing dredged-material disposal areas and in ocean dredged-material disposal sites (ODMDSs). The USEPA has several designated ODMDS in the GOA, all of which can be accessed at https://www.epa.gov/ocean-dumping/ocean-disposal-map. Additional information can also be accessed on the U.S. Army Corps of Engineers' Ocean Disposal Database at https://odd.el.erdc.dren.mil/. The USEPA Region 4 Final National Pollutant Discharge Elimination System Permit (General Permit No. GEG460000) for Offshore Oil and Gas Activities in the Eastern GOM (including portions of the CPA) does not allow the discharge of any drilling fluids, drill cuttings, or produced waters from offshore oil and gas facilities within 1,000 m (3,280 ft) (or as determined by the USEPA Director) of any federally designated ODMDS.

Most aquatic pollutants result from agricultural or urban runoff or discrete point source wastewater discharges from industrial sites or sewage plants and are released to streams, rivers, bays, and estuaries. Nonpoint source pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and ground waters. Both discrete point sources and nonpoint sources make their way to coastal waters and the open ocean where they are prevalent impact-producing factors for marine life. Constituents added to the Mississippi River originate from erosion, uncontained runoff, sediment, suspended solids, organic matter, and pollutants (including nutrients, heavy metals, fertilizer, pesticides, oil and grease, microplastics, and pathogens). As a result, water quality in coastal waters of the northern GOA is highly influenced by seasonal variation in river flow. The Mississippi River basin alone introduces approximately 104,895 tonnes of oil and grease per year from land-based sources (National Academies of Sciences 2022b). For more information, please refer to Chapters 2.2, 3.3, 3.5 of the GOM Oil and Gas SID.

The National Academies of Sciences (2022b) computed petroleum hydrocarbon inputs into North American marine waters for several major categories, indicating that land-based runoff, natural seeps, operational discharges, and accidental events are the main sources of anthropogenic petroleum hydrocarbon pollution in the sea. The annual estimates of land-based sources far outweigh other sources, even when factoring in the *Deepwater Horizon* oil spill in 2010 and the worst-case projection for the oil spills resulting from Taylor Energy's toppled platform in Mississippi

Canyon Block 20 into the estimates (National Academies of Sciences 2022b). More information on Taylor Energy's toppled platform is discussed in Chapter 2.9.1.1 of the GOM Oil and Gas SID. In accordance with CEQ guidelines to provide decisionmakers with a robust environmental analysis, the GOM Catastrophic Spill Event Analysis technical report (BOEM 2021) provides an analysis of the potential impacts of a low-probability catastrophic oil spill, which is not part of a proposed action and not likely expected to occur, to the environmental and cultural resources and the socioeconomic conditions analyzed in **Chapter 4**.

Table B.4-2 provides *Oil in the Sea IV* (National Academies of Sciences 2022a) estimates of hydrocarbon inputs into marine waters, which is an update to *Oil in the Sea III* (National Research Council 2003). Excluding the *Deepwater Horizon* oil spill*,* there is an approximately 35 percent decrease in petroleum hydrocarbon inputs overall when compared to the 1990-1999 period (National Academies of Sciences 2022b). Multiple inputs covered in *Oil in the Sea III* were not reported for *Oil in the Sea IV*, including atmospheric deposition, aircraft jettison, and recreational marine vessels. Operational discharges from commercial vessel estimates are less than 10 metric tons per year total, assuming full compliance with regulations. In general, response activities to non-OCS oil- and gas-related spills would be similar to an OCS oil- and gas-related spill (**Chapter 3.5.1** of this Programmatic EIS and Chapter 2.9.2 of the GOM Oil and Gas SID).

Table B.4-2. Estimated Annual Inputs of Petroleum Hydrocarbons to the Gulf from 2010-2019 (National Academies of Sciences 2022b) in Metric Tons per Year. (Estimated loads of <10 metric tons per year were marked as "trace" in *Oil in the Sea IV* (National Academies of Sciences 2022a)).

Inputs	Petroleum Process	Subzone	Western Gulf	Eastern Gulf
Seeps	Natural Source	NA	60,000	8,000
Spills (including *Deepwater Horizon*)	Extraction	Offshore	57,161	1.4
Spills (excluding *Deepwater Horizon*)	Extraction	Offshore	18.1	1.4
Spills (including *Deepwater Horizon*)	Extraction	Coastal	70.8	0
Spills (excluding *Deepwater Horizon*)	Extraction	Coastal	70.8	0
Produced Water[1]	Extraction	Coastal	44	6
Produced Water[1]	Extraction	Offshore	1,838	54
Sum of Extraction (including *Deepwater Horizon*)	Extraction	NA	59,113.80	61.4
Sum of Extraction (excluding *Deepwater Horizon*)	Extraction	NA	1,970.90	61.4
Pipeline Spills	Transportation	Offshore	2.1	0
Pipeline Spills	Transportation	Coastal	296.1	11.4
Tank Vessel Spills	Transportation	Offshore	91	0
Tank Vessel Spills	Transportation	Coastal	84.8	2.3
Coastal Terminal Spills	Transportation	Coastal	14.3	174.3
Coastal Refinery Spills	Transportation	Coastal	10.4	0.1
Sum of Transportation	Transportation	NA	498.7	188.1
Vessel <100 GT (spills)	Consumption	Coastal	21.3	2.1

Inputs	Petroleum Process	Subzone	Western Gulf	Eastern Gulf
Vessel >100 GT (spills)	Consumption	Coastal	28.4	12.7
Vessel <100 GT (spills)	Consumption	Offshore	24.9	0.3
Vessel >100 GT (spills)	Consumption	Offshore	18.3	1.2
Sum of Consumption	Consumption	NA	92.9	16.3

[1] Assumes a maximum amount of 29 milligrams per liter.

B.4.2.3 Bottom Disturbance

Seafloor disturbance caused by activities that are not part of the Bureau of Ocean Energy Management's OCS Oil and Gas Program can occur from anchoring, buoys, or moorings; military operations; State oil and gas activities; artificial reefs; dredging and trawling; renewable energy installations; and mass wasting events. Anchors "bite" into the seafloor to secure a vessel in place and work best in areas of soft seafloor sediment. Buoy or mooring fields can be found outside harbors for cargo ships to tie before heading into a port; in smaller ports or harbors for recreational vessels or small commercial vessels to moor; in locations that are marked for fishing, diving, or other recreation; or they may mark avoidance areas such as reefs, fishing nets, or scientific equipment. Many of the operations and training exercises conducted by the military can result in seafloor disturbance. Activities can include the following: live-fire testing and training; torpedo testing; weapons testing; live ordnance release and impact activities; live underwater ordnance detonation operations; mine neutralization operations; torpedo firing exercises; dynamic submarine, surface ship, and helicopter anti-submarine warfare exercises; anti-submarine warfare instrumented training on seabed; bomb dropping exercises; and mine warfare testing and training. See Chapter 2.3.2 of the GOM Oil and Gas SID for more information associated with onshore and offshore activities that create bottom disturbance.

B.4.2.4 Noise

Noise in the ocean is the result of both natural and anthropogenic sources. Natural sources of noise include sounds produced by animals and processes such as wind-driven waves, rainfall, and storms. Human-generated (anthropogenic) contributions to the ocean's soundscape have steadily increased in the past several decades. This increase is largely driven by a worldwide increase in oil and gas exploration and the amount of vessel traffic using the GOA, including sources not related to OCS oil- and gas-related operations such as tourism, commercial shipping, naval operations (e.g., military sonars, communications, and explosions), fishing (e.g., pingers used in fisheries to prevent animals getting caught in nets), research (e.g., air-guns, sonars, telemetry, communication, and navigation), and other activities such as construction (e.g., pile driving) and recreational boating. Refer to Chapter 2.4.2 of the GOM Oil and Gas SID for more information on impact-producing factors linked to noise.

B.4.2.5 Coastal Land Use/Modification

Non-OCS oil- and gas-related activities causing coastal land use/modification include erosion, saltwater intrusion, dredging and navigation canals, coastal restoration programs, and

tourism infrastructure. Erosion is a major contributor to land loss in the coastal zone. Saltwater intrusion is one of many factors that impact coastal environments by killing marsh grasses and contributing to coastal land loss. Such impacts can be natural, as when storm surge brings GOA water inland, or anthropogenic, as when navigation or pipeline canals allow tides to introduce high salinity water to interior marshes. Impacts from dredging and navigation channels include the displacement of wetlands by original channel excavation and disposal of the dredged material. Indirect cumulative land losses resulted from hydrologic modifications, saltwater intrusion, or bank erosion from vessel wakes (Wang 1988). However, the material from maintenance dredging can be used to rebuild affected areas. Coastal restoration programs seek to address many of the above-mentioned issues. BOEM's Marine Minerals Program partners with communities to address serious erosion along the Nation's coastal beaches, dunes, barrier islands, and wetlands. Erosion affects natural resources, energy, defense, public infrastructure, and tourism. To help address this problem, the Marine Minerals Program leases sand, gravel, and/or shell resources from Federal waters on the OCS for shore protection, beach nourishment, and wetlands restoration with vigorous safety and environmental oversight. Several other programs have been established for the conservation, protection, and preservation of coastal areas, including wetlands along the Gulf Coast. In particular, the Louisiana Coastal Master Plan (Coastal Protection and Restoration Authority 2023) has been developed to achieve the State's comprehensive coastal restoration and risk reduction goals.

While carbon capture and sequestration activities in federal waters are not reasonably foreseeable at this time, there are multiple planning efforts for such activities in coastal counties and state waters off Texas and Louisiana. In September 2023, for example, Texas and Louisiana awarded licenses for two new carbon sequestration projects in their respective state waters. In Texas, Repsol is leading a project with partners Carbonevert, POSCO, and Mitsui, which plans to store more than 20 million tonnes of CO_2 in 140,000 acres offshore of Corpus Christi, Texas (Carbonvert 2024). In Louisiana, Carbonvert, Castex, and Enbridge plan to develop a 24,000-acre project off the coast of Cameron Parish together under the joint venture OnStream CO_2. The project has an estimated storage capacity of over 250 million metric tons, with plans to begin injecting CO_2 in 2028 (Carbonvert 2025). Both projects intend to source the carbon from industrial emitters near each site. Moving CO_2 from these various emitters to offshore storage sites would require land-based transportation networks that could traverse population centers and coastal areas off Texas and Louisiana.

Tourism infrastructure enables humans to spend time away from home in pursuit of recreation, leisure, and other endeavors. Counties and parishes along the GOA are home to various resources and infrastructure that support recreation and tourism. Publicly owned and administered areas (such as national seashores, parks, beaches, and wildlife lands), as well as specially designated preservation areas (such as historic and natural sites and landmarks, wilderness areas, wildlife sanctuaries, and scenic rivers), attract residents and visitors throughout the year. For more information on non-OCS oil- and gas-related activities in the Gulf of America OCS, see Chapter 2.5.2 of the GOM Oil and Gas SID.

B.4.2.6 Lighting and Visual Impacts

Many stakeholders use the ocean environment, in addition to the OCS Oil and Gas Program, including tourism and recreation, commercial and recreational fishing, marine transportation, subsea cables, military activities, deepwater ports, OCS sand borrowing, renewable energy turbines, ocean dumping, and possibly carbon sequestration. Each of these uses has the potential to alter or disrupt the existing visual and aesthetic environment. Lighting and visual impacts are covered in greater detail in Chapter 2.6 of the GOM Oil and Gas SID.

B.4.2.7 Offshore Habitat Modification/Space Use

In addition to the OCS Oil and Gas Program, other activities on the Gulf of America OCS include tourism and recreation, commercial and recreational fishing, marine transportation, subsea cables, the military, deepwater ports, OCS sand borrowing, renewable energy development, ocean dumping, and aquaculture, and possibly carbon sequestration. Each of these uses for the Gulf of America OCS requires some amount of space to operate and must be taken into account when planning to hold proposed OCS oil and gas lease sales that would potentially make areas of the Gulf of America OCS unavailable for other uses (**Table B.4-3**). Recreational activities can occur in large areas (i.e., beach going) but many occur in small, localized areas (i.e., offshore diving). Some recreational areas can be permanent uses of space (e.g., public beaches, wildlife areas, etc.), while others represent only a short-term use of space (e.g., boating, diving, etc.). Both commercial and recreational fishing are valuable industries that represent significant uses of the OCS. In areas of dense fishing effort, or where gear is spread over a large area, commercial fishing has the potential to cause semi-permanent, standoff-distance conflicts on the OCS. Most recreational fishing in the GOA planning areas takes place within State waters. However, for those few trips that do take place on the Federal OCS, they represent a short-term and localized use of the OCS.

Table B.4-3. Areas of Marine Space Use by Industries Other Than Oil and Gas.

Industry	Coastal	Sea Surface/ Airspace	Water Column	Seafloor
Recreation	X	X	X	X
Commercial and Recreational Fishing	X	X	X	X
Ports, Navigation Lanes, and Shipping	X	X	X	-
Undersea Cables	-	X	-	X
Military	X	X	X	X
Deepwater LNG Ports	-	X	X	X
OCS Sand Borrowing	-	X	-	X
Coastal Restoration	X	-	-	X
Renewable Energy	X	X	X	X
Ocean Dumping	-	-	-	X

Maritime shipping is one of the most important industries on the Gulf Coast. As such, there is a large existing infrastructure presence in the GOA to support the industry, including ports and

navigation lanes. The maritime shipping industry represents a major use of GOA coastal space both for onshore infrastructure needs, such as port facilities and for offshore needs, such as safe navigation.

As discussed in Chapter 2.7.2.4 of the GOM Oil and Gas SID, there are currently only two major telecommunications subsea cable networks on the Gulf of America OCS: one traversing the WPA and CPA with landing points in Freeport, Texas, and Pascagoula, Mississippi; and another crossing part of the EPA with a landing point in Sarasota, Florida. Gold Data, Inc. has also announced construction of a subsea cable (GD-1) with landfall points in Apalachee Bay, Florida, and Veracruz, Mexico, as part of a joint project with Liberty Networks (Gold Data 2023). The GD-1 cable is expected to be installed and operational in late 2026. Undersea cables are critical infrastructure for telecommunications or power transmission and represent an important use of the OCS. The space-use requirements for undersea cables are dependent on the requirements for the specific project and are typically determined on a case-by-case basis but may be large. TeleGeography maintains a comprehensive map of submarine cables at https://www.submarinecablemap.com/.

The U.S. Department of Defense conducts training, testing, and operations in offshore operating areas, military warning areas, at warfare training ranges, and in special use or restricted airspace on the OCS. These activities are critical to military readiness and national security. However, the offshore operating areas, military warning areas, and Eglin water test areas are multiple-use areas where military operations and oil and gas development have coexisted without conflict for many years through the use of Military Stipulations.

Deepwater ports are installations on the OCS that service the importing and exporting of natural gas products like liquefied natural gas and crude oil (refer to Chapter 2.7.2.6 of the GOM Oil and Gas SID). These facilities represent permanent but localized use of the OCS and usually also connect to onshore infrastructure. While currently only the LOOP in the GOA is active, several additional deepwater ports have been proposed and are in various stages of licensing and permitting, as outlined below, with additional information on found at https://www.maritime.dot.gov/ports/deepwater-ports-and-licensing/deepwater-ports-map:

- LOOP (approved; operational facilities; Docket Number USCG-2000-6981). The port consists of three single-point mooring buoys used for the offloading of crude tankers and a marine terminal consisting of a two-level pumping platform and a three-level control platform. The Clovelly Hub is located 25 mi (40 km) inland and is connected to the port complex by a 48-inch (122 cm) diameter pipeline. The Clovelly Hub provides interim storage for crude oil before it is delivered via connecting pipelines to refineries on the Gulf Coast. Oil is stored in eight underground caverns capable of storing approximately 60 million barrels (9.54 million m^3) of crude oil. In addition, LOOP has an above-ground tank facility consisting of fifteen 600,000 barrel (95,000 m^3) tanks and seven 375,000 barrel (59,000 m^3) tanks. Total crude oil storage in tanks is approximately 12 million barrels (1.91 million m^3)

- Sea Port Oil Terminal (SPOT) (approved; license issued; construction delayed; Docket Number MARAD-2019-0011). Located approximately 27.2 to 30.8 nm off the coast of Brazoria County, Texas, the planned port would have the capacity to handle up to 2 MMbbl of oil exports a day, 24 hours per day. However, the applicant is still in the process of making a final investment decision regarding the development of SPOT. Therefore, if and when this project would be constructed remains unknown.
- Delfin LNG, LLC (approved; license issued; Docket Number USCG-2015-0472; Office of Fossil Energy Docket 13-129-LNG (FTA)). On January 27, 2025, Delfin submitted to MARAD an update to facilitate its review of the project, including a description of all the refinements to the project and their probable environmental impacts as detailed in a revised and updated Environmental Impact Assessment (EIA), consistent with the ROD issued in 2017 (Delfin LNG 2025). The EIA concluded that overall, the project refinements since the 2017 ROD reduced impacts and there were no significant new circumstances or adverse environmental consequences that substantially differ from those originally evaluated in the previously completed Final EIS for the proposed project. On March 21, 2025, MARAD publicly announced that it had issued a license authorizing Delfin LNG, LLC, to own, construct, operate, and eventually decommission a deepwater port, to export LNG from the U.S. (MARAD 2025). The Delfin LNG, LLC deepwater port license was issued in accordance with E.O. 14154, signed January 20, 2025. The Delfin LNG deepwater port facility, if constructed on schedule, would be the first offshore LNG export facility in the U.S., transporting LNG to the global market from Federal waters approximately 37.4 to 40.8 nm off the coast of Cameron Parish, Louisiana.
- Texas Gulflink, LLC (approved; license issuance pending; Docket Number MARAD-2018-0114). In February 2025, MARAD issued a ROD for Texas Gulflink LLC, which plans to construct and operate a deepwater port for the export of domestically produced crude oil located approximately 32 mi off the coast of Brazoria County, Texas. Texas GulfLink's onshore terminal would be located near Jones Creek in Brazoria County, Texas.
- Blue Marlin (pending application; draft EIS under development; currently paused; Docket Number MARAD-2020-0127). The proposed port would have the capacity to handle up to 2 MMbbl of oil exports a day, 365 days per year. This application is currently on hold, however, for receipt of additional technical and environmental information from the applicant. Therefore, the estimated timeframe for agency decision-making for this project is currently unknown.
- Blue Water (pending application; currently paused; Docket Number MARAD-2019-0094). The proposed Bluewater deepwater port terminal would be located approximately 15 nm off the coast of San Patricio County, Texas, and have the capacity to handle up to 1.92 MMbbl of oil exports a day. The facility is

expected to service up to 16 Very Large Crude Carriers (VLCCs) per month. As of April 2025, the estimated timeframe for agency decision-making for this project was not publicly available.

- New Fortress Energy Louisiana (pending application; draft EIS under development; currently paused; Docket Number MARAD-2022-0076). The proposed deepwater port would be located approximately 16 nm off the southeast coast of Grand Isle, Louisiana. The Project proposes to source domestic natural gas from multiple supply hubs in the southeast Louisiana local market, liquefy, and export the gas as LNG up to 2.8 million metric tonnes per annum (MTPA). As of April 2025, the estimated timeframe for agency decision-making for this project was not publicly available.
- West Delta LNG (pending application; draft EIS under development; currently paused; Docket Number MARAD-2019-0095). The proposed deepwater port would be located approximately 10.5 nm off the coast of Plaquemines Parish, Louisiana, and have a proposed average throughput capacity of 750 million standard cubic feet per day. This application is currently on hold, however, for receipt of additional technical and environmental information from the applicant. Therefore, the estimated timeframe for agency decision-making for this project is currently unknown.

Also of relevance, Commonwealth LNG, a proposed LNG export facility to be located onshore in Cameron, Louisiana, received full Federal Energy Regulatory Commission approval in 2022, and recently received a conditional non-free trade agreement export authorization from the U.S. Department of Energy. A final ruling on the export authorization is anticipated later in 2025, with LNG production scheduled to begin in 2029.

Sand, gravel, and other mineral resources from the OCS are often used in beach nourishment, wetlands restoration, and other coastal restoration projects to address erosion issues. As the sole steward of OCS marine minerals, BOEM assesses where sand resources are located, how much may be available for coastal protection and restoration projects, and reserves these critical minerals. Given the substantial number of other ocean users, BOEM strives to reduce or eliminate the potential for multiple-use conflicts or environmental impacts that could result from marine minerals projects.

Renewable energy development has the potential to cause space use issues in the GOA. BOEM organized a GOM Renewable Energy Task Force with State and other Federal stakeholders to address the multiple-use conflicts associated with renewable energy development. On August 29, 2023, BOEM held the first offshore wind energy auction for the Gulf region, resulting in one lease area being issued to RWE Offshore US Gulf, which has the potential to generate approximately 1.24 gigawatts of offshore wind energy capacity. At present, it is reasonably foreseeable for renewable energy site assessment and site characterization activities to take place on the Gulf of America OCS. These activities represent only a small and short-term use of the OCS.

Ocean dumping uses space at the seafloor. Designated ocean disposal sites for dredged materials are selected to minimize the risk of potentially adverse impacts of the disposed material on human health and the marine environment. Permits for ocean dumping of dredged material are subject to USEPA review and written concurrence (USEPA 2020).

Offshore aquaculture is the rearing of aquatic animals in controlled environments (e.g., cages or net pens) in Federal waters. In the GOA, marine aquaculture focuses on stock enhancement (i.e., the release of juvenile fishes to supplement wild populations), food production, research, and restoration efforts (NOAA Fisheries 2022). NOAA is not currently issuing permits for aquaculture in Federal waters of the GOA; however, NMFS has identified aquaculture opportunity areas in the GOA and is beginning the NEPA process to assess the impacts of these areas (NMFS 2023).

At this time, BOEM and BSEE are examining potential regulations that address the transportation and storage of CO_2 on the OCS. In the absence of regulations, however, these activities are not considered reasonably foreseeable. Initially, these projects would likely be limited to saline reservoirs or depleted oil and gas reservoirs occurring close to shore due to cost and other considerations as indicated by ongoing research and industry interest. For example, a five-year offshore-focused project known as the Southeast Regional Carbon Storage Partnership: Offshore Gulf of America (SECARB Offshore) was started in 2018. SECARB is a coalition of industry, government, and academic institutions seeking to assess the potential for implementation of offshore CO_2 injection in the GOA, either for geologic storage or for enhanced oil recovery (Southern States Energy Board 2025). These areas have also seen decreased oil and gas development interest. Therefore, it is likely that space-use conflicts between carbon sequestration and OCS oil- and gas-related activities could be mitigated under Alternatives B and C, and even further reduced under Alternative D. BOEM will continue to monitor new information on potential OCS carbon sequestration activities to incorporate into subsequent analyses as appropriate.

B.4.2.8 Socioeconomic Changes and Drivers

This IPF broadly addresses the extent to which non-OCS oil- and gas-related activities produce socioeconomic changes. Because people plan for, instigate, avoid, and react to changes in myriad ways, socioeconomic considerations are also drivers of change in the offshore oil and gas industry and elsewhere in society, changes which, in turn, cause additional changes with their own impacts. These impacts are often interpreted subjectively and can be perceived as positive, negative, or neutral, often simultaneously, for multiple reasons or by multiple groups of people. Socioeconomic changes and drivers associated with variables like job loss and creation, public perceptions, etc. are discussed in Chapter 2.8 of the GOM Oil and Gas SID.

B.4.2.9 Other Environmental Factors

There are certain physical processes in the environment that will naturally occur and that have the potential to be impact producing factors. Some of these, such as natural seeps, are unaffected by human activity whereas the impacts from others can be amplified by human activity.

Furthermore, research suggests the climate's response to natural and human-influenced changes to the Earth's atmosphere can influence the magnitude and intensity of many of these environmental factors (see Chapter 3.4 of the GOM Oil and Gas SID). Determining the degree to which changing climate may influence existing and reasonably foreseeable stressors and the potential consequences of OCS energy development, however, remains a challenge and is beyond the scope of this PEIS.

Hurricanes and Tropical Storms

Tropical cyclones, especially hurricanes, that affect the GOA originate from the equatorial Atlantic, Caribbean Sea, and GOA itself, with peak activity from June to November. Historically, about 10.2 storms and 5.9 hurricanes occur annually in the Atlantic, with 81 percent potentially impacting the GOA. The Yucatan Channel is a key entry point for these storms, and their slow movement through the GOA leads to prolonged effects. Tropical storms cause significant damage to physical, economic, biological, and social systems, affecting offshore operations and necessitating robust structure designs to withstand storm surge, waves, and high winds.

From 2017 to 2022, several hurricanes and tropical storms crossed through the GOA or made landfall on coastal areas of the GOAR. Oil and natural gas production was reduced for several days during Hurricanes Harvey, Nate, Michael, Barry, Laura, Sally, Delta, Zeta, and Ida, and Tropical Storms Gordon, Cindy, and Cristobal; however, damage to structures and refineries from each hurricane or tropical storm appeared minimal (BSEE 2017a; 2017b; 2017c; 2018a; 2018b; 2019; 2020a; 2020b; 2020c; 2020d; 2020e; 2021). In August 2021, a pipeline and a wellhead on the seafloor were impacted by Hurricane Ida and resulted in accidental releases. Aerial images taken by NOAA showed an oil spill approximately two miles south of Port Fourchon, Louisiana, which was attributed to a ruptured pipeline and a spill discovered five miles from the Bay Marchand Port was attributed to a wellhead discharging oil (Powell 2021; USCG 2021). Hurricanes remain one of the primary causes of pipeline spills, and can also cause structure spills (refer to **Chapter J.3.1.1**). For additional detail on major storms affecting the GOA, see Chapter 3.3.1 of the GOM Oil and Gas SID. For information on how climate-related factors may affect storms, see **Chapter J.4.3**.

Eutrophication and Hypoxia

Nutrients are compounds that are essential to both plant and animal growth, including nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, silicon, and organic matter. Though vital for healthy ecosystems, excessive nutrients in water bodies (eutrophication) can lead to unintended side effects. This overabundance can cause an overproduction of aquatic primary producers, such as algae. When this excess algae dies and decomposes, bacteria consume dissolved oxygen, resulting in low-oxygen conditions (hypoxia) in eutrophic waters.

The GOA hypoxic zone is an area of oxygen-stratified water that stretches along the Texas-Louisiana shelf each summer, where the dissolved oxygen concentrations are less than 2 milligrams per liter (USEPA 2019). While smaller hypoxic areas occasionally form as a result of the discharges from other Gulf Coast rivers, the zone resulting from the Mississippi and Atchafalaya Rivers is the

largest. The hypoxic zone is the result of excess nitrogen and phosphorus (eutrophication; Chapter 3.3.2 of the GOM Oil and Gas SID) carried downstream by these rivers. Density stratification occurs as the less dense, nutrient-rich freshwater spreads atop the denser seawater, preventing oxygen replenishment in bottom waters. Phytoplankton blooms, fueled by excess nutrients, die and sink, leading to bacterial decomposition that further depletes oxygen. These seasonal, oxygen-depleted bottom waters are influenced by the timing of nutrient-rich freshwater discharges from the Mississippi and Atchafalaya Rivers. Hypoxic zones are often called "dead zones" because of the absence of commercially viable quantities of shrimp and fish in the bottom layer.

In 2024, the GOA annual low-oxygen area measured 6,705 square miles (17,365 square kilometers), making it the 12th largest zone recorded in 38 years of measurement. This area exceeded the forecasted size of 5,827 square miles (15,091 square kilometers) (NOAA 2024).

Sea-Level Rise

Some areas of the Gulf Coast have experienced higher local rates of sea-level rise than the global average (Dangendorf et al. 2023; Sweet et al. 2022; U.S. Global Change Research Program 2023). This, coupled with coastal subsidence, will likely increase the risks to and extent of impacts from storm surges (Blum et al. 2023). The Intergovernmental Panel on Climate Change (IPCC) reported that, since 1961, global average sea level (mean sea level) has increased by 0.20 [0.15 to 0.25] m (0.65 [0.49-0.82] ft) between 1901 and 2018. The average rate of sea-level rise was 1.3 [0.6 to 2.1] mm yr^{-1} between 1901 and 1971, increasing to 1.9 [0.8 to 2.9] mm yr^{-1} between 1971 and 2006, and further increasing to 3.7 [3.2 to 4.2] mm yr^{-1} between 2006 and 2018 (high confidence).

Sweet et al. (2022) estimated sea-level rise scenarios and probabilities of water level at 1-degree grids along the U.S. coastline based on the United Nations Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (Intergovernmental Panel on Climate Change 2021). These two reports comprise key technical information and data for the Fifth National Climate Assessment (U.S. Global Change Research Program 2023), which is a comprehensive and integrative research program to assess the climate impacts in the U.S. Combining historical observations and model projections, Sweet et al. (2022) reported with high confidence that relative sea level along the contiguous U.S. coastline is expected to rise on average as much over the next 30 years (0.25-0.30 m [0.82-0.98 ft] over 2020-2050) as it has over the last 100 years (1920-2020).

Natural Seeps

Natural petroleum seeps in the GOA are the second highest input of petroleum after land based sources (National Academies of Sciences 2022b). The estimated annual input from natural seeps in the GOA is approximately 68,000 metric tons per year (National Academies of Sciences 2022b). Another study estimates that hydrocarbons enter the Gulf by natural seeps at a rate of between 173,000 and 669,000 bbl per year (O'Reilly et al. 2022). This amount equates to an annual input of roughly 2.5 times the estimated amount of oil spilled by the 1989 *Exxon Valdez* spill (~260,000 bbl; Hostettler et al. 1999) or roughly a quarter of the amount released by the *Deepwater*

Horizon spill (4.9 MMbbl of oil; ABS 2016). To date, 1,618 seep zones have been identified in the GOA; approximately 1,400 are in the northern GOA (O'Reilly et al. 2022). These seeps are highly variable in volume and can occur as gases, volatiles, liquids, pitch, asphalt, tars, water, brines, and fluidized sediments. Seeps are most abundant and most prolific in the central and western regions of the northern GOA (Garcia-Pineda et al. 2010). For additional detail on natural seeps, see Chapter 3.3.3 of the GOM Oil and Gas SID.

Climate-Related Factors

The Earth's climate system is driven by solar radiation, which provides heat to the planet. The Earth's atmosphere has slowed the rate at which this incoming solar radiation is re-radiated back into space, resulting in a net increase of energy in the Earth's system (Intergovernmental Panel on Climate Change 2022). The climate's subsequent response is complicated by several positive and negative feedback processes among atmospheric, terrestrial, and oceanic systems. However, the overall result is a warming of the Earth that is evident by observed increases in air and ocean temperatures, melting snow and ice, and rising sea levels (Intergovernmental Panel on Climate Change 2022). **Figure B.4-1** shows factors that have increased and decreased as a result of a warming planet.

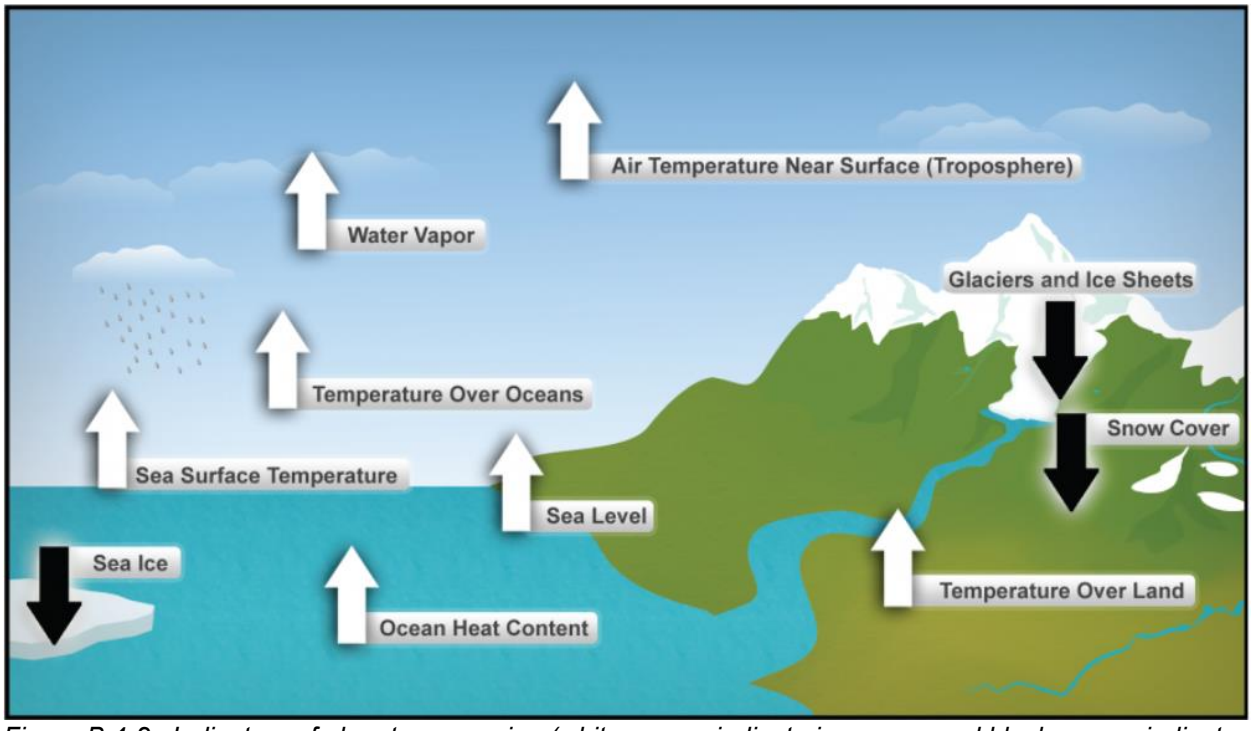

Figure B.4-2. Indicators of planetary warming (white arrows indicate increases and black arrows indicate decreases) (Melillo et al. 2014).

Primary climate-related factors are increasing atmospheric concentrations of GHGs, such as CO_2, CH_4 (also known as natural gas), and N_2O (U.S. Global Change Research Program 2018).

Life-cycle GHG emissions from the proposed action, Alternatives B-D, could influence climate systems. Climate-related factors are discussed in detail in Chapter 2.2 of the 2024-2029 National OCS Oil and Gas Program Programmatic EIS and Chapter 3.4 of the GOM Oil and Gas SID, which are incorporated by reference. These descriptions are useful for the GOA Oil and Gas Programmatic EIS to establish a broad understanding of climate that can be analyzed at the regional level for this document. Future impacts from climate-related factors can be lessened, but some impacts may be "unavoidable and/or irreversible" (Intergovernmental Panel on Climate Change 2023).

Gevondyan et al. (2023) examined the observed harms that include shoreline degradation and erosion from sea level rise, the consequences of ocean acidification, and increasingly severe weather events like hurricanes. The study also highlighted the overall impacts on environmental health, the effects of hypoxic zone (see section J.4.12) formation, and the threats to marine life and fisheries. Additionally, the researchers noted the damage to historically significant heritage sites from these factors (Gevondyan et al. 2023). Ocean acidification, a direct result of increasing atmospheric CO_2 mixing with surface ocean waters is a concern globally and within the GOA, where it can be exacerbated by eutrophication (Jiang et al. 2024; Kealoha et al. 2020). Available data, though scarce or lacking for many coastal and estuarine areas, indicates that ocean acidification has been occurring in many Texas and Florida estuaries and that subsurface waters in the northwestern GOA are acidifying at a rate greater than the global rate (National Academies of Sciences 2022c). Ocean acidification is explored in more detail in **Chapter 4.17**.

Regarding hurricanes, the National Center for Atmospheric Research conducted a modeling study of the impacts of climate on GOA hurricane intensity and frequency (Bruyère et al. 2017). The study found a trend towards fewer hurricanes in the GOA and a slight reduction in the proportion of Atlantic hurricanes entering the GOA. It also projected an increased proportion of Category 3, 4, and 5 storms, while the size and track speed of future hurricanes are expected to remain similar to the current ones. However, there is currently no consensus on the extent to which climate-related factors may impact hurricane frequency, with no significant trend so far in the Atlantic since 1900 (NOAA 2012; 2023c). An increase in Atlantic hurricane intensity has been observed over several decades, but the relationship to climate systems requires more research (Knutson et al. 2021; Kossin et al. 2020). See Appendix J.4.12 for more information on major storms.

The impacts of climate-related factors are considered and evaluated as part of the existing and future environmental baseline within the alternatives and cumulative analysis for each resource in **Chapter 4**.

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APPENDIX C

DESCRIPTION OF DECOMMISSIONING ACTIVITIES

C DESCRIPTION OF DECOMMISSIONING ACTIVITIES

C.1 INTRODUCTION

This appendix provides additional information on decommissioning-related activities and associated IPFs in the GOA region, historical and expected decommissioning trends, and regulatory oversight of decommissioning activities. The key IPFs associated with offshore decommissioning activities, as identified in **Chapter 3** (see **Table 3.3-4**) and factored into the resource analyses throughout **Chapter 4** of the Programmatic EIS, include:

- **Air Emissions** produced by combustion engines on vessels and equipment involved in decommissioning activities and transport.
- **Discharges and Wastes** including sanitary wastes, domestic waste, bilge and ballast water, cooling water, deck drainage from vessels, wastewater, trash and debris, and potential minor releases of chemicals, hydrocarbons, residual petroleum, and hydraulic fluids associated with vessel operations and activities like removal of conductors, piles, subsea infrastructure, pipelines, and power cables.
- **Bottom Disturbance** resulting in turbidity and sedimentation from activities like anchoring, trawling, excavation of jacket pilings, pipelines, concrete mattresses, or other obstructions, severance activities, and general site clearance. The removal of jacket structures, associated shell mounds, and pipeline infrastructure can result in the loss of established benthic and fish habitats as well.
- **Noise** generated by vessel and equipment traffic and operation, mechanical and abrasive severance, and especially impulsive underwater shockwaves from explosive severance.
- **Coastal Land Use/Modification** through the use of existing coastal ports and facilities for vessel support and for the disposal and processing of decommissioned material brought back to shore.
- **Lighting and Visual Impacts** resulting from the presence of lighting, vessels, and work activities, with lighting impacts more so a factor at night.
- **Offshore Habitat Modification/Space Use** resulting from potential interference of decommissioning work vessels or subsea infrastructure (e.g., pipelines) with other OCS users, including commercial navigation and shipping, commercial fisheries, military activities, and other energy development sectors.
- **Socioeconomic Changes and Drivers** related to economic activity, job creation, income, taxes, and potential impacts on local housing and community services associated with decommissioning activities.

- **Accidental Events** unintended spills of fuel or crude oil are possible. There is also the potential for collisions between support vessels and marine life, particularly marine mammals and sea turtles. Although not an IPF of the decommissioning process itself, the failure to decommission or maintain structures can lead to safety risks for personnel and pose navigational hazards due to structural degradation and lack of lighting.

As discussed below, BOEM and BSEE work closely to regulate these offshore decommissioning activities and associated IPFs in a manner that prevents or minimizes environmental risks and obstructions with other uses of the GOA.

Regulatory Oversight of Offshore Decommissioning

The oversight of industry decommissioning activities spans multiple BSEE organizational units, from District Offices overseeing well plugging and abandonment, to the Office of Environmental Compliance verifying site clearance, and to the Pipeline Section and Office of Structural and Technical Support overseeing pipeline and structure decommissioning, respectively. BSEE works closely with BOEM and other federal partners with shared jurisdiction on the OCS to enforce and continually improve timely decommissioning and environmental stewardship.

OCSLA and its implementing regulations, as well as the terms and conditions of the offshore oil and gas leases, ROWs, and RUEs granted by DOI and other applicable laws and regulations, require lessees, operation right holders, and holders of ROWs and RUEs to, among other things: (i) permanently plug all wells; (ii) remove all platforms and other facilities; (iii) decommission all pipelines; and (iv) clear the seafloor of all obstructions created by the lease, pipeline ROW, and RUE operations within one year after termination or when BSEE determines they no longer have future use (i.e., decommissioning activities). See 43 U.S.C. 1334; 30 CFR 250.J and Q. Operators may request an extension of the regulatory one-year deadline to decommission, which BSEE might grant due to any individual or combination of the factors below:

- One or more facilities permitted under the terminated authority will be transferred to an active authority. BSEE Decommissioning Support Section (DSS) may grant these extension requests when the operator provides certain documentation, and such approvals must include a timeline for moving the facility to an active authority.
- Platform Removal permits and Applications for Permit to Modify (APMs) have been submitted at least 6 months before the one-year due date for decommissioning but still in review with the appropriate BSEE authorities.
- There is evidence of work in progress or mobilization to location.

- If the structure and well are operated by the same company, DSS may grant an extension of one year (2 years from lease termination) if there is a justifiable reason for the delay, such as procurement of special equipment and tools; however, the well(s) must be fully plugged within one year of lease termination.
- If there is a structure authority transfer to RUE or ROW authority, DSS usually grants an extension to cut and pull the casing at the time of structure removal normally within a year after the authority expires.
- Coordination between BSEE and BOEM districts and office sections reveals no unacceptable risk and a determination is made to extend the time.

In 2005, the Minerals Management Service (MMS, predecessor agency of BOEM and BSEE) published the *Structure-Removal Operations on the Gulf of Mexico Outer Continental Shelf: Programmatic Environmental Assessment* (MMS 2005) (Decommissioning Programmatic EA). That evaluation encompassed all structure-removal operations (i.e., structure removals and well, pipeline, and mooring severances) under the regulatory authority of BSEE. The Decommissioning Programmatic EA resulted in a Finding of No Significant Impact for all structure removal operations (i.e., structure removals and well, pipeline, and mooring severances). Since the issuance of the 2005 Decommissioning Programmatic EA, MMS and later BSEE have managed well, pipeline, and structure decommissioning operations in accordance with the description of the proposed activities and impacts analysis as outlined in the 2005 EA and subsequent NEPA analyses. This Programmatic EIS incorporates those analyses by reference, and validates or updates the relevant activity trends, descriptions, and potential impacts where appropriate.

All applications for infrastructure decommissioning undergo additional, tiered NEPA reviews prepared by BOEM for potential impacts and other compliance requirements, including Categorical Exclusion Reviews for lease-term pipeline decommissioning and ROW pipeline cessations, and Site-Specific EAs for structure decommissioning. For example, most APMs proposing well decommissioning are managed under BSEE's NEPA Compliance process, which relies on a "conformance" clause in 30 CFR 550.281(b) to ensure the activities proposed in the APM conform to those described in an associated and approved exploration plan, development and production plan, or development operations and coordination document. The NEPA review prepared for the associated plan can then be referenced by BSEE for application of a categorical exclusion (see DOI Departmental Manual (DM) 516 DM 15.4(C)(14)), unless an extraordinary circumstance exists, which would require a BOEM Supplemental EA (Site-Specific EA) for review and possible permit approval. See Chapter 5.2.7.4 of the *Programmatic Description of the Potential Effects from Gulf of Mexico OCS Oil- and Gas-Related Activities: A Supporting Information Document* (GOM Oil and Gas SID) (BOEM 2023) for more information on permits and applications for structure removal and site clearance.

C.2 OCS Infrastructure and End of Term Decommissioning

C.2.1 Wells

Since the 1940s, the offshore oil and gas industry has installed more than 55,000 wells in the GOA. In 2000, there were approximately 16,000 active or non-decommissioned wells. By the end of 2024, there were approximately 5,325 active or non-decommissioned wells (**Figure C.2-1**). When a company signs a lease for offshore oil or gas exploration or production, that initial agreement includes the requirement that all wells drilled under the lease would eventually be "decommissioned" or plugged and abandoned, which includes safely plugging the hole in the earth's crust and disposing of the equipment used to support the production. This process is critical for environmental protection after a well is drilled, used for production, and then plugged and sealed when the well is of no further use. Decommissioning regulations for wells are detailed in 30 CFR 250.1710-1723. The regulations require operators to provide information sufficient for BSEE to determine whether the well decommissioning will be done successfully and will protect the environment and people using the waters around it. Under 30 CFR 250.1710, operators must permanently plug all wells on a lease within 1 year after the lease terminates and verify site clearance within 60 days of well plugging under 30 CFR 250.1740. BSEE may also order well decommissioning if the well poses a hazard or if the well is no longer useful for lease operations pursuant to 30 CFR 250.1711.

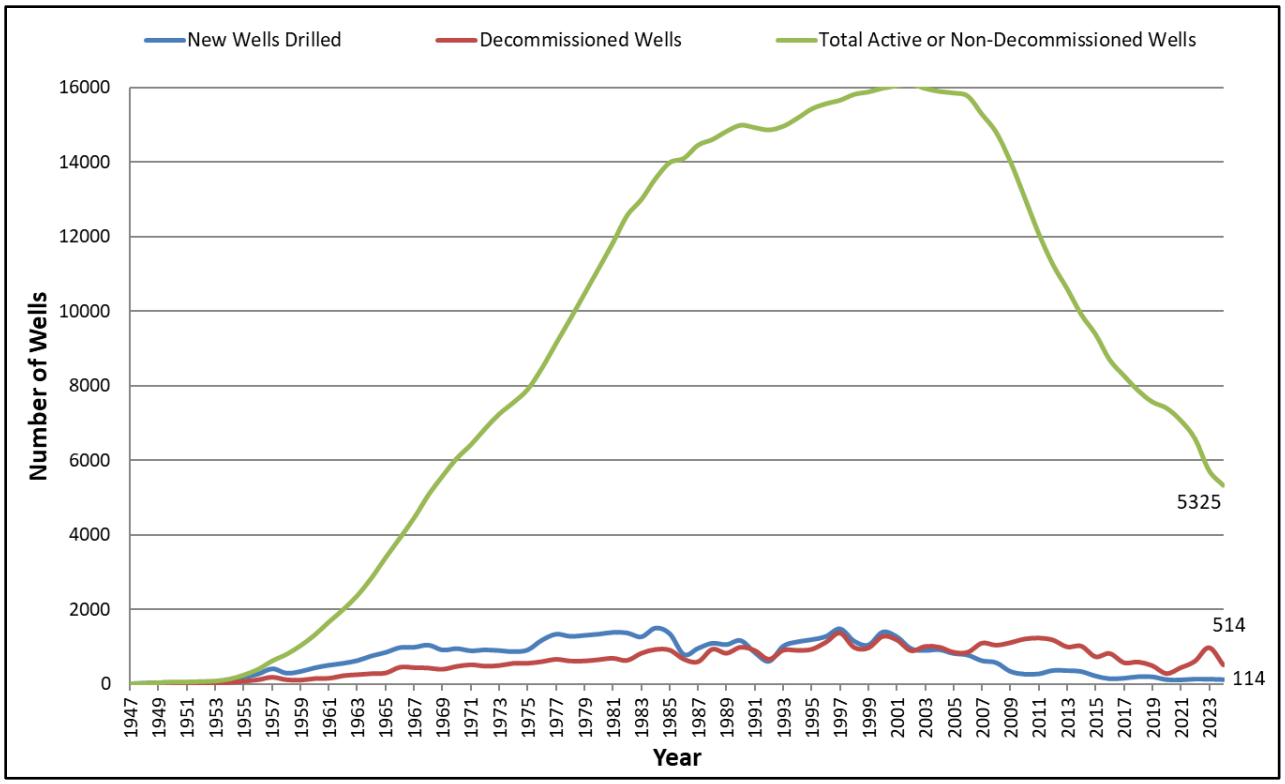

Figure C.2-1. New wells drilled, wells decommissioned, and total active or non-decommissioned wells annually 1947-2024.

Well abandonment operations, both temporary and permanent, can occur at any well phase. Permanent abandonment operations are undertaken when a wellbore is of no further use to the

operator (i.e., the well is a dry hole or the well's producible hydrocarbon resources have been depleted). From 2015-2024, an average of 411 wells per year were permanently plugged-and-abandoned, totaling 4,109 wells decommissioned within that timeframe (**Table C.2-1**) (ONRR 2020). During permanent abandonment, equipment is removed from the well, and specific intervals in the well that contain hydrocarbons are plugged with cement. A cement surface plug is also required for the abandoned well. The cement surface plug serves as the final isolation component between the wellbore and the environment. An operator may opt for temporary abandonment to (1) allow detailed analyses or additional delineation wells while deciding if a discovery is economically viable, (2) save the wellbore for a future sidetrack to a new geologic bottom-hole location, or (3) wait on design or construction of special production equipment or facilities. Abandoned wells are also sometimes converted into injection wells to store carbon dioxide, dispose of wastewater, enhance oil production and mining, or prevent saltwater intrusion. BOEM is currently funding a study to examine the potential existence and prevalence of leaking abandoned wells with a report expected in late 2026. BOEM has considered the potential risk that methane leakage from abandoned oil and gas wells in the Gulf of America OCS may pose to marine life. Although research is limited, risks to marine organisms could arise from the chemical interactions of methane upon entering the water column, including microbial degradation that leads to localized oxygen depletion (Kessler et al. 2011). However, factors like water depth, pressure, currents, wave action, dissolution, and biodegradation are likely to substantially decrease methane concentrations, thereby reducing the likelihood of acute and secondary effects on exposed marine life. Additionally, the GOA has numerous natural methane seeps, and many marine organisms have evolved adaptations to cope with elevated methane levels over time. While localized effects on marine organisms are possible, the combined influence of environmental factors that lower methane concentrations reduce the likelihood of impacts on individuals, localized communities, and populations. Given the limited and incomplete information on this subject, BOEM determined that it is not essential for a reasoned choice among alternatives, and therefore, does not warrant additional detailed analysis in this Programmatic EIS.

Once the wellbore is plugged and passes an integrity test, the operator then is required to remove wellheads and casings at a minimum of 15 feet (ft) (5 meters [m]) below mudline (BML) in accordance with 30 CFR 250.1716. The majority of BML cuts are accomplished using regular mechanical tools like a carbide cutter that is affixed to a drill string, which takes advantage of the rotary table of the drilling unit to power the unit and then lift the wellhead and casings to the surface after the severance is complete. When wells are secured to a surface structure, the wells are often brought to temporary abandonment status and the associated conductor left until the structure is decommissioned or a "slot recovery" is needed to remove the conductor and make space for sidetrack drilling operations. Similar to independent wellheads, the temporarily abandoned wells are required to have their conductors cut to 15 ft (5 m) BML during the structure decommissioning and, once the conductors are cut and pulled, the well is given permanent abandonment status. However, if the structure jacket is accepted into the Rigs-to-Reefs Program to be reefed-in-place, BSEE does allow for the conductors to be cut at the height of jacket top (BSEE 2019).

Table C.2-1 . Wells Decommissioned and Permanently Plugged-and-Abandoned by Water Depth (meters) from Calendar Years (CY) 2015 to 2024.

Year	0-60 m	61-200 m	201-800 m	801-1600 m	>1600 m	Total
2015	311	93	16	24	30	474
2016	492	94	30	43	24	683
2017	278	75	24	27	19	423
2018	253	83	29	20	12	397
2019	215	36	16	20	17	304
2020	77	31	59	23	24	214
2021	180	54	27	23	17	301
2022	269	78	20	26	6	399
2023	481	96	12	21	13	623
2024	223	37	4	16	11	291
Total	2,779	677	237	243	173	4,109

Under 30 CFR 250.1716(b), operators can request an alternate depth from the 15-ft (5-m) BML requirement for wellheads in depths greater than 1,000 ft (305 m) since there could be future usefulness in allowing the wellhead to remain above mudline (AML). An AML wellhead can provide for near-immediate reentry into the wellbore, should it be required for safety issues, relief wells, or other downhole management issues. Operator APMs requesting abandonment of the wellhead are required to provide a justification in alignment with the regulations, information on the type of wellhead, and the aerial and lateral measurements of the AML components. A site-specific NEPA review is conducted on each APM proposing wellhead abandonment in place to assess possible conflicts with deepwater commercial bottom trawling (generally limited to rock shrimp, royal red shrimp, and calico scallops) and military operations. The northern Gulf of America OCS is used extensively by the U.S. military for aircraft, vessel, and weapons training exercises, which mostly occur on the water surface and already require industry notification so not to interfere with their operations. However, exercises and deployments involving U.S. Navy submarines could still occur near the seafloor. Therefore, BSEE provides documentation to the U.S. Navy of the final abandonment, including location data, the height off the seabed, and abandoned items.

C.2.2 Structures

During exploration, development, and production operations, the seafloor around activity sites within a proposed lease sale area becomes the repository of temporary and permanent equipment and structures (i.e., platforms, fixed structures, floating structures, moorings, and well heads). In compliance with Section 22 of BOEM's Oil and Gas Lease Form (BOEM-2005) and BSEE regulations (30 CFR 250.1725 and 30 CFR 250.1740), operators must remove seafloor obstructions from their leases within 1 year of lease termination or after a structure has been deemed obsolete or unusable and verify site clearance within 60 days after removal. Under 30 CFR 250.1730, the BSEE Regional Supervisor may grant a departure from the requirement to remove the jacket assembly or other structure component if it is accepted by an approved, state artificial reef program and meets

the safety and environmental standards outlined in BSEE's Rigs-to-Reefs Program Policy (BSEE 2019).

Platforms are structures that allow the extraction, transfer, and processing of oil and natural gas, which is different from drilling rigs that "drill" a well to discover hydrocarbons and bring them to the surface for processing. Platforms generally consist of two parts for decommissioning purposes: the topside (the structure visible above the waterline) and the substructure (the parts between the waterline and the seabed, or mudline). In most cases the topsides, which contain the operational components, are taken to shore for recycling, scrap, or re-use. For fixed structures (e.g., jackets, compliant towers, and caissons), substructures are required to be removed 15 ft (3 m) BML in accordance with 30 CFR 250.1728 then brought to shore to sell as scrap for recycling, refurbished for installation at another location, or have components used as reef material. Floating facilities (e.g., TLPs, mini TLPs, spars, semisubmersibles, and floating production storage and offloading vessels) have slightly different decommissioning processes, wherein their associated moorings (i.e., cables, chains, lines, etc.) are disconnected from their anchors or suction piles and removed. Depending on water depth, recovery issues, and potential conflicts with other users, operators can request an alternate removal depth for the platform or other facility after decommissioning under 30 CFR 250.1728(b).

Installations of new structures in shallow water are not expected to increase unless there is a dramatic change in current conditions or new plays arise in the future, which is not reasonably foreseeable. The number of structures in water depth less than 400 ft peaked in 2001 at 3,972. Since then, the number of structures in the GOA has dramatically decreased (**Figure C.2-2**). A total of 7,090 structures have been decommissioned and removed by the year 2024. As of March 31, 2025, there are 1,360 active structures (i.e., caissons, well-protector structures, and jacketed and floating facilities) remaining on the Gulf of America OCS and a total of 308 structure decommissioning applications have been submitted to BSEE, with 225 of those applications pertaining to structures located on terminated leases. Of the 308 structure decommissioning applications, 199 (about 63 percent) proposed removal and transport back to shore, 109 (about 35 percent) proposed either reefing in place or relocating through the rigs-to-reefs program, and the remaining 6 (about 2 percent) proposed reuse (BSEE 2025).

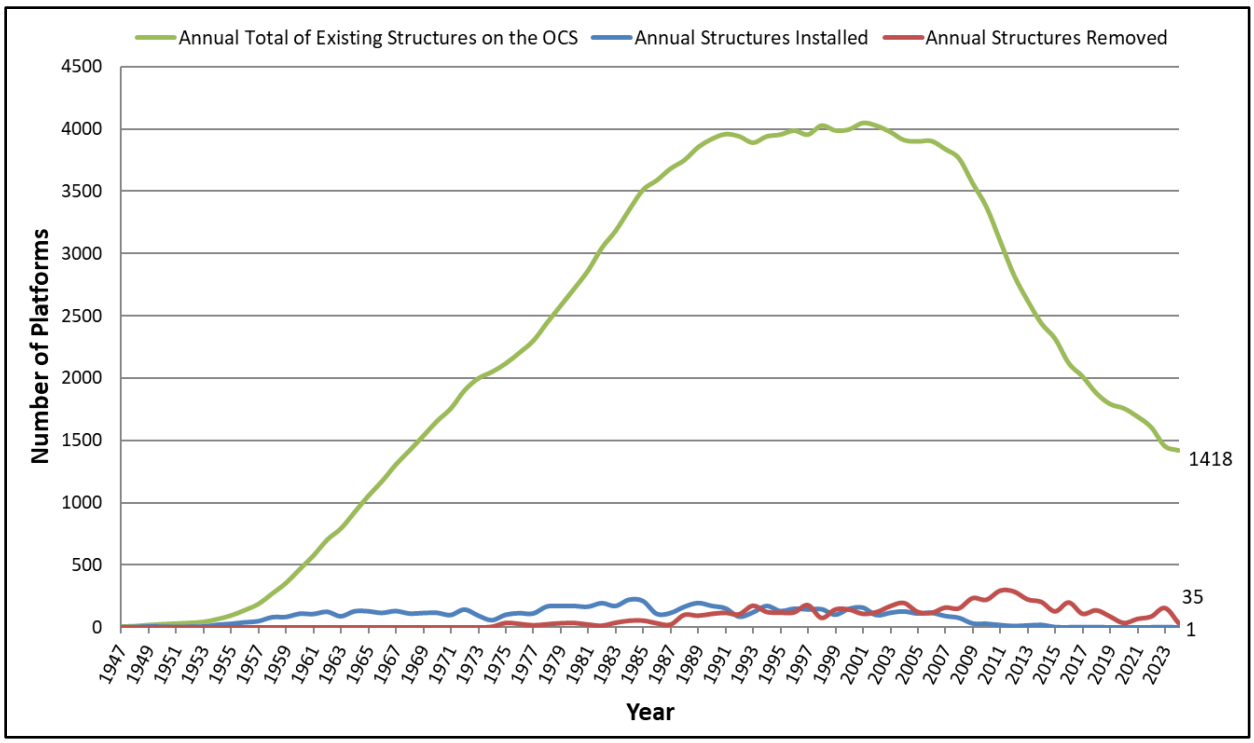

Figure C.2-2. Structures Installed, Structures Removed, and Total Existing Structures on the OCS Annually 1947-2024.

Research by Kaiser and Narra (2018) suggests that decommissioning activity for shallow water areas fluctuates year-to-year, and from 2007 through 2017 between 100 and 290 structures were decommissioned annually in water depths less than 400 ft (122 m). This level of decommissioning activity in water depths less than 400 ft (122 m) is likely the result of aging infrastructure, maturity of producing properties in the region, sustained low oil and gas prices, and regulatory conditions and oversight (Kaiser and Narra 2018). Over the past decade, the offshore energy industry has averaged 104 platform removals per year with fewer (averaging 76 removals per year) happening over the last 5 years (Table C.2-2). From 1989 to 2017, a total of 23 platform structures in water depths greater than 400 ft (122 m) were decommissioned (Kaiser and Narra 2018). This level of decommissioning activity in water depths greater than 400 ft (122 m) is due to several factors, but the most obvious are the small number of structures installed annually, as well as the major capital expenditures and planning required in development and execution of decommissioning operations. From 2015-2024, approximately 99 percent of all structure removals were in water depths less than 656 ft (200 m) (**Table C.2-2**). Similar decommissioning activity rates in water depths greater than 656 ft (200 m) are expected in the years ahead unless alternative uses for structures are found.

Table C.2-2. Number of Structures Removed by Calendar Year and Water Depth (in meters).

Year	0-60 m	61-200 m	201-800 m	801-1600 m	>1600 m	Total
2015	118	10	0	0	0	**128**
2016	179	19	1	0	0	**199**

Year	0-60 m	61-200 m	201-800 m	801-1600 m	>1600 m	Total
2017	97	11	1	0	0	**109**
2018	117	19	1	0	0	**137**
2019	80	7	0	0	1	**88**
2020	33	2	1	0	0	**36**
2021	62	5	1	0	0	**68**
2022	75	12	0	0	0	**87**
2023	148	6	1	0	0	**155**
2024	32	2	1	0	0	**35**
Total	**941**	**93**	**7**	**0**	**1**	**1,042**

Various severing devices and methods are used to cut structural targets during decommissioning activities. The structures are generally grouped into two main categories depending upon their relationship to the platform/facilities (i.e., piles, jackets, caissons, templates, mooring devices, etc.) or the well (i.e., wellheads, casings, casing stubs, etc.). The methodologies and tools for removal operations are generally grouped and classified as either nonexplosive or explosive. Operators and contractors decide which severing tool to use based on the consideration of the target size and type, water depth, economics, environmental concerns, tool availability, and weather conditions. Explosive and nonexplosive severing tools are used on the OCS for a wide array of structure and well decommissioning targets in all water depths. Both methods are typically deployed, either together as a backup or separately depending on the specific needs of the operation. These tools can be deployed and operated by divers, remotely operated vehicles, or from the surface. Common nonexplosive severing tools consist of abrasive cutters (e.g., sand cutters and abrasive water jets), mechanical (carbide) cutters, diver cutting (e.g., underwater arc cutters and the oxyacetylene/oxy-hydrogen torches), and diamond wire cutters. Explosive severing methods include (1) mechanical distortion (ripping), (2) high-velocity jet cutting, and (3) fracturing or “spalling.” From 2013 to 2022, approximately 65 percent of future platform removal permit applications requested authorization for the use of explosive severing methods, often as a back-up cutter when other nonexplosive methodologies prove unsuccessful (Welsch 2023, official communication). From 2015-2024, however, only 18 percent of removals used explosives (**Table C.2-3**). BOEM expects similar trends for the foreseeable future.

Table C.2-3. Number of Structures Decommissioned and Removed from CY 2015 to 2024 Using Explosive or Non-Explosive (Mechanical) Severance Methods.

Year	Explosive	Non-explosive (Mechanical)	Total Count
2015	41	87	**128**
2016	34	165	**199**
2017	22	87	**109**
2018	33	104	**137**
2019	17	71	**88**
2020	4	32	**36**

Year	Explosive	Non-explosive (Mechanical)	Total Count
2021	11	57	**68**
2022	14	73	**87**
2023	11	144	**155**
2024	4	31	**35**
Total Count	**191**	**851**	**1,042**

After all decommissioning work is completed and the structure is salvaged, operators are required to perform site-clearance verification (SCV) work to ensure that the seafloor is clear of all obstructions created during their lease, ROW, or RUE operations in compliance with 30 CFR § 250.1703(e). Based upon requirements found in 30 CFR 250.Q (30 CFR 250.1740-1743), removed platforms that were in less than 300 ft (91 m) water depth, the operator is required to trawl with nets similar to those used by commercial fishermen to reduce the risk of getting entangled in OCS debris. Removal of platforms in deeper water depths, areas near archaeological or biological resources, and when certain seafloor conditions make trawling activities hazardous, operators may also request SCV using high-resolution sonar or ROV surveys to detect debris and/or obstructions and help facilitate its removal.

The SCV regulations at 30 CFR 250.1741 outline the minimum requirements associated with the various infrastructure types. Facilities damaged or toppled during storm events often have debris displaced far outside the minimal areas, and BSEE may require larger SCV coverage and/or surveying to ensure that all the material is retrieved and the potential for space-use conflicts is reduced.

C.2.3 Pipelines and Other Appurtenances

There is a range of offshore infrastructure installed for hydrocarbon production, including pipelines, bottom-fixed and floating platforms, caissons, well protectors, casing, wellheads, flowlines and risers, manifolds, jumpers, flowline support sleds, subsea systems, and conductors. In accordance with 30 CFR 250.1725, offshore operators are required to clear all platforms and other facilities within 1 year after the lease, pipeline right-of-way, or right-of-use and easement terminates. While platforms and other facilities are typically removed, pipeline-related infrastructure (which are separate components like subsea systems, umbilical lines, pipeline end terminations, pipeline end manifolds, pumps, electrical and hydraulic flying leads that are attached to, but not considered part of the main piping segments) might not be removed from the seafloor in water depths greater than 600 ft (182 m) when approved by BSEE under certain conditions. BSEE currently considers 600 ft (182 m) to be an appropriate minimum depth for consideration of requests (which may or may not result in approval) to allow DIP of pipeline-related infrastructure because 600 ft (182 m) is below the depths at which trawling equipment for commercial fishing can typically reach. In water depths less than 600 feet, however, pipeline-related infrastructure is typically removed and obstructions cleared given the potential for obstruction or interference with other uses of the OCS, like commercial trawling fisheries. Most pipeline-related infrastructure in shallower waters will be removed, and

obstructions cleared, as presumptively required by the 30 CFR 250.Q regulations. For pipeline-related infrastructure that remains on the seafloor, BOEM performs an additional NEPA review as part of the decommissioning application submitted to BSEE (refer to Chapter 5 of the GOM Oil and Gas SID).

Since the 1940s, the offshore oil and gas industry has installed over 50,000 mi (80,467 km) of oil and gas pipelines in Federal offshore waters of the GOA. As of May 2025, approximately 25,300 mi (40,716 km) of those pipelines (which includes Department of Transportation (DOT) permitted pipelines) were considered active or have not yet been fully decommissioned. From 2015 to 2024, roughly 5,657 mi (9,104 km) of pipeline were decommissioned; approximately 94 percent of which was abandoned-in-place (5,334 mi; 8,584 km) in accordance with 30 CFR 250.1750 (**Table C.2-4**) while the other 6 percent was removed (323 mi; 520 km) (**Table C.2-5**). Generally, pipelines must be removed from the seafloor; however, under 30 CFR 250.1750, pipelines may be abandoned-in-place (i.e., DIP) when the BSEE Regional Supervisor determines that the pipeline does not constitute a hazard (obstruction) to navigation and commercial fishing operations, unduly interfere with other uses of the OCS, or have adverse environmental effects.

Table C.2-4. Length (in miles)[1] of Pipeline Abandoned-in-Place for CY 2015 to 2024 by Water Depth Category.

Water Depth	0-60 m	61-200 m	201-800 m	801-1600 m	>1600 m	Undefined[2]	Total
2015	136.3	182.6	93.6	17.2	213.9	12.9	656.4
2016	281.6	233.2	79.2	58.6	24.5	2.1	679.2
2017	133.2	251.9	195.1	15.6	371.0	8.9	975.6
2018	93.6	156.2	34.7	30.9	40.7	11.1	367.2
2019	139.8	187.9	74.0	58.6	8.2	26.2	494.7
2020	153.5	109.6	128.5	0.0	11.3	0.0	402.9
2021	93.1	131.0	69.0	20.8	145.8	8.2	467.8
2022	178.8	119.4	92.5	5.5	69.4	6.6	472.2
2023	103.6	222.2	84.7	0.0	111.0	14.3	535.8
2024	26.7	102.0	76.8	0.0	77.3	0.0	282.8
Total	1,340.1	1,696.0	928.0	207.1	1073.1	90.2	5,334.4

[1] Pipelines differ in diameter; the vast majority (greater than 98%) range from 6-42 inches.
[2] Total length of segments for which water depth was not reported in the available dataset.

Table C.2-5. Length (in miles)[1] of Pipeline Decommissioned and Removed for CY 2015 to 2024 by Water Depth Category.

Water Depth	0-60 m	61-200 m	201-800 m	801-1600 m	>1600 m	Undefined[2]	Total
2015	2.7	0.0	0.0	0.0	0.1	2.0	4.8
2016	34.8	0.9	4.3	0.0	2.1	0.0	42.2
2017	4.1	0.0	0.0	0.0	0.1	1.6	5.8
2018	28.2	0.2	0.0	0.0	0.3	3.3	31.9
2019	30.7	14.8	0.0	0.0	0.2	11.1	56.8

Water Depth	0-60 m	61-200 m	201-800 m	801-1600 m	>1600 m	Undefined[2]	Total
2020	36.9	7.3	14.0	0.0	0.1	2.9	61.1
2021	22.6	2.4	0.0	0.0	0.1	0.0	25.1
2022	11.7	7.5	0.0	0.0	0.2	0.4	19.7
2023	13.5	31.7	0.0	0.0	0.3	0.4	45.8
2024	21.2	3.6	4.7	0.0	0.1	0.0	29.6
Total	206.4	68.2	23.1	0.1	3.6	21.6	322.9

[1] Pipelines differ in diameter; the vast majority (greater than 98%) range from 6-42 inches.
[2] Total length of segments for which water depth was not reported in the available dataset.

An offshore pipeline must be decommissioned at the end of its useful life (30 CFR 250.1006), which may or may not initially involve cleaning the line using pigging. Pigging is a procedure used to clear residual gas or liquid (Clark and Nestleroth 2004). After evaluating the feasibility of pigging, a decommissioned pipeline will then be flushed or flushed alone, with the pipeline endpoints plugged and cut. Each endpoint will be buried below the seabed or covered with a concrete mat.

A 2002 MMS (the predecessor of BSEE and BOEM) study indicates that the procedure outlined in 30 CFR 250.1006 for flushing out-of-service pipelines removes impurities that pose a risk to the integrity of the pipeline (Auer 2002; BSEE 2012). These practices appear to help preserve the pipeline for potential future reactivation; however, the sample size was limited (consisting of only 4 pipeline segments), and more research is needed for statistical reliability. BSEE has a study underway to evaluate the potential environmental impacts from pipelines and pipeline-related infrastructure (including those abandoned- or decommissioned-in-place) on coastal and marine waters, and the associated ecosystems and sensitive habitat/species of the Gulf of America OCS. The study will focus on assessing the potential contamination risk from potentially hazardous residual materials within pipelines and associated equipment (e.g., scale, paraffin, chemicals, normally-occurring radioactive material [NORM]) after decommissioning requirements and seawater flushing is completed per 30 CFR 250.Q. A sampling plan was developed, and collection efforts and subsequent laboratory assessments are expected over a two-year period. Once the final report is prepared, the research findings will be made available to BOEM to inform future NEPA analyses that support BSEE's pipeline permitting program, and for assessing if future policy or regulatory modifications are warranted.

Once flushed, decommissioned pipelines can be removed from the seabed by reverse lay barge or reel recovery, J-lift recovery, tow recovery, or sectional recovery as discussed in Chapter 2.3.1 of the GOM Oil and Gas SID. The recovery of decommissioned and removed pipeline sections could be accomplished by rigging a winch wire to the pipeline and lifting it to a barge. A crane may be used in conjunction with a winch to hoist the pipeline onto a recovery vessel. Excavation may be required to remove some pipelines, or they may be recovered without excavation if enough lifting force can be applied. In addition, some decommissioning operations, such as subsea tie-in (SSTI) disconnection and installing caps and anchoring pipeline ends, might require local excavation to

access work points. Localized seafloor turbidity, followed by sedimentation could occur in areas where the pipeline is dragged over the seafloor during removal or in the area of excavation. Compaction of the seafloor could occur within the footprint of anchors set by vessels removing the pipeline. Pipeline materials are transported to approved onshore disposal facilities, with the purpose of refitting and reuse at another OCS location or the materials' eventual scrapping/recycling.

The regulations governing Pipelines and Pipeline Rights-of-Way are under 30 CFR 250.J at 30 CFR 250.1000-1019. In March 2021, the GAO published a report, “Offshore Oil and Gas: Updated Regulations Needed to Improve Pipeline Oversight and Decommissioning” (GAO 2021) that determined BSEE’s pipeline regulations were outdated. In response, DOI continues to strengthen oversight and is currently working towards the implementation of updated regulations.

C.3 IDLE INFRASTRUCTURE DURING DECOMMISSIONING

Infrastructure that is no longer useful for operations must be decommissioned pursuant to 30 CFR 250.1703. This “idle iron,” can include wells, structures, and pipelines that pose potential safety and environmental impacts to personnel and sensitive OCS resources, especially if components are allowed to deteriorate or become damaged or toppled during storm events. In general, idle iron applies to wells or platforms (structures) on active leases that have not been used in the past 5 years and for which there is no future utility as determined by BSEE.

Structural deterioration of boat landings, gratings, ladder wells, and handrails needed to access and traverse platforms increases safety risks to industry personnel and BSEE inspectors. Firefighting and other safety equipment on idle facilities may not function when needed, and the risk of vessel collisions may also increase if required lighting and other navigational aids are not maintained on idle platforms. Similarly, aging tanks, piping, storage units, and other equipment may compromise integrity and lead to the leakage of contaminants (including air emissions) into marine environments (Jernelöv 2010; National Academies of Sciences 2022). Fish and other marine protected species in the immediate vicinity of the structure may experience acute and chronic impacts.

Storm-toppled wells and facilities may introduce broad environmental hazards due to hydrocarbon and contaminant leaks from the damaged wells and submerged tanks, piping, and equipment. There are also increased safety risks due to potential impacts to other OCS users from unmarked seabed obstructions and the need for extremely dangerous diving and lifting operations required to gain access to the well conductors for plugging and abandoning activities and to remove the toppled platform decks and jackets, production equipment, and extensive debris fields. Storm systems also have the capacity to unbury and shift pipelines dozens to hundreds of feet outside of their prior routes and several feet up into the water column, making them more susceptible to snagging by anchored vessels and commercial trawlers. These snagged pipelines result in unnecessary space-use conflicts and may lead to potential hydrocarbon leaks and injury to crews.

The GAO, in its January 2024 report "Interior Needs to Improve Decommissioning Enforcement and Mitigate Related Risks" (GAO 2024) noted that delayed decommissioning increases environmental, safety, and financial risks. The GAO found that DOI could better enforce decommissioning deadlines and mitigate the safety, environmental, and financial risks that unmet decommissioning obligations pose by ensuring BSEE and BOEM prioritize completing planned actions. The GAO made four recommendations to DOI to strengthen BSEE and BOEM's decommissioning oversight and enforcement: (1) strengthen BSEE's approach to proactively overseeing and enforcing decommissioning deadlines; (2) complete planned actions to identify, propose, finalize, and fully implement changes to decommissioning regulations and guidance; (3) complete planned actions to further develop, finalize, and fully implement changes to financial assurance regulations and procedures that reduce financial risks; and (4) complete planned actions to assess and revise qualification procedures to address decommissioning capacity and compliance history. The DOI is currently working towards implementing the GAO report recommendations.

C.3.1 Defining Idle Infrastructure Qualifications – 30 CFR 250.1703

Unlike the regulatory decommissioning timeframe requirements for wells and platforms on *terminated/expired leases*, there is no prescriptive regulation providing a timeframe for which idle platforms and wells on *active leases* must be decommissioned. To provide additional guidance to lessees and ROW/RUE holders on their decommissioning obligations for idle infrastructure on active leases, BSEE developed NTL No. 2010-G05 and then NTL No. 2018-G03 to clarify when the Bureau may deem infrastructure "no longer useful for operations" and "not capable of oil, gas, and sulfur production in paying quantities" and the associated timeframes for decommissioning. The NTL also provides guidance for companies that believe their infrastructure may be useful for future operations or capable of production in paying quantities, which includes the submittal of supporting documentation for review and concurrence. When BSEE concurs that a well may be useful and is capable of producing in paying quantities, companies are informed that they may still be required to ensure the well is secured and that producing zones are isolated to prevent potential safety and environmental impacts.

C.3.2 Decommissioning Compliance and Enforcement Framework for Idle Infrastructure

BOEM enforces its right to secure financial assurance pursuant to regulations found in 30 CFR 556.900 et seq. The regulations outline the decommissioning obligations for lessees and operators and provide the discretion for BOEM to require supplemental financial assurance outside the base amounts when certain regulatory factors are met.

When companies declare bankruptcy, some, or all, of their decommissioning obligations could remain unfulfilled, shifting the financial burden to predecessor lessees or in some cases, to taxpayers by way of BOEM as the regulating agency. However, 30 CFR 556.900 et seq. provides discretion for BOEM to set the necessary financial assurance levels to minimize the possibility that those costs fall to taxpayers. Furthermore, if firms declare bankruptcy, predecessor lessees are

jointly and severally liable for meeting decommissioning liabilities, and financial assurance can be used to cover decommissioning costs. This rule fortifies financial protections, minimizing the risk that U.S. taxpayers inherent the cost for failures in compliance under OCSLA — especially when it comes to decommissioning oil and gas facilities. On May 2, 2025, the Trump-Vance Administration announced their intent to revise this rule for a more balanced regulatory approach while still protecting U.S. taxpayers from high-risk decommissioning liabilities. At the time of this Programmatic EIS, however, a proposed rule remained forthcoming.

In 2016, BSEE amended its regulations addressing decommissioning expenditure reporting to include decommissioning expenditure summaries for right-of-way and lease term pipelines, and in 2017, BSEE issued Notice to Lessees and Operators No. 2017-N02, *Reporting Requirements for Decommissioning Expenditures on the OCS*, regarding submission of certified decommissioning cost expenditure summaries following permanent plugging of any well, removal of any platform or other facility, clearance and verification of any site, and decommissioning of pipeline segments. The information is used to improve estimates of future decommissioning costs, which BOEM can apply to set necessary financial assurance levels to minimize the possibility that the taxpayers, through the government, will incur the costs of decommissioning when financial assurance amounts are insufficient or require more financial assurance than necessary to cover future decommissioning liabilities. Additionally, pursuant to DOI regulations, predecessor lessees are jointly and severally liable for meeting decommissioning liabilities, and financial assurance can be used to cover decommissioning costs.

Operators have 3 years to decommission idle wells and 5 years to decommission idle structures. Wells may get a 2-year extension by using zonal isolation. Operators may submit a Future Utility Plan which can postpone decommissioning in order to recover reserves associated with the wellbore. If an operator can document that a well or structure has future use, it will defer decommissioning activities until the approved timeframe or deadline. For example, a well may have a recompletion to another productive zone, and a structure may have a well with sidetrack potential to a new zone which may return the well and structure to production. An operator must submit the appropriate information to justify future use. The BSEE Decommissioning Support Section generates an annual list for each operator with idle structures or wells, known as the Idle Iron List. If any of the requisite items are not submitted and managed within the specified timeframes or if decommissioning activities are not conducted according to the Decommissioning Plan, then BSEE has the ability to issue an Incident of Noncompliance (INC) outlining corrective actions and/or move towards other enforcement actions, including a civil penalty.

C.3.3 Idle Infrastructure Inspections and Monitoring

As of September 2024, there were approximately 950 idle wells and 175 idle facilities identified by BSEE on the Gulf of America OCS. At the end of 2024, approximately 357 mi (575 km) of pipeline was inactive for 5 or more years but not yet flushed and filled. Safety and environmental-compliance inspections are maintained on idle infrastructure, before and after issuance of the Bureau orders noted above, in accordance with field compliance priorities outlined in the GOA

Region's Annual Inspection Plan. The focus of the safety and environmental-compliance inspection remains the same as that for an active facility and is variable only with regards to the existing wells and equipment. Despite an associated Decommissioning Plan and approved schedule, should an inspection of idle infrastructure identify any component that poses a threat of serious, irreparable, or immediate harm to human health and safety or the environment and/or violates an associated law, regulation, or other conditional requirement, BSEE can issue a Bureau order under 30 CFR 250.107(d) for the "shut-in" of the operations or facility and require immediate remediation, decommissioning, and removal. Failure to comply with a shut-in order can result in an INC, civil penalty, and/or disqualification as an OCS operator.

C.4 REFURBISHMENT/REUSE, SCRAPPING, AND DISPOSAL STREAMS

Most of the material that is decommissioned and removed from the OCS has the potential for continued use following refurbishment or has value in the form of scrap slated for recycling. Virtually no steel (with the exception of some pilings and conductors cased in cement) is typically landfilled (Dismukes et al. 2007). A small amount of obsolete equipment that cannot be brokered and sold may ultimately be disposed in a landfill. Decommissioned well components, pipeline infrastructure (e.g., PLEMs, PLETs, valving, and couplers), and platform equipment that can be refurbished and reused (in part or as a complete unit) are taken to their associated manufacturing or assembly companies once brought back to shore. The equipment is then sandblasted, stripped, or treated for surface corrosion and then decontaminated in the yard with steam and/or solvents according to State permitting prior to any expendable replacements and recalibration. Similarly, deck assemblies and jackets from decommissioned platforms that are still within their design life are returned to fabrication yards for repairs and refurbishment work to allow for their use at alternative State water and OCS sites. Structural components are stripped to allow for flooded-member testing and x-ray work on critical welds. Once the assessments are complete and the items repaired and retested, they are treated and coated similar to that of new structural items and prepared for return to service.

Well, pipeline, and structure equipment and other components removed from the OCS with no future use are most often transported to specialized fabrication and/or scrap yards that can manage any requisite decontamination (as noted above with steam and solvents) and the additional processing needed to allow for the scrapping process to begin. The steel used in most offshore equipment and structural components is highly recyclable and can help recoup some costs associated with the decommissioning process. Most of the scrap yards are located along the Gulf Coast of Louisiana and Texas in industrial areas that also support offshore oil and gas operations. These areas are generally found in Venice, New Orleans, Houma, Morgan City, New Iberia, and Cameron, Louisiana and in Galveston, Houston, Corpus Christi, and Brownsville, Texas. Once decontaminated, sorted, and sized, the material is loaded onto trucks, train cars, and/or barges for transport to steel recycling centers that further sort the items by alloy types before being melted in electric arc furnaces along with other chemicals and material to allow for purification and reforming into new steel.

A much smaller amount of non-metal debris that primarily consist of wooden pallets, plastics, ropes and lines, tires (used for boat-landing bumpers), and minor equipment items that cannot be recycled are also collected during facility decommissioning and SCV efforts. Once brought to shore, the material is transferred to dockside dumpsters provided by the operator. In most cases, these are managed by contractors to coordinate the necessary State and local permitting and oversee final transport to landfills and waste processing centers.

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APPENDIX D

GLOSSARY

D GLOSSARY

Acute—Sudden, short term, severe, critical, crucial, intense, but usually of short duration, as opposed to chronic. Effects associated with acute can vary depending on the context of its use (e.g., acute [short-term] exposure could be more or less problematic than chronic [long-term] exposure).

API gravity—A standard adopted by the American Petroleum Institute for expressing the specific weight of oil.

Aromatic—Class of organic compounds containing benzene rings or benzenoid structures.

Barrel (bbl)—A volumetric unit used in the petroleum industry; equivalent to 42 U.S. gallons or 158.99 liters.

Benthic—On or in the bottom of the sea.

Biological Opinion—The FWS or NMFS evaluation of the impact of a proposed action on endangered and threatened species, in response to formal consultation under Section 7 of the Endangered Species Act.

Block—A geographical area portrayed on official BOEM protraction diagrams or leasing maps that contains approximately 5,760 ac (2,331 ha; 9 mi^2).

Cetacean—Aquatic mammal of the order Cetacea, such as whales, dolphins, and porpoises.

Chemosynthetic—Organisms that obtain their energy from the oxidation of various inorganic compounds rather than from light (photosynthetic).

Coastal waters—Waters within the geographical areas defined by each State's Coastal Zone Management Program.

Coastal wetlands—forested and nonforested habitats, mangroves, and marsh islands exposed to tidal activity. These areas directly contribute to the high biological productivity of coastal waters by input of detritus and nutrients, by providing nursery and feeding areas for shellfish and finfish, and by serving as habitat for birds and other animals.

Coastal zone—The coastal waters (including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder) strongly influenced by each other and in proximity to the shorelines of several coastal states; the zone includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, and it extends seaward to the outer limit of the United States territorial sea. The zone extends inland from the shorelines only to the extent necessary to control shorelands, the uses of which have a direct and significant impact on the coastal waters. Excluded from the coastal zone are lands the use of which is by law subject to the discretion of or which is held in trust by the Federal Government, its officers, or agents (also refer to State coastal zone boundaries).

Completion—Conversion of a development well or an exploration well into a production well.

Continental margin—The ocean floor that lies between the shoreline and the abyssal ocean floor, includes the continental shelf, continental slope, and continental rise.

Continental shelf—General term used by geologists to refer to the continental margin province that lies between the shoreline and the abrupt change in slope called the shelf edge, which generally occurs in the Gulf of America at about the 200-m (656-ft) water depth. The continental shelf is characterized by a gentle slope (about 0.1°). This is different from the juridical term used in Article 76 of the United Nations Convention on the Law of the Sea Royalty Payment (refer to the definition of Outer Continental Shelf).

Continental slope—The continental margin province that lies between the continental shelf and continental rise, characterized by a steep slope (about 3°-6°).

Critical habitat—Specific areas essential to the conservation of a protected species and that may require special management considerations or protection.

Crude oil—Petroleum in its natural state as it emerges from a well or after it passes through a gas-oil separator, but before refining or distillation. An oily, flammable, bituminous liquid that is essentially a complex mixture of hydrocarbons of different types with small amounts of other substances.

***Deepwater Horizon*—**The name of a ultra-water semi-submersible drilling unit, owned by Transocean and operated by BP. During drilling at the Macondo prospect in the Gulf of America on April 20, 2010, a blowout led to an explosion, resulting in the *Deepwater Horizon* sinking. The period began April 24, 2010, when search and recovery vessels on site reported oil at the sea surface, to September 19, 2010, when the uncontrolled flow from the *Macondo* well was capped.

Delineation well—A well that is drilled for the purpose of determining the size and/or volume of an oil or gas reservoir.

Demersal—Living at or near the bottom of the sea.

Development—Activities that take place following discovery of economically recoverable mineral resources, including geophysical surveying, drilling, platform construction, operation of onshore support facilities, and other activities that are for the purpose of ultimately producing the resources.

Development Operations Coordination Document (DOCD)—A document that must be prepared by the operator and submitted to BOEM for approval before any development or production activities are conducted on a lease in the western Gulf of America.

Development well—A well drilled to a known producing formation to extract oil or gas; a production well; distinguished from a wildcat or exploration well and from an offset well.

Discharge—Something that is emitted; flow rate of a fluid at a given instant expressed as volume per unit of time.

Dispersant—A suite of chemicals and solvents used to break up an oil slick into small droplets, which increases the surface area of the oil and hastens the processes of weathering and microbial degradation.

Dispersion—A suspension of finely divided particles in a medium.

Drilling mud—A mixture of clay, water or refined oil, and chemical additives pumped continuously downhole through the drill pipe and drill bit, and back up the annulus between the pipe and the walls of the borehole to a surface pit or tank. The mud lubricates and cools the drill bit, lubricates the drill pipe as it turns in the wellbore, carries rock cuttings to the surface, serves to keep the hole from crumbling or collapsing, and provides the weight or hydrostatic head to prevent extraneous fluids from entering the well bore and to downhole pressures; also called drilling fluid.

Effluent—The liquid waste of sewage and industrial processing.

Essential habitat—Specific areas crucial to the conservation of a species and that may necessitate special considerations.

Estuary—Coastal semi-enclosed body of water that has a free connection with the open sea and where freshwater meets and mixes with seawater.

Eutrophication—Enrichment of nutrients in the water column by natural or artificial methods accompanied by an increase of respiration, which may create an oxygen deficiency.

Exclusive Economic Zone (EEZ)—The maritime region extending 200 nm (230 mi; 370 km) from the baseline of the territorial sea, in which the United States has exclusive rights and jurisdiction over living and nonliving natural resources.

Exploration Plan (EP)—A plan that must be prepared by the operator and submitted to BOEM for approval before any exploration or delineation drilling is conducted on a lease.

Exploration well—A well drilled in unproven or semi-proven territory to determining whether economic quantities of oil or natural gas deposit are present.

Field—An accumulation, pool, or group of pools of hydrocarbons in the subsurface. A hydrocarbon field consists of a reservoir in a shape that will trap hydrocarbons and that is covered by an impermeable, sealing rock.

Floating production, storage, and offloading (FPSO) system—A tank vessel used as a production and storage base; produced oil is stored in the hull and periodically offloaded to a shuttle tanker for transport to shore.

Geophysical survey—A method of exploration in which geophysical properties and relationships are measured remotely by one or more geophysical methods.

Habitat—A specific type of environment that is occupied by an organism, a population, or a community.

Harassment—An intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, feeding or sheltering.

Hydrocarbons—Any of a large class of organic compounds containing primarily carbon and hydrogen. Hydrocarbon compounds are divided into two broad classes: aromatic and aliphatics. They occur primarily in petroleum, natural gas, coal, and bitumens.

Hypoxia—Depressed levels of dissolved oxygen in water, usually resulting in decreased metabolism.

Incidental take—Takings that result from, but are not the purpose of, carrying out an otherwise lawful activity (e.g., fishing) conducted by a Federal agency or applicant (refer to Taking).

Infrastructure—The facilities associated with oil and gas development, e.g., refineries, gas processing plants, etc.

Jack-up rig—A barge-like, floating platform with legs at each corner that can be lowered to the sea bottom to raise the platform above the water.

Lease—Authorization that is issued under Section 8 or maintained under Section 6 of OCSLA and that authorizes exploration for, and development and production of, minerals.

Lease sale—The competitive auction of leases granting companies or individuals the right to explore for and develop certain minerals under specified conditions and periods of time.

Lease term—The initial period for oil and gas leases, usually a period of 5, 8, or 10 years depending on water depth or potentially adverse conditions.

Lessee—A party authorized by a lease, or an approved assignment thereof, to explore for and develop and produce the leased deposits in accordance with regulations at 30 CFR part 250 and 30 CFR part 550.

Littoral zone—Marine ecological realm that experiences the effects of tidal and longshore currents and breaking waves to a depth of 5-10 m (16-33 ft) below the low-tide level, depending on the intensity of storm waves.

Marshes—Persistent, emergent, nonforested wetlands characterized by predominantly cordgrasses, rushes, and cattails.

Minerals—As used in this document, minerals include oil, gas, sulphur, and associated resources, and all other minerals authorized by an Act of Congress to be produced from public lands as defined in Section 103 of the Federal Land Policy and Management Act of 1976.

Naturally occurring radioactive materials (NORM)—naturally occurring material that emits low levels of radioactivity, originating from processes not associated with the recovery of radioactive material. The radionuclides of concern in NORM are Radium-226, Radium-228, and other isotopes in the radioactive decay chains of uranium and thorium.

Nonattainment area—An area that is shown by monitoring data or by air-quality modeling calculations to exceed primary or secondary ambient air quality standards established by USEPA.

Offloading—Unloading liquid cargo, crude oil, or refined petroleum products.

Operational discharge—Any incidental pumping, pouring, emitting, emptying, or dumping of wastes generated during routine offshore drilling and production activities.

Operator—An individual, partnership, firm, or corporation having control or management of operations on a leased area or portion thereof. The operator may be a lessee, designated agent of the lessee, or holder of operating rights under an approved operating agreement.

Outer Continental Shelf (OCS)—All submerged lands that comprise the continental margin adjacent to the United States and seaward of State offshore lands.

Pelagic—Of or pertaining to the open sea; associated with open water beyond the direct influence of coastal systems.

Plankton—Passively floating or weakly motile aquatic plants (phytoplankton) and animals (zooplankton).

Platform—A steel or concrete structure from which offshore development wells are drilled.

Play—A prospective subsurface area for hydrocarbon accumulation that is characterized by a particular structural style or depositional relationship.

Post-lease—Refers to activity that could occur on a lease block after the lease is issued (i.e., post-lease issuance).

Primary production—Organic material produced by photosynthetic or chemosynthetic organisms.

Produced water—Total water discharged from the oil and gas extraction process; production water or production brine.

Production—Activities that take place after the successful completion of any means for the extraction of resources, including bringing the resource to the surface, transferring the produced resource to shore, monitoring operations, and drilling additional wells or workovers.

Province—A spatial entity with common geologic attributes. A province may include a single dominant structural element such as a basin or a fold belt, or a number of contiguous related elements.

Recreational beaches—Frequently visited, sandy areas along the Gulf of America shorefront that support multiple recreational activities at the land-water interface. Included are National Seashores, State Park and Recreational Areas, county and local parks, urban beachfronts, and private resorts.

Refining—Fractional distillation of petroleum, usually followed by other processing (e.g., cracking).

Relief—The difference in elevation between the high and low points of a surface.

Reserves—Proved oil or gas resources.

Rig—A structure used for drilling an oil or gas well.

Royalty—A share of the minerals produced from a lease paid in either money or "in-kind" to the landowner by the lessee.

Saltwater intrusion—Saltwater invading a body of freshwater.

Seagrass beds—More or less continuous mats of submerged, rooted, marine, flowering vascular plants occurring in shallow tropical and temperate waters. Seagrass beds provide habitat, including breeding and feeding grounds, for adults and/or juveniles of many of the economically important shellfish and finfish.

Sediment—Material that has been transported and deposited by water, wind, glacier, precipitation, or gravity; a mass of deposited material.

Seeps (hydrocarbon)—Gas or oil that reaches the surface along bedding planes, fractures, unconformities, or fault planes.

Sensitive area—An area containing species, populations, communities, or assemblages of living resources, that is susceptible to damage from normal OCS oil- and gas-related activities. Damage includes interference with established ecological relationships.

Site fidelity or philopatry—The tendency to return to a previously occupied location.

State coastal zone boundary—The State coastal zone boundaries for each CZMA-affected State are defined at https://coast.noaa.gov/czm/media/StateCZBoundaries.pdf.

Structure—Any OCS facility that extends from the seafloor to above the waterline; in petroleum geology, any arrangement of rocks that may hold an accumulation of oil or gas.

Subarea—A discrete analysis area.

Supply vessel—A boat that ferries food, water, fuel, and drilling supplies and equipment to an offshore rig or platform and returns to land with refuse that cannot be disposed of at sea.

Take; taking—To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any endangered or threatened species, or to attempt to engage in any such conduct (including actions that induce stress, adversely impact critical habitat, or result in adverse secondary or cumulative impacts). Harassments are the most common form of taking associated with OCS Program activities.

Tension-leg platform (TLP)—A production structure that consists of a buoyant platform tethered to concrete pilings on the seafloor with flexible cable.

Traditional cultural properties—Property that is eligible for inclusion in the National Register of Historic Places based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community.

Turbidity—Reduced water clarity due to the presence of suspended matter.

Volatile organic compound (VOC)—Any organic compound that is emitted to the atmosphere as a vapor.

Weathering (of oil)—The aging of oil due to its exposure to the atmosphere, causing marked alterations in its physical and chemical makeup.

APPENDIX E

KEYWORDS

E KEYWORDS

APPENDIX F

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APPENDIX G

CONSULTATION AND COORDINATION

G CONSULTATION AND COORDINATION

G.1 INTRODUCTION

BOEM is conducting consultations and other activities to comply with the following laws, including but not limited to, the development of consistency determinations (CDs) under the CZMA, consultation under the ESA for potential impacts to listed species or designated critical habitat, completion of an EFH assessment pursuant to MSA, and a request for comments and consultation with federally recognized American Indian tribes pursuant to NHPA and E.O. 13175. Pursuant to NEPA, BOEM has conducted public involvement activities during preparation of this Final Programmatic EIS. This chapter describes the processes with which BOEM worked with other Federal and State agencies, tribal governments, and the public during the development of this Programmatic EIS.

G.2 COASTAL ZONE MANAGEMENT ACT

BOEM performs a consistency review pursuant to the CZMA, and CDs are prepared for each coastal State along the Gulf of America with a federally approved Coastal Management Program (CMP) before each oil and gas lease sale. To prepare the CDs before each GOAR oil and gas lease sale, BOEM reviews each State's federally approved Coastal Management Plan and analyzes the potential impacts as described in this Programmatic EIS; new information; and applicable studies as they pertain to the enforceable policies of each CMP. The CZMA requires that Federal actions that have reasonably foreseeable coastal effects (i.e., effects to any coastal use or resource of the coastal zone) be "consistent to the maximum extent practicable" with relevant enforceable policies or guidelines of the State's federally approved coastal management program (15 CFR 930. C).

Based on these and other analyses, BOEM's Gulf of America Regional Supervisor for the Office of Environment makes an assessment of consistency for GOAR oil and gas lease sales, which is then sent to the States of Texas, Louisiana, Mississippi, Alabama, and Florida at least 90 days before final approval of a GOAR oil and gas lease sale (unless BOEM and the State agree to an alternative schedule). If the State concurs, BOEM proceeds with the lease sale. A State's concurrence may be presumed when a State does not provide a response within the 60-day review period. A State may request an extension of time to review the CD within the 60-day period, which the Federal agency shall approve for an extension of 15 days or less. If a State objects, it must do the following under the CZMA:

(1) indicate how BOEM's prelease proposal is inconsistent with the State's federally approved CMP and suggest alternative measures to bring BOEM's proposal into consistency with the State's CMP; or

(2) describe the need for additional information that would allow a determination of consistency. In the event of an objection, the Federal and State agencies should use the remaining portion of the 90-day notice period to attempt to resolve their differences before final approval of a GOAR oil and gas lease sale (15 CFR 930.43(b)).

At the end of the 90-day notice period, the Federal agency shall not proceed with the activity over a State agency's objection unless the Federal agency concludes that, under the "consistent to the maximum extent practicable" standard described in 15 CFR 930.32, consistency with the enforceable policies of the CMP is prohibited by existing law applicable to the Federal agency, and the Federal agency has clearly described, in writing, to the CZMA State agency the legal impediments to full consistency; or the Federal agency has concluded that its proposed action is fully consistent with the enforceable policies of the CMP, though the State agency objects. Unlike the consistency process for specific OCS plans and permits, there is no procedure for administrative appeal to the Secretary of Commerce for a Federal CD for prelease activities. In the event that there is a serious disagreement between BOEM and a State, either agency may request mediation. Mediation is voluntary, and the Secretary of Commerce would serve as the mediator. Whether there is mediation or not, the final CD is made by DOI, and it is the final administrative action for the prelease consistency process. Each Gulf Coast State's CMP is described in **Appendix I**.

G.3 ENDANGERED SPECIES ACT

The Endangered Species Act of 1973 (ESA, 16 U.S.C. 1531 et seq., as amended) establishes a national policy designed to protect and conserve threatened and endangered species and the ecosystems upon which they depend. Section 7(a)(2) of the ESA requires each Federal agency to ensure that any action that the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or result in the adverse modification of designated critical habitat.

On April 20, 2018, FWS issued a 10-year BiOp for BOEM and BSEE activities with no terms and conditions, and any future consultations may be informal, dependent upon the likelihood of take of ESA-listed species under that Service's jurisdiction. On March 6, 2024, BOEM and BSEE requested reinitiation of consultation with FWS regarding updated oil-spill risk analyses, new listings and general species information. FWS requested additional information from BOEM and BSEE in a letter dated December 20, 2024; the bureaus responded on February 5, 2025. On March 28, 2025, the FWS sent BOEM a letter with its evaluation of the new information and data, and its determination that nothing considered during the reinitiated consultation changed the conclusions of the 2018 BiOp and that no further ESA consultation with the Service for the proposed action is necessary (BOEM 2025a). The 2018 FWS BiOp remains in effect and any future BiOp amendments or associated COAs will be binding on subsequent post-lease actions.

On March 13, 2020, NMFS issued its previous programmatic BiOp (2020 NMFS BiOp) and Amended Incidental Take Statement (ITS) and Revised Appendices on April 26, 2021 (2021 Amended ITS and Revised Appendices). The 2020 NMFS BiOp, as amended, was intended to cover ten years of OCS oil and gas activities in the GOA region, including lease sales. However, on August 19, 2024, the United States District Court for the District of Maryland remanded the 2020 NMFS BiOp to NMFS and vacated the BiOp as of May 21, 2025. See Sierra Club v. NMFS, 8:20-cv-3060, ECF No. 211-2 paragraphs 7-9 (Sept. 16, 2024). On October 25, 2022, BOEM and BSEE reinitiated consultation with NMFS and, as a result, on May 20, 2025, NMFS issued a new biological opinion

(2025 NMFS BiOp), which supersedes and replaces the 2020 NMFS BiOp. NMFS published its Biological and Conference Opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's Oil and Gas Program Activities in the Gulf of America (NMFS 2025a) and associated Attachments and Appendices (NMFS 2025b), which contain protocols BOEM applies for ESA compliance.

The relevant terms and conditions, reasonable and prudent measures, as well as the provisions of the 2020 NMFS BiOp (as amended) that are a part of the proposed action in the 2025 NMFS BiOp (e.g., the vessel mitigations found in the 2025 NMFS BiOp at Section 3.1.6.5 and Attachment A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA)), and other protocols identified in the 2025 NMFS BiOp Attachments and Appendices are made a binding part of the lease in the "Protected Species" Stipulation. Any future BiOp amendments or COAs will be binding on subsequent post-lease actions. The 2025 NMFS BiOp, as amended, and supporting documents can be found at https://www.fisheries.noaa.gov/resource/document/biological-and-conference-opinion-bureau-ocean-energy-management-and-bureau. The 2025 NMFS BiOp Attachments and Appendices can be found at: https://www.fisheries.noaa.gov/resource/document/attachments-and-appendices-2025-gulf-america-oil-and-gas-biological-opinion.

To implement the 2025 NMFS BiOp, certain post-lease approvals (e.g., for activities involving new and unusual technologies, certain tiers of seismic surveys, including certain ancillary G&G surveys) will require an ESA review by BOEM, and applicable protocols and/or COAs will be applied per the 2025 NMFS BiOp, subject to additional mitigations to protect ESA-listed species. Therefore, lessees must notify BOEM before conducting any ancillary G&G surveys, including but not limited to ancillary G&G surveys that use high-resolution geophysical acoustic sources. Some activities may be subject to NMFS step-down reviews as specified in the 2025 BiOp with potential additional requests for information.

BOEM also petitioned NMFS for rulemaking under the MMPA (16 U.S.C. 1361 et seq.) relating to G&G surveys on the OCS in the GOA. On January 19, 2021, NMFS published in the Federal Register a final ITR, which became effective on April 19, 2021 (86 FR 5322). A draft revision to this regulation that corrects some calculation errors and therefore adjusts taking allowable under the regulations was published on January 5, 2023 (88 FR 916). On April 24, 2024, NMFS published in the *Federal Register* its final rule, "Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Geophysical Surveys in the Gulf of Mexico" and the rule is effective from May 24, 2024 through April 19, 2026 (89 FR 31488). There are no changes to the specified activities or the specified geographical region in which those activities would be conducted, nor to the original 5-year period of effectiveness. A new request for MMPA authorization was prepared and submitted by industry in March 2025.

Based on the most recent and best available information at the time, BOEM and BSEE will continue to closely evaluate and assess risks to listed species and designated critical habitat in

upcoming environmental compliance documentation under NEPA and other statutes. See **Appendix H** for copies of the consultation letters.

G.4 Magnuson-Stevens Fishery Conservation and Management Act

Pursuant to Section 305(b) of the MSA, Federal agencies are required to consult with NMFS on any action that may result in adverse effects to EFH. NMFS published the final rule implementing the EFH provisions of the MSA (50 CFR 600) on January 17, 2002. Certain OCS oil- and gas-related activities authorized by BOEM may result in adverse effects to EFH and therefore require EFH consultation.

BOEM prepared an EFH Assessment technical report that describes the OCS proposed activities, analyzes the effects of the proposed activities on EFH, and identifies proposed mitigating measures (BOEM 2022). The EFH Assessment was sent to NMFS on May 25, 2022, with a letter requesting formal consultation. NMFS responded to BOEM's consultation request with conservation recommendations on July 29, 2022. The regional programmatic EFH consultation concluded on September 27, 2022, when BOEM and BSEE responded via letter to NMFS' conservation recommendations. This consultation covers reasonably foreseeable oil- and gas-related activities on the Gulf of America OCS. Reasonably foreseeable activities include proposed lease sales and activities related to exploration, development, production, and decommissioning, including, but not limited to, geological and geophysical activities, drilling, construction, support, removal, and site clearance operations. The agreed-upon conservation recommendations contain provisions for initiating supplemental discussions should it be determined that site-specific or activity-specific consultation is necessary. Refer to **Appendix H** for the regional programmatic EFH consultation letters.

G.5 National Marine Sanctuaries Act 304(d) Consultation

The National Marine Sanctuaries Act (16 U.S.C. 1431 et seq.; NMSA) authorizes the Secretary of Commerce to designate and manage areas of the marine environment with special national significance. Section 304(d) of the NMSA requires Federal agencies to consult with the Office of National Marine Sanctuaries (ONMS) whenever their proposed actions are likely to destroy, cause the loss of, or injure a sanctuary resource and/or may adversely affect the protected resources within a sanctuary's boundaries. The purpose of NMSA consultation is to protect sanctuary resources by requiring Federal agencies to consider alternatives to proposed actions that might otherwise destroy, cause the loss of, or injure these resources. For the activities analyzed in this Programmatic EIS, BOEM initiated Section 304(d) consultation with the FGBNMS. BOEM is currently in consultation with ONMS and FGBNMS on programmatic OCS oil- and gas-related activities in the GOA. In accordance with the requirements set forth in Section 304(d), individual activity-specific consultations will be initiated for proposed activities likely to destroy, cause the loss of, or injure a sanctuary resource and/or may adversely affect the protected resources within a sanctuary's boundaries until the programmatic consultation is complete.

G.6 National Historic Preservation Act

In accordance with the NHPA (54 U.S.C. 300101 et seq.), Federal agencies are required to consider the effects of their undertakings on historic properties. The implementing regulations for Section 106 of the NHPA, issued by the Advisory Council on Historic Preservation (36 CFR 800), specify the required review process. In accordance with 36 CFR 800.8(c), BOEM intends to use the NEPA substitution process and documentation for preparing a prelease EIS and Record of Decision or a post-lease environmental assessment and Finding of No Significant Impact to comply with Section 106 of the NHPA in lieu of 36 CFR 800.3-800.6. Because of the extensive geographic area analyzed in this Programmatic EIS and because identification of historic properties will take place after leases are issued, BOEM will complete its Section 106 review process once BOEM has performed the necessary site-specific analysis of post-lease activities prior to issuing a permit or approving these activities. Additional consultations with the Advisory Council on Historic Places, State Historic Preservation Offices, federally recognized Indian Tribes, and other consulting parties may take place at that time, if appropriate. See Chapter 3.18 of the *Gulf of America OCS Regulatory Framework* (BOEM 2025b) technical report for more information on this review process.

BOEM conducts Section 106 of the NHPA consultations with State Historic Preservation Offices for site-specific permitted activities with Areas of Potential Effect in State waters. No recent consultations have identified historic properties with the potential to be adversely affected by those activities.

G.7 Government-to-Government Tribal Consultation

In accordance with E.O. 13175, “Consultation and Coordination with Indian Tribal Governments,” Federal agencies are required to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications to strengthen the United States’ government-to-government relationships with American Indian tribes and to reduce the imposition of unfunded mandates upon Indian tribes. On October 2, 2023, BOEM sent a formal letter to federally recognized tribes notifying them of the development of this Programmatic EIS. That letter was addressed to each of the Gulf Coast State-affiliated tribes, including the Absentee Shawnee Tribe of Indians, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Apache Tribe of Oklahoma, Caddo Nation of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Chitimacha Tribe of Louisiana, Choctaw Nation of Oklahoma, Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Eastern Shawnee Tribe of Oklahoma, Jena Band of Choctaw Indians, Kiowa Indian Tribe of Oklahoma, Mescalero Apache Tribe, Miccosukee Tribe of Indians of Florida, Mississippi Band of Choctaw Indians, Muscogee (Creek) Nation, Poarch Band of Creek Indians, Seminole Tribe of Florida, Seminole Nation of Oklahoma, Shawnee Tribe, Southern Ute Indian Tribe, Thlopthlocco Tribal Town, Tonkawa Tribe, and the Tunica-Biloxi Tribe of Louisiana. See **Appendix H** for an example of the letter that was sent to the tribes. The letter was intended to be the first step of a long-term and broad consultation effort between BOEM and the Gulf-area tribes, inclusive of all BOEM activities that may occur under the Programmatic EIS, as well as ongoing activities.

In response to these communications, the Southern Ute Indian Tribe acknowledged receipt and said they would reach out if they wanted to consult on this matter (Shipps 2023). The Seminole Tribe of Florida responded and noted the action was outside of their area of interest but would still like to continue consultation on this matter (Mueller 2023). The Kiowa Tribe responded and requested additional information and expressed interest in becoming a cooperating agency as part of the Programmatic EIS process (Kelley 2023). A meeting with the acting regional tribal liaison and a representative from the Kiowa Tribe was held on December 12, 2023, to provide more information regarding this Programmatic EIS. That meeting addressed the tribe's needs and they decided not to pursue being a cooperating agency at that time. No further correspondence has been received from the Kiowa Tribe to date. The Choctaw Nation of Oklahoma responded and noted that this action lies within their area of interest where they have a number of cultural and sacred sites along the Gulf of America and requested to continue consultation on this matter (Bilyeu 2023).

BOEM continues to consult with tribes on GOAR oil- and gas-related activities and other BOEM-authorized activities proposed on the Gulf of America OCS and will update this summary as additional efforts are conducted (e.g., The Quapaw Tribe of Oklahoma responded to receiving the "Department of the Interior Announces New 2025 Lease Sale in the Gulf of America" News Release (April 4, 2025) by stating it is not located within their tribal area of interest and therefore have no comment).

G.8 Lease Sale Process and the National Environmental Policy Act

G.8.1 Development of the Proposed Action

The proposed Federal action is a GOA oil and gas lease sale. This Programmatic EIS analyzes a representative Gulf of America OCS oil and gas lease sale. This Programmatic EIS is expected to be used to inform the decision for the first GOA oil and gas lease sale proposed in the 2024-2029 National OCS Oil and Gas Program, to be used and supplemented as appropriate for decisions on future proposed GOA lease sales, to be used for tiering purposes for associated site- and activity-specific OCS oil- and gas-related activity approvals, and/or to help inform extraordinary circumstance reviews to ensure categorical exclusions are used appropriately. BOEM conducted early coordination with appropriate Federal and State agencies, tribal governments, and other concerned parties to discuss and coordinate BOEM's prelease process for GOAR oil and gas lease sales and this Programmatic EIS.

G.8.1.1 Call for Information and Area ID Memorandum

Pursuant to OCSLA, BOEM published a Call for Information (Call) to request and gather information to determine the Area ID for each lease sale. The Call was published in the *Federal Register* (83 FR 66300) on October 2, 2023. The comment period for the Call closed on November 1, 2023. BOEM received 10 comments in response to the Call; the substantive comments are summarized below.

Earthjustice, Natural Resources Defense Council, Sierra Club, Friends of the Earth US, Oceana, Zero Hour, Mystic Aquarium, Ocean Defense Initiative, Chispa Texas, and League of Conservation Voters

- BOEM should minimize oil and gas leasing in the GOA and limit the areas available for leasing.
- Based on the data, oil and gas exploration should be limited in the Rice's whale area, FGBNMS, SSRAs, topographic and sensitive biological areas, and Wind Energy Areas.

American Petroleum Institute, Independent Petroleum Association of America, Louisiana Mid-Continent Oil and Gas Association, and EnerGeo Alliance

- Offer maximum amount of acreage.
- No targeted leasing.
- Disappointed in curtailment of lease sales.
- Notes Program gap.
- Disagrees with net-zero analysis and methodology.

Cantium

- Requests maximum acreage offered.
- Prioritize oil and gas over wind energy areas.
- More oil and gas lease sales per Program.

BP America Inc.

- Offer maximum acreage, maximize Tier 1 nominations.
- Notes legal requirements (Inflation Reduction Act).
- Consider new lease award procedures – offering the second highest bidder the lease if the highest bidder does not pay the full amount required to award the lease.
- Wants explicit language in the Proposed Notice of Sale of BOEM’s oil and gas lease sale intent.

Sierra Club Lone Star Chapter

- Minimize oil and gas leasing in the GOA.
- Limit areas available for leasing.

- Noted development impact on communities, marine ecosystems, and climate change.
- Noted environmental impact due to production and noise pollution from surveying, exploration and vessel traffic.
- Limit exploration in the Rice's whale area, FGBNMS, SSRAs, topographic and sensitive biological, and Wind Energy Areas.
- Supports no drilling option in the Programmatic EIS.
- Improve restriction and mitigating measures.

Shell Offshore Inc.

- Nominate all blocks in GOA Program area.
- Refers to the Inflation Reduction Act and encourages following the 60,000-acre minimum offering requirement.
- Asks for at least one oil and gas lease sale in the GOA per year to better cover wind leases.
- Increase primary term to 10 years on some blocks to make them more attractive opportunities.
- Encourage multiple uses on the block, such as carbon capture and sequestration.
- Encourages BOEM to follow legally required process to designate endangered species and their habitats.

Offshore Operators Committee

- Offer a vast majority of the Western and Central Planning Areas.
- Continue to include the limited portion of the Eastern Planning Area.

National Ocean Industries Association

- BOEM should offer all available unleased acreage in the GOA.
- Terminate regressive energy policies and return to business as usual.
- BOEM is asking for too much information be given in the Call and that information would be used nefariously.

Chevron

- BOEM should offer all available blocks for each GOA oil and gas lease sale.

- Touts Chevron's operating history of cooperation for working with other stakeholders and believes some areas should not be separated by use but shared.
- Supports multiuse blocks for carbon capture and sequestration.
- Nominate all blocks.

Private Citizen

- Wants the oil and gas lease sale cancelled for environmental reasons.

Using information provided in response to the Call and from scoping comments (summarized below) received for the GOA Oil and Gas Programmatic EIS, BOEM developed an Area Identification (Area ID) recommendation memorandum. The Area ID is an administrative prelease step that describes the geographic area for environmental analysis and consideration for leasing. All of this information was used to develop a proposed action and a reasonable range of alternatives for the GOA Oil and Gas Programmatic EIS. On March 15, 2024, the Area ID decision was published (89 FR 22444) for all proposed oil and gas lease sales from 2024 through 2029. The Area ID memo recommended keeping the area of the GOA made up of all unleased blocks in the WPA, CPA, and EPA not subject to Presidential withdrawal (the withdrawn area was previously subject to a Congressional leasing moratorium under GOMESA), for environmental analysis when considering future GOAR oil and gas lease sales.

G.8.2 Development of the Draft Programmatic EIS

G.8.2.1 Internal Scoping

Internal scoping provides BOEM an opportunity to update BOEM's Gulf of America OCS Region's environmental and socioeconomic information base. The internal scoping process for the Draft Programmatic EIS yielded the following:

- the GOM Oil and Gas SID, which is incorporated by reference, was created and publicly released to reduce the amount of technical information contained in an EIS;
- all subject-matter experts reevaluated the cause and effect relationships between OCS oil- and gas-related activities and their resources;
- several resources have been reorganized or renamed since the GOM Lease Sales 259 and 261 Supplemental EIS to increase document readability and reduce redundancies:
  - Coastal Communities and Habitats combines the Estuarine Systems (Wetlands and Seagrasses/Submerged Vegetation) and Coastal Barrier Beaches and Associated Dunes chapters;

- Benthic Communities and Habitats combines the Deepwater Benthic Communities, Live Bottoms (Topographic Features and Pinnacles and Low-Relief Features), and Protected Corals chapters;
- Pelagic Communities and Habitats includes and expands upon the *Sargassum* and Associated Communities chapter;
- Protected Species (Marine Mammals, Sea Turtles, Protected Birds, and Protected Corals) descriptions have been included in their respective chapters and not considered in their own separate analyses; and
- after careful consideration, the beach mice were eliminated from further analysis as species of special concern as they are not likely to be impacted by a proposed action. As they only inhabit coastal sand dunes, their habitat is generally removed from the associated activities of the proposed action. They are generally considered part of the coastal communities and habitats analysis. BOEM reserves the right to add them at a future date as designations and overall environmental indicators may change following consultations with, and concerns of, the FWS.

G.8.2.2 Notice of Intent to Prepare an Environmental Impact Statement

Scoping for the Draft Programmatic EIS was conducted in accordance with NEPA statute (42 U.S.C. 4321 et seq.) and the DOI implementation of NEPA regulations (43 CFR 46). BOEM published a Notice of Intent to Prepare an Environmental Impact Statement (NOI) on October 2, 2023, in the *Federal Register* (88 FR 67803). The NOI announced the scoping process that BOEM will use to identify significant issues and potential alternatives for consideration in this Programmatic EIS. The comment period for the NOI closed on November 1, 2023. BOEM also held two virtual public scoping meetings on October 17, 2023, at 6 p.m. CDT and on October 19, 2023, at 1 p.m. CDT. BOEM received 21 total comments in response to the NOI (4 by email through Government-to-Government Consultation, 13 on the NOI [Docket BOEM-2023-0046], and 4 at the public meetings). The substantive comments are summarized below by commenter. For a summary of responses by American Indian Tribal Governments, see **Chapter G.7** above.

Noble Corporation

- Stated a preference for Alternative B.
- Interested in seeing offshore wind evolve in support of Carbon Capture Utilization and Storage (CCUS) growth and expansion.

Private Citizen

- Concerned for the impacts of the proposed action on air quality, water quality, protected species (protected corals and Rice's whale), vulnerable coastal communities, space use with other ocean users (i.e., commercial fishing and aquaculture industries), and contribution to greenhouse gas.
- Stated preference for Alternative D due to Inflation Reduction Act requirements to also issue offshore wind leases.

Private Citizen

- Supports BOEM's efforts in preparing an EIS.
- Requests consideration of the climate and ecological impacts from leasing in the Gulf of America by adopting the strongest possible protections.

Occidental Petroleum Corporation

- Supports BOEM's efforts in preparing an EIS.
- Requests consideration of the climate and ecological impacts from leasing in the GOA by adopting the strongest possible protections.

American Petroleum Institute, National Ocean Industries Association, Independent Petroleum Association of America, Louisiana Mid-Continent Oil and Gas Association, Offshore Operators Committee, and EnerGeo Alliance

- Support regionwide leasing under Alternative B and preparing a streamlined EIS.
- BOEM cannot use the NEPA process to delay the lease sale.
- Alternative A should be rejected as not meeting the purpose and need.
- Support analysis of climate change, but not the social cost of greenhouse gas.
- Do not support mitigations for Rice's whale critical habitat and provided an analysis of current information related to Rice's whale critical habitat.

Surfrider Foundation

- Concerned for the effects of climate change on the Texas coast and the impacts resulting from oil spills, seismic surveys, increased ship traffic, increased air and water pollution on environmental justice communities, commercial fishing, and recreation and tourism industries.
- Requests that BOEM do a cumulative analysis and include protections for the Rice's whale.

Ocean Conservancy

- Concerned for climate change, oil spill, and environmental impacts.
- Requests that BOEM consider a full suite of mitigating measures.
- BOEM's analysis of the No Action Alternative must be rigorous.
- BOEM must carefully consider the ramifications of Section 50265 of the Inflation Reduction Act.
- The Programmatic EIS should take a hard look at potential environmental justice impacts.
- BOEM should establish stringent fitness to bid/fitness to operate requirements.
- Revise regulations' policy and guidance governing methane emissions from OCS operations.
- Establish more stringent standards for decommissioning.
- Increase minimum bid requirements.

Private Citizen

- Supports Alternative D.

Earthjustice

- Requests BOEM meaningfully assess:
- Greenhouse gas emissions and impacts to climate change.
- Impacts to Rice's whale from the Proposed Action, oil spills, and vessel strikes.
- Direct, indirect, and cumulative impacts of oil spills and OCS oil- and gas-related activities.
- Impacts to air quality, noise, increased vessel traffic, orphaned wells and pipelines, and multiple uses.
- Mitigating measures that reduce impacts to Rice's whale from noise vessel traffic and habitat disturbance, and other measures to avoid or minimize impacts to the environment.
- Requests that BOEM properly define the purpose and need and thoroughly evaluate all alternatives, consider more protective alternatives that incorporate geographic exclusions, mitigating measures, and a climate screen; consider an alternative that excludes Rice's whale habitat with a 10-kilometer (197-mile) or greater buffer and establishes protective mitigating measures; and consider an alternative excluding additional environmentally sensitive areas from leasing.

- Supports inclusion of Alternatives C and D in the Programmatic EIS, which excludes whole and partial blocks within the full range of Rice's whale habitat.

National Marine Fisheries Service, Southeast Regional Office

- Accepts the invitation extended in the NOI for Cooperating Agency status.
- Supports the selection of an alternative that would best avoid conflicts with NOAA's trust resources (e.g., Rice's whale critical habitat, FGBNMS areas' sensitive topographic features, etc.).
- Identified several areas to be analyzed in the Programmatic EIS related to their trust resources (e.g., entanglement risk, vessel strikes, acoustic pollution, fishing industries, socioeconomic impacts, etc.).
- Suggests use of marine spatial planning modelling to minimize multiple use issues.
- Provided information related to threatened or endangered species.
- Listed several areas of special expertise: ESA; MSA; Fish and Wildlife Coordination Act; MMPA; and NEPA.

National Park Service

- Requests Cooperating Agency status due to special expertise regarding the resources and values of the National Park System (NPS) where NPS has management jurisdiction.
- Requests that BOEM consider a no-leasing area within 15 nautical miles (nm) (17 m; 27 km) of the Gulf Islands National Seashore in the GOA.

Center for Biological Diversity

- Requests that BOEM cancel all oil and gas lease sales in the 5-Year OCS Oil and Gas Program due to oil spill and climate change concern.
- Requests that, under any oil and gas lease sale alternative, Rice's whale habitat be excluded.

Environment America

- Opposes new leasing due to pollution, climate change, Rice's whale, and environmental and visual impacts.
- Supports a transition to renewable energy.

Surfrider Foundation

- Opposes new leasing due to pollution, climate change, Rice's whale, and environmental and visual impacts.
- Supports Alternative A.
- Requests an analysis of impacts to human communities, the environment, and other ocean users; and address life-cycle GHG emission issues.
- Notes that the negative impacts of oil and gas leasing outweighs the benefits of wind leasing and suggests no leasing at all.

Sierra Club, Texas Chapter

- Supports Alternative A.
- Notes that the negative impacts of oil and gas leasing outweighs the benefits of wind leasing and suggests no leasing at all.
- Requests analysis of downstream refining of oil and gas, protection of ESA-listed species, FGBNMS, and all GOA wildlife.

G.8.2.3 Cooperating Agencies

Pursuant to 43 CFR 46.225, BOEM must invite eligible government entities to participate as cooperating agencies when developing an EIS in accordance with the requirements of the NEPA statute (42 U.S.C. 4321 et seq.) and the DOI implementation of NEPA regulations (43 CFR 46). BOEM must also consider any requests by eligible government entities to participate as a cooperating agency with respect to a particular EIS and must either accept or deny such requests. As defined by the DOI implementation of NEPA regulations (43 CFR 46), a cooperating agency may be any Federal or non-Federal agency that has jurisdiction by law or special expertise with respect to environmental impacts resulting from a proposed activity.

As part of BOEM's Notice of Intent for the Draft Programmatic EIS, BOEM invited other Federal agencies and Tribes to consider becoming Cooperating Agencies in the preparation of this Programmatic EIS. For details on this invitation, see https://www.boem.gov/environment/environmental-assessment/gulf-mexico-regional-ocs-oil-and-gas-programmatic. Even if a governmental entity is not a Cooperating Agency, it will have opportunities to provide information and comments to BOEM during the public input stages of the NEPA process.

Kiowa Tribe

The Kiowa Tribe responded and requested additional information and expressed interest in becoming a cooperating agency as part of the EIS process (Kelley 2023). A meeting with the acting regional Tribal liaison and a representative from the Kiowa Tribe was held on December 12, 2023, to

provide more information regarding this Programmatic EIS. That meeting addressed the Tribe's needs and they decided not to pursue being a cooperating agency at that time. No further correspondence has been received from the Kiowa Tribe to date.

Bureau of Safety and Environmental Enforcement

BSEE, as a sister DOI agency, has responsibilities under the current BOEM-BSEE Memorandum of Agreement (MOA) for NEPA and Environmental Compliance, as outlined in Section III of the MOA. The MOA establishes a general framework for coordination between BOEM and BSEE on environmental issues. The MOA outlines BOEM and BSEE's National Environmental Policy Act responsibilities to ensure adequate environmental review of energy and marine mineral resource activities on the OCS. Through this MOA, the two bureaus minimize duplication of efforts, promote consistency in procedures and regulations, and resolve disputes. The BSEE has been working as a Cooperating Agency through the MOA and formally requested to serve as a Cooperating Agency for this Programmatic EIS, via email, on October 20, 2022. BOEM met with BSEE on November 1, 2023, to discuss the scope of the Programmatic EIS, and April 9, 2024, to kick off BSEE collaboration on the preparation of the Draft GOM Oil and Gas Programmatic EIS. BSEE assisted with document preparation and response to public comments on the Draft Programmatic EIS by providing guidance and expertise on matters relating to compliance, operating trends, and accidental events.

National Park Service

BOEM received a Cooperating Agency request in a letter from the NPS dated November 1, 2023, in response to scoping for this Programmatic EIS. BOEM met with the NPS on February 7, 2024, to discuss the scope of the Programmatic EIS. The NPS reiterated the same concerns from the scoping comment letter and provided data layers to BOEM to show areas of concern. Data layers provided to BOEM included the National Park System Boundary; National Natural Landmarks; Rivers on the Nationwide Rivers Inventory; National Heritage Areas; Properties listed in the NRHP, including National Historic Landmarks; and Legislated Wilderness Areas. BOEM mapped these areas overlaid with the proposed alternatives and considered those that were in the project area (features on the OCS and coast). See (**Figure G.8-1**) for an example of the maps. Most of the features were inland and not considered as they were not within the project area. There were also no features on the OCS. Coastal features included areas on the NRHP, National Historic Landmarks, National Heritage Areas, and the NPS Boundary around the Gulf Islands National Seashore (GUIS).

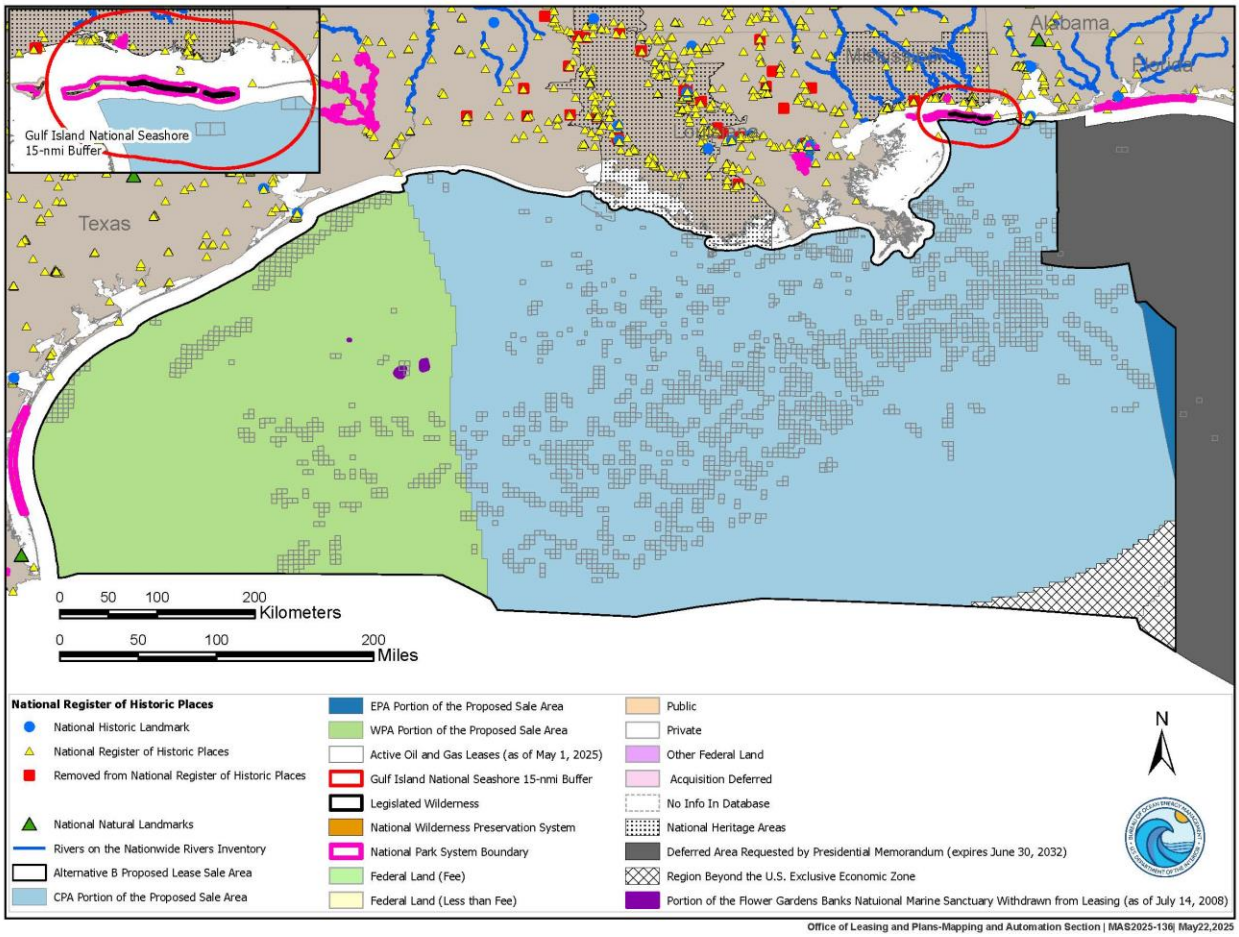

Figure G.8-1. Data Layers Provided by the National Park Service Overlaid with Alternative B.

As part of the NEPA process, BOEM conducts Section 106 of the NHPA consultations with State Historic Preservation Offices for site-specific permitted activities with Areas of Potential Effect in State waters (refer to **Section G.6**). No recent consultations have identified historic properties with the potential to be adversely affected by those activities. Any future site-specific activity would also undergo the same review, and therefore, each of these areas of concern to the NPS will be carefully considered through the Section 106 Consultation process.

The NPS also reiterated their concern over leasing in OCS blocks within 15 nm (17 mi; 27 km) of the GUIS and requested that those blocks not be leased. To identify which OCS blocks would be fall within the NPS area of concern, BOEM mapped and analyzed the whole and partial OCS blocks available for lease under Alternatives B, C, and D within 15 nm (17 mi; 27 km) of the GUIS. Whole and partial OCS blocks within 15 nm (17 mi; 27 km) of the GUIS available for lease under Alternative B are listed in **Table G.8-1**. The total acreage of this area is 410,495.8 acres. Whole and partial OCS blocks within 15 nm (17 mi; 27 km) of the GUIS available for lease under Alternatives C and D are listed in **Table G.8-1**. The total acreage of this area is 153,871.8 acres. As a mitigating measure to address the NPS concerns, BOEM provides the Gulf Islands National Seashore Information to Lessees to make them aware that post-lease plans submitted by lessees proposing development of whole and partial lease blocks located within the first 12 mi (19 km) of Federal

waters near the GUIS may be subject to additional review in order to minimize visual impacts from development operations on these blocks.

Table G.8-1. Whole and Partial OCS Blocks Available for Lease within a 15-Nautical Mile Buffer Around the Gulf Islands National Seashore Under Alternatives B, C, and D.

Alternative B	Alternatives C and D
CA1, MO765, MO766, MO767, MO778, MO779, MO809, MO810, MO811, MO812, MO813, MO814, MO815, MO816, MO817, MO818, MO819, MO820, MO821, MO822, MO823, MO824, MO853, MO854, MO855, MO856, MO857, MO858, MO859, MO860, MO861, MO862, MO863, MO864, MO865, MO866, MO867, MO868, MO897, MO898, MO899, MO900, MO901, MO902, MO903, MO904, MO905, MO906, MO907, MO908, MO909, MO910, MO911, MO942, MO943, MO944, MO945, MO946, MO947, MO948, MO949, MO950, MO951, MO952, MO953, MO954, MO955, MO987, MO988, MO989, MO990, MO991, MO992, MO993, MO994, MO995, MO996, MO997, MO998, VK21, VK22, VK23, VK24, VK25, VK26, VK27, VK28	MO943, MO944, MO945, MO948, MO949, MO950, MO951, MO952, MO953, MO987, MO988, MO989, MO990, MO992, MO993, MO994, MO995, MO996, MO997, MO998, VK21, VK22, VK24, VK25, VK26, VK27, VK28

CA = Chandeleur Area; MO = Mobile Area; VK = Viosca Knoll Area.

BOEM considered the information provided by the NPS as part of this Programmatic EIS and met with the NPS to discuss the analysis BOEM conducted using the data provided.

National Marine Fisheries Service

BOEM received a Cooperating Agency request in a letter from the NMFS Southeast Regional Office (NMFS SERO) dated November 3, 2023, in response to scoping for this Programmatic EIS. BOEM met with NMFS SERO on February 15, 2024, to discuss the scope of the Programmatic EIS and their role as a cooperating agency. NMSF SERO did not provide any additional concerns from the scoping comment letter during the meeting. BOEM requested that NMFS SERO provide any data or information they wish considered in the Programmatic EIS by March 1, 2024. NMSF SERO did not provide any information to BOEM. BOEM considered the comments that NMFS SERO provided during scoping and on the Draft Programmatic EIS in preparation of this Programmatic EIS and met with NMFS SERO to discuss our analysis in this Programmatic EIS. Issues related to specific Trust Resources are analyzed in **Chapters 4.3, 4.4, 4.5, 4.6, 4.8, 4.9, 4.10, and 4.11**. Through conversation with NMFS, the use of marine spatial planning tools was identified as a potential direction for future OCS oil and gas lease sale planning exercises and not for this effort. Other areas of NMFS' expertise, such as ESA and MSA, are managed through formal consultation as described above. BOEM does not have an active role in the administration of MMPA. Authorizations for activities under MMPA are applied for directly by operators to NOAA; however, BOEM analyzes the potential impacts to marine mammals in

Chapter 4.8. The Fish and Wildlife Coordination Act has been determined to not be applicable to this action.

G.8.2.4 Distribution of the Draft GOM Oil and Gas Programmatic EIS

BOEM announced the publication of the Draft GOM Oil and Gas Programmatic EIS via a press release on December 6, 2024, and published the Draft GOM Oil and Gas Programmatic EIS at https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic. In addition, a Notice of Availability announcing the availability of the Draft GOM Oil and Gas Programmatic EIS, the duration of the public comment period, and the virtual public meetings was published in the *Federal Register* on December 13, 2024 (89 FR 101044).

G.8.3 Development of the Final Programmatic EIS

G.8.3.1 Major Differences Between the Draft and Final Programmatic EIS

Several changes were made between the Draft and Final GOA Oil and Gas Programmatic EISs. These changes were the result of new information becoming available, editorial suggestions, and comments received on the Draft GOA Oil and Gas Programmatic EIS. The paragraphs below detail the major changes.

BOEM made a minor change to the title to clarify that the GOA Oil and Gas Programmatic EIS will be used as a tiering document for post-lease activities.

The One Big Beautiful Bill Act (Pub. L. 119-21) repealed Section 50263 of the Inflation Reduction Act of 2022 (Pub. L. 117-169, 136 Statute 1818), which had required royalty payments on all produced gas. Therefore, Stipulation 11 in the Draft GOA Oil and Gas Programmatic EIS was removed from consideration in the Final GOA Programmatic EIS.

On January 20, 2025, President Donald J. Trump issued E.O.14172, “Restoring Names that Honor American Greatness,” which includes changing the name of the Gulf of Mexico to the Gulf of America. On February 7, 2025, Secretary of the Interior Burgum released S.O. 3423, “The Gulf of America,” instructing the US Board of Geographic Names to implement E.O.14172 by changing the name in the Geographic Names Information System. In documents and other materials, BOEM uses the new Gulf of America OCS Region (GOAR) and Gulf of America (GOA) names. However, before the E.O. and S.O., GOM had been the official name in BOEM materials; therefore, previously published materials remain the same. “GOM,” “GOA,” “GOAR,” and “the Gulf” describe the same area of the U.S. Continental Shelf area bounded on the northeast, north, and northwest by the States of Texas, Louisiana, Mississippi, Alabama, and Florida and extending to the seaward boundary with Mexico and Cuba in the area formerly known as the Gulf of Mexico.

In consideration of E.O. 14154 and Departmental priorities), BOEM has changed its Preferred Alternative to Alternative B – Regionwide OCS Lease Sale from Alternative C – Targeted OCS Lease Sale Area in the Final GOA Oil and Gas Programmatic EIS.

DOI has recently changed position on considering Environmental Justice in NEPA analysis and has removed such analysis form the Final Programmatic EIS. E.O. 14154 and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025), require DOI to strictly adhere to NEPA, 42 U.S.C. 4321 et seq. Further, E.O. 14154 and the 2025 Memorandum repeal E.O.s 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023), which had mandated federal agencies to address environmental justice. Because E.O.s 12898 and 14096 have been repealed, agencies are no longer required to consider environmental justice generally in their environmental analyses, among other issues. BOEM has complied with the requirements of NEPA, including DOI's regulations and procedures implementing NEPA at 43 C.F.R. 46 and 516 of the Departmental Manual in place during the time of the preparation of this Final Programmatic EIS, consistent with the President's January 2025 Order and Memorandum.

BOEM has removed the Social Cost of Greenhouse Gas (SC-GHG) estimates from the Final Programmatic EIS based on E.O. 14154 and recent administration changes implementing the order. BOEM is not evaluating SC-GHG for the Final PEIS because: (1) BOEM is not engaged in a rulemaking for which the now-rescinded SC-GHG protocol was originally developed; (2) the IWG has been disbanded and all technical supporting documents and associated guidance have been withdrawn; (3) NEPA does not require agencies to prepare SC-GHG estimates or cost-benefit analyses; (4) costs attributed to GHGs are often so variable and uncertain that they are unhelpful for BOEM analysis; and (5) the full social benefits of carbon-based energy production have not been monetized, and quantifying only the costs of GHG emissions, but not the benefits, would yield information that is both potentially inaccurate and not useful.

In March 2025, the U.S. District Court for the District of Columbia issued a memorandum opinion in *Healthy Gulf v. Burgum* related to BOEM's decision to hold Lease Sale 259. The opinion found that BOEM had acted arbitrarily in its NEPA analysis supporting the decision, when it measured the environmental impacts of the GHGs. This was because BOEM used a baseline that did not capture existing laws and policies. For this Programmatic EIS, BOEM used the 2023 Annual Energy Outlook (AEO), and conducted a qualitative analysis considering changes in the 2025 AEO and potential effects of recent policy changes made since the publication of 2025 AEO. BOEM acknowledges that it is challenging to be in full compliance with the newest data due to the complexities of integrating the AEO into BOEM's Market Simulation Model and the time between environmental analysis and the publication of data by the AEO. BOEM addressed this issue in a white paper on the BOEM website (https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic)

Also, in response to the *Healthy Gulf* memorandum opinion filed on March 27, 2025, BOEM addresses in this Final Programmatic EIS the court's opinion that BOEM acted arbitrarily by failing to address NMFS's determination that the Rice's whale habitat range extends into the western and central Gulf. To remedy this in the Programmatic EIS, BOEM expanded the environmental analysis of marine mammals, including the Rice's whale, to include a description of the Rice's whale habitat in the western and central GOA, using additional references of this habitat use. This is also addressed through the analysis of Alternative C, where the Rice's whale proposed core distribution

area as of March 2025 and Rice's whale proposed critical habitat area as of March 2025 are removed for leasing.

In response to public comments, and in accordance with the DOI Implementing regulations in place at the time of the preparation of this EIS (43 CFR 46) and NEPA statute (42 U.S.C. 4321 et seq), BOEM has clarified and added detail to the presentation of ongoing activities, the incremental impact of a single proposed OCS oil and gas lease sale, and the reasonably foreseeable cumulative impacts analysis in each resource section in **Chapter 4** and summarized in **Chapter 4.17**. With this clarification, for each resource section in **Chapter 4**, impacts are discussed for the past and present conditions (baseline) and reasonably foreseeable conditions for both OCS and non-OCS oil- and gas-related activities, and impact determinations are clearly shown for the ongoing OCS oil- and gas-related activities that could occur from past lease sales. The severity of the ongoing OCS oil- and gas- related activities for each resource in **Chapter 4** have been compared to the non-OCS oil- and gas-related activities to put the impacts into perspective. In addition, the cumulative impact analysis for each resource has been moved from **Chapter 4.17** to each resource section in **Chapter 4** so that the impact determination for incremental impacts of a proposed OCS oil and gas lease sale can be clearly compared to cumulative impacts (past, present, and reasonably foreseeable future lease sales) for each resource analyzed in the Programmatic EIS. A summary of the potential cumulative impacts remains in **Chapter 4.17**. The severity of the cumulative OCS oil- and gas- related activities for each resource in **Chapter 4** has been compared to the cumulative non-OCS oil- and gas-related activities to put the impacts into perspective. This presentation helps to clarify the additive effects of individual IPFs and individual lease sales and clearly show the incremental impact of a single OCS oil and gas lease sale in comparison to the cumulative impacts effecting each resource in the GOA.

The assumptions for the ongoing scenario in **Chapter 3.3.2** were updated for the Final Programmatic EIS. In the Draft Programmatic EIS, the ongoing scenario assumed the possibility of a zero lease sale National Program. Now BOEM assumes it is reasonably foreseeable to expect continued leasing in the GOAR in the future similar to historical levels in response to E.O.s 14154 "Unleashing American Energy" (January 20, 2025) and 14156 "Declaring a National Energy Emergency" (January 20, 2025), S.O.s 3417 "Addressing the National Energy Emergency" (February 3, 2025) and 3418 "Unleashing American Energy" (February 3, 2025), and the Secretary's announcement of the preparation of a new National OCS Leasing Program.

Revisions have been made to the cumulative scenario in **Chapter 3.3.2** of the Final Programmatic EIS to acknowledge for the reasonably foreseeable future National OCS Oil and Gas Programs that could schedule up to 10 proposed OCS oil and gas lease sales in the GOAR in response to recently issued E.O. 14156 "Declaring a National Energy Emergency" (January 20, 2025), E.O. 14154, S.O. 3417 "Addressing the National Energy Emergency" (February 3, 2025), and S.O. 3418 "Unleashing American Energy" (February 3, 2025). These changes have also been addressed in **Chapter 2.2.1** and the impact analyses for each resource in **Chapter 4** in the Final Programmatic EIS.

The need for the Programmatic EIS has been revised in response to the recent Presidential Memorandum, "Temporary Withdrawal of All Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects," (January 20, 2025), which withdrew all areas within the OCS as defined in section 2 of OCSLA, 43 U.S.C. 1331 from disposition for wind energy leasing as of January 21, 2025, and shall remain in effect until the Presidential Memorandum is revoked. This withdrawal temporarily prevents consideration of any area in the OCS for any new or renewed wind energy leasing for the purposes of generation of electricity or any other such use derived from the use of wind. Based on this Presidential Memorandum, the need for the Programmatic EIS has been revised to remove the statement "per current law, to facilitate the development of offshore wind as a source of renewable electricity." The need for the Programmatic EIS has been revised and now reads "the need for the Proposed Action is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. §§ 1331 *et seq*.)."

BOEM has sharpened the analysis of climate change in the Draft Programmatic EIS to focus the analysis on the underlying issues, such as sea level rise, increases in sea temperature and surface temperatures, ocean acidification, increasing storms and their severity, etc. in the Final Programmatic EIS. The location of the analysis was also moved from **Chapter 4.17** to within each resource section in **Chapter 4** so that these issues could be considered for the ongoing and cumulative impacts analyses.

On May 20, 2025, NMFS published a new Biological and Conference Opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's Oil and Gas Program Activities in the Gulf of America. The Final Programmatic EIS and analysis within has been updated to include the 2025 Biological Opinion. In addition, following a reinitiation of consultation with FWS regarding upcoming oil-spill risk analyses, new listings, and general species information the FWS sent BOEM a letter on March 28, 2025 with its evaluation of the new information and data and its determination that nothing considered during the reinitiated consultation changed the conclusions of the 2018 BiOp and that no further ESA consultation with the Service for the proposed action is necessary. The Final Programmatic EIS and analysis within has been updated to include this information.

As part of the consultation and coordination with the Department of Defense (DoD) for the development of the 2024-2029 National Program, DoD identified areas for potential exclusion as Department of Defense Mission Incompatibility areas that BOEM analyzed under Alternative D in the Draft Programmatic EIS. During additional coordination, DoD identified a new exclusion area off the Mississippi coast. This exclusion area is incorporated into the Final Programmatic EIS maps and impact analysis. BOEM is coordinating with DoD on their specific needs to determine if appropriate mitigation can be developed for these areas. BOEM anticipates applying the Military Areas, Evacuation, and Coordination Stipulations, with possible revisions, to the newly identified DoD areas of exclusion.

In an effort to increase the readability of the document and to streamline the analysis, BOEM has reordered the Appendices from the Draft GOA Oil and Gas Programmatic EIS and included three additional appendices. BOEM chose to reorder the appendices to keep the information pertinent to the analysis as close to those sections as possible. Therefore, appendices with supporting information like definitions of terms or keywords were included earlier. **Table G.8-2** shows the changes to the appendices. BOEM also included three new appendices in the Final GOA Oil and Gas Programmatic EIS. **Appendix B** includes the detailed descriptions of Impact-Producing Factors. **Appendix L** details BOEM's responses to public comments, and **Appendix M** aids in streamlining and focusing the document on resources that could be impacted by the Proposed Action. Through BOEM's environmental impacts analysis several resources were found to have minor or less impacts, and the detailed explanations for those impacts were moved to **Appendix M**. It is important to note, however, that these resources may be within the scope of analysis for future actions like subsequent lease sales or post-lease NEPA reviews.

Table G.8-2. Appendix order in the Draft and Final GOA Oil and Gas Programmatic EIS.

Draft GOA Oil and Gas Programmatic EIS	Final GOA Oil and Gas Programmatic EIS
Appendix A – Consultation and Coordination	Appendix A - References
Appendix B – References	Appendix B – Impact-Producing Factor Descriptions
Appendix C – Preparers	Appendix C – Description of Decommissioning Activities
Appendix D – Glossary	Appendix D - Glossary
Appendix E – Consultation Correspondence	Appendix E – Keywords
Appendix F – Proposed Lease Mitigating Measures	Appendix F – Preparers
Appendix G – State Coastal Management Programs	Appendix G – Consultation and Coordination
Appendix H – Gulf of Mexico OCS Oil and Gas Leasing Greenhouse Gas Emissions	Appendix H – Consultation Correspondence
Appendix I - Keywords	Appendix I – State Coastal Management Programs
Appendix J - Decommissioning	Appendix J – Proposed Lease Mitigating Measures
-	Appendix K – Gulf of America OCS Oil and Gas Leasing Greenhouse Gas Emissions
-	Appendix L – Responses to Public Comments on the Draft GOM Programmatic EIS
-	Appendix M – Assessment of Resources with Negligible to Minor Impacts

In response to comments on the Draft Programmatic EIS, BOEM had added additional information and analysis on decommissioning to the Final Programmatic EIS. **Appendix C** (formerly **Appendix J** in the Draft Programmatic EIS), Description of Decommissioning Activities, has been expanded in the Final Programmatic EIS to include additional detail on decommissioning of OCS oil- and gas-related infrastructure and facilities. Decommissioning impacts have been expanded in the

impact analyses of the Final Programmatic EIS. New information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3** and **4**, **Appendix B**, and **Appendix C** of the Programmatic EIS. Updated historical data and trends on decommissioning provided were added to **Chapter 3** and **Appendix C** of the Programmatic EIS to highlight the drastic decommissioning of wells and structures in the last 20 years. Additional analyses of the potential risk for effects from idle wells has also been added throughout **Chapter 4**.

Comments on the Draft Programmatic EIS were received via verbal testimony, email, and electronic submission via regulations.gov. As a result of these comments, and the publication of new information, changes and updates have been made between the Draft and Final Programmatic EISs. Where appropriate, the text in this Final Programmatic EIS has been verified or expanded to provide clarification on specific issues, as well as to provide updated information. The revisions made between the Draft and Final Programmatic EISs, however, did not change the impact conclusion for any of the resources analyzed. Specific revisions and/or additions have been made to: **Chapter 2.2.1** wherefor additional information on Alternative A, which provides details on potential impacts of the cancellation of a single proposed OCS oil and gas lease sale, has been added; **Chapter 4.1.2.3** where impacts from methane are clarified and additional information was added to explain that rising temperatures and increased wildfires are expected to increase criteria air pollutants such as ozone and particulate matter; **Chapter 4.1.2.5** where the reference to Li et al. (2023) related to a ozone was removed and results of the study were clarified to distinguish them from OCS oil and gas lease sales; **Chapter 4.1.3** was revised to clarify that the *2017 Emission Inventory Study* was used to "more completely capture the range of potential effects from all types of OCS oil- and gas-related sources under the proposed action;" **Chapter 4.2** was updated to address the potential effects of hydraulic fracturing and completion fluid discharges on water quality with the addition of information regarding the regulation of hydraulic fracturing wastes and produced water, including toxicity testing requirements, as well as adding information about microplastics from OCS oil- and gas-related activities and non-OCS oil- and gas-related activities; **Chapter 4.6** was updated to clarify that impact assessments include impacts to fish stocks and was updated to include the queen conch in the analysis; **Chapter 4.6.2.1** was updated to add specific information regarding the impacts of produced water on fish; **Chapter 4.7.2.1** was updated with additional language on lighting and visual impacts for oil- and gas-related activities to birds; **Chapter 4.8** was updated with new information on impacts to marine mammals following the *Deepwater Horizon* event, as well as new information about Rice's whale, Rice's whale distribution and sightings, and Rice's whale habitat; **Chapter 4.8.2** has been updated with additional literature, discussion, and analysis of: potential water quality impacts from runoff, vessels, and other activities on marine mammals, relevant scientific literature on strikes and collisions with marine mammals, relevant scientific literature on noise impacts to marine mammals, and relevant scientific literature on seafloor disturbance to marine mammals; **Chapter 4.9.2.2** was updated with additional scientific literature to further assess the potential impacts of pollutants to sea turtles; **Chapter 4.9.2.1** and **4.9.2.3** have been updated with relevant scientific literature concerning noise and high levels of exposure for sea turtles; **Chapter 4.15** has been updated with new data on oil and gas production indices and revenues; **Chapter 4.16** includes the addition of the 2024 Crescent Midstream oil spill as an example of a discharge from a non-OCS pipeline that is connected to the overall OCS oil and gas network,

includes the additional study references for health impacts from the *Deepwater Horizon* event, and adds information about microplastics from OCS oil- and gas-related activities and non-OCS oil- and gas-related activities.

G.8.3.2 Virtual Public Meetings

In accordance with 30 CFR 556.26, BOEM scheduled three virtual public meetings soliciting comments on the Draft GOM Oil and Gas Programmatic EIS. The meetings were conducted to solicit information from interested parties in order to provide the Secretary with information to help in the evaluation of the potential effects of OCS oil and gas leasing. An announcement of the dates and times of the virtual public meetings was included in the press release and *Federal Register* Notice. A copy of the *Federal Register* Notice was posted on BOEM's website at https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic.

Virtual public meetings were held on the dates and at the times indicated below:

- January 14, 2025, at 1:00 p.m. CST,
- January 15, 2025, at 9:00 a.m. CST,
- January 16, 2025, at 6:00 p.m. CST.

G.8.3.3 Comments Received on the Draft GOA Oil and Gas Programmatic EIS and BOEM's Responses

The press release and the announcement of public meetings were distributed and published on BOEM's website on December 6, 2024 and the Notice of Availability for the Draft Programmatic EIS was published in the *Federal Register* on December 13, 2024 (89 FR 101044). The comment period ended on January 27, 2025. BOEM received 5,251 comments in response to the Draft GOA Oil and Gas Programmatic EIS via written and verbal comments at public meetings and the regulations.gov website. Of the 5,251 submissions, 33 were identified as unique and containing substantive content. BOEM also received 5,197 form letters from a single campaign. All comments were analyzed to identify all substantive issues raised by the public. Each issue within an individual's comment was grouped into 11 major categories and labeled with a Comment ID Number. Within these 11 categories, responses are provided for each issue.

As shown in the comment matrix, BOEM received two formal requests for an extension to the comment period from Earthjustice et al. and a private citizen. These extension requests were not granted. In addition, BOEM received an informal request for an informal extension from the USEPA. As with the formal requests, BOEM responded to the USEPA indicating that an extension would not be granted. The USEPA submitted comments to BOEM on the Draft GOA Oil and Gas Programmatic EIS 3 days after the comment period closed and published the comments in the *Federal Register* in accordance with their responsibilities under Section 309 of the Clean Air Act. Since USEPA also conducts reviews of final EISs to ensure that the lead agency has taken USEPA's

comments into account, BOEM has included those comments and responses under Topic 15, USEPA Comments on the Draft GOA Oil and Gas Programmatic EIS in **Table L-1**.

The comments and responses are presented in a matrix in **Appendix L** and are organized by the topics below.

Topic 1 – "NEPA Process and Public Involvement" contains those issues related to the process of preparing this Programmatic EIS and the public's engagement.
Topic 2 – "NEPA Analysis" includes comments about how BOEM carried out its analysis under NEPA.
Topic 3 – "Alternatives" includes all of the comments related to the alternatives considered in the preparation of this Programmatic EIS, alternatives suggested, and stated preference for alternative.
Topic 4 – "Environmental Issues and Concerns" contains the 17 subcategories listed below.

- Climate Change
- Greenhouse Gasses (including general comments, comments on SC-GHG analysis, and comments on Market Sim)
- Well Stimulation
- General Physical, Biological, and Social Resource Analysis
- Air Quality
- Water Quality
- Coastal Communities and Habitats
- Benthic Communities and Habitats
- Fishes and Invertebrates
- Birds
- Marine Mammals
- Sea Turtles
- Commercial Fisheries
- Recreational Fishing
- Recreational Resources
- Economic Factors
- Social Factors

Topic 5 – "Cumulative Analysis" includes the comments that BOEM received regarding the analysis of past, present, and reasonably foreseeable activities in this Programmatic EIS.
Topic 6 – "Consultations" includes comments about the Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, and other consultations.
Topic 7 – "Mitigation" includes all of the comments that propose mitigations as wells as how BOEM plans to minimize environmental impacts.
Topic 8 – "Oil Spills" includes comments related to concerns over oil spills and their impact on the environment.

Topic 9 – "General Feedback on the Draft GOA Oil and Gas Programmatic EIS and Associated Leasing" includes comments that either support or oppose OCS oil and gas leasing and the Programmatic EIS.

Topic 10 – "Decommissioning" includes comments related to decommissioning activities.

Topic 11 – "Out of Scope" comments include those comments that are not covered within the analysis of this Programmatic EIS. They include comments that did not fall into one of the above categories.

Topic 12 – "EPA Comments on the Draft GOA Oil and Gas Programmatic EIS" includes the comments submitted late by the USEPA.

G.9 REFERENCES

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BOEM. 2025a. Oil and gas ESA consultations and protocols. Washington (DC): U.S. Department of the Interior, Bureau of Ocean Energy Management; [accessed 2025 Jul 3]. https://www.boem.gov/regions/gulf-america-ocs-region/oil-and-gas-esa-consultations-and-protocols

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NMFS. 2025a. Biological and conference opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's oil and gas program activities in the Gulf of America. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 701 p. Report No.: OPR-2022-03526.

NMFS. 2025b. Attachments and appendices for the 2025 Gulf of America oil and gas Biological Opinion. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 87 p.

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APPENDIX H

CONSULTATION CORRESPONDENCE

H CONSULTATION CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

April 20, 2018

Mr. Michael A. Celata
Regional Director, BOEM
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123

Mr. Lars Herbst
Regional Director, Gulf of Mexico OCS Region
Bureau of Safety and Environmental Enforcement
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) on the effects of Bureau of Ocean Energy Management's (BOEM) and Bureau of Safety and Environmental Enforcement's (BSEE) proposed oil and gas leasing, exploration, development, production, decommissioning, and all related activities in the Gulf of Mexico (GOM) Outer Continental Shelf (OCS) within existing leased areas and those areas proposed for future leasing in the Western Planning Area (WPA), the Central Planning Area (CPA), and the Eastern Planning Area (EPA).

Based on our review of the proposed action, as illustrated in the attached BO, formal consultation is not required for this action. No further Endangered Species Act (ESA) consultation with the Service for the proposed action will be necessary for the duration covered under this BO, unless there are new species that become listed, new critical habitat designated, or there are changes in the scope, location, or impacts of the proposed action. Furthermore, future consultations for this action may not warrant formal consultation and could be handled informally dependent upon the likelihood of take.

We appreciate BOEM's continued coordination and cooperation in the conservation of threatened and endangered species and their critical habitat. If you require further assistance regarding ESA coordination, or have questions regarding the content of this letter, please contact Ms. Karen Soileau (337/291-3132) of this office.

Sincerely,

Joseph A. Ranson
Field Supervisor

Louisiana Ecological Services Office

cc: Protected Species Coordinator, BSEE, New Orleans, LA
Energy Coordinator, Ecological Services, FWS, Atlanta, GA (ES/CPA)
ESA Consultation Coordinator, FWS, Southeast Region, Tallahassee, FL
Field Supervisor, Ecological Services, FWS, Daphne, AL
Field Supervisor, Ecological Services, FWS, Jacksonville, FL
Field Supervisor, Ecological Services, FWS, Panama City, FL
Field Supervisor, Ecological Services, FWS, Vero Beach, FL
Field Supervisor, Ecological Services, FWS, Jackson, MS
Field Supervisor, Ecological Services, FWS, Houston, TX
Field Supervisor, Ecological Services, FWS, Corpus Christi, TX
Andrew Strelcheck, Deputy Regional Administrator, NOAA, St. Petersburg, FL
Rachel Sweeney, Protected Resources Division, NOAA, St. Petersburg, FL
LDWF, Baton Rouge, LA

United States Department of the Interior
BUREAU OF OCEAN ENERGY MANAGEMENT
New Orleans Office
1201 Elmwood Park Blvd
New Orleans, Louisiana 70123-2394

In Reply Refer To: GM 673E

Mr. Joseph Ranson, Field Supervisor
U.S. Fish and Wildlife Service
Louisiana Ecological Services
200 Dulles Drive
Lafayette, Louisiana 70506
joseph_ranson@fws.gov

Via Electronic Mail

Dear Mr. Ranson:

Pursuant to the Biological Opinion (BiOp) dated April 20, 2018, the Bureau of Ocean Energy Management's (BOEM) and Bureau of Safety and Environmental Enforcement's (BSEE) are requesting concurrence with our determination of the effect of proposed oil and gas leasing, exploration, development, production, decommissioning, and all related activities in the Gulf of Mexico Outer Continental Shelf (OCS) within existing leased areas and those areas proposed for future leasing in the Western Planning Area, the Central Planning Area, and the Eastern Planning Area on the newly designed threatened eastern black rail (*Laterallus jamaicensis jamaicensis*). The BiOp is for a ten-year period and any future consultations for this action may not warrant formal consultation and could be handled informally dependent upon the likelihood of take. The listing of a new species was identified as a potential trigger for reinitiation.

On October 8, 2020, a Final Rule was published that listed the eastern black rail as threatened with no critical habitat. The rule became effective on November 9, 2020. Attached is the BOEM evaluation regarding the potential effects from the OCS oil- and gas-related activities on the eastern black rail. Based on our evaluation, OCS oil and gas activities would have no effect or would be not likely to adversely affect the eastern black rail except in the case of a low-probability catastrophic spill, which is not reasonably certain to occur. Since a low-probability spill is not reasonably certain to occur, this type of spill has not been evaluated as either a direct or an indirect effect of the proposed action. As such, BOEM and BSEE have determined that the effects of the proposed action are not likely to jeopardize the continued existence of the eastern black rail.

If you have any questions regarding the above information or need any additional information for clarification, please do not hesitate to contact Dr. Tre Glenn at (504) 736-1749 or tre.glenn@boem.gov, and Mr. Daniel Leedy at (504) 736-2597 or daniel.leedy@bsee.gov.

Sincerely,

AGATHA-MARIE KALLER

Digitally signed by AGATHA-MARIE KALLER
DN: c=US, o=U.S. Government, ou=Department of the Interior, ou=Bureau of Ocean Energy Management, cn=AGATHA-MARIE KALLER, 0.9.2342.19200300.100.1.1=14001001248643
Date: 2021.02.12 06:41:16 -06'00'

Arie Kaller
Supervisor, Office of Environment
BOEM, Gulf of Mexico OCS Region

cc: Ms. Brigette Firmin, brigette_firmin@fws.gov
Mr. Joe Hodges, joe_hodges@fws.gov
Mr. T.J. Broussard, t.j.broussard@boem.gov

Enclosure:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Louisiana Ecological Services
200 Dulles Drive
Lafayette, Louisiana 70506

April 26, 2021

Mr. Michael A. Celata
Regional Director, BOEM
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123

Mr. Lars Herbst
Regional Director, Gulf of Mexico OCS Region
Bureau of Safety and Environmental Enforcement
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123

Dear Mr. Celata and Mr. Herbst:

Please reference Mr. Tré Glenn's February 12, 2021, electronic mail and attached biological evaluation (BE) for the Bureau of Ocean Energy Management's (BOEM) and Bureau of Safety and Environmental Enforcement's (BSEE) proposed oil and gas leasing, exploration, development, production, decommissioning, and all related activities in the Gulf of Mexico Outer Continental Shelf (OCS) within existing leased areas and those areas proposed for future leasing in the Western Planning Area (WPA), the Central Planning Area (CPA), and the Eastern Planning Area (EPA) on the threatened eastern black rail (*Laterallus jamaicensis jamaicensis*). With a mutual agreement to extend the Service's response date, the BOEM and BSEE request our review of and concurrence with their determination that the proposed activities are not likely to adversely affect the eastern black rail. We have reviewed the information provided and offer the following comments in accordance with provisions of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq).

Proposed Action

The proposed action area includes coastal waters of Texas (TX), Louisiana (LA), Mississippi (MS), Alabama (AL), and Florida (FL) where OCS oil and gas activities are expected to occur across the western, central, and eastern planning areas that are maintained by BOEM and BSEE. The WPA is primarily located within coastal waters of Texas, the CPA within coastal waters of Louisiana, Mississippi, and Alabama, and the EPA within coastal waters of Florida. The proposed action would allow for routine OCS oil and gas activities to continue within the WPA, CPA, and EPA. Activities include aircraft and vessel traffic, pipeline landfalls, terminals,

platforms, drilling, discharge, and removal operations. These activities facilitate existing or proposed oil and gas leasing, exploration, development, production, and decommissioning within the action area. Potential occurrence of marine debris resulting from OCS oil and gas activities are included for consideration regarding the proposed action.

Methods for carrying out these activities will follow previously established regulations or protocols in order to ensure compliance with safe operations. Vessels utilizing navigation waterways or corridors will adhere to U.S. Coast Guard regulations to limit vessel speeds within inland areas. Aircraft will adhere to altitude restrictions set forth by the Federal Aviation Administration while working offshore between platform sites or when flying over inland areas. Pipeline landfalls and terminals as well as other onshore infrastructure that result in wetland destruction or modification within the action area require mitigation or restoration as outlined by Section 404 of the Clean Water Act. Discharges, such as produced water, are restricted based on maximum allowable amounts permitted by the National Pollutant Discharge Elimination System. Additionally, daily monitoring will be performed by the permittee through a visual sheen test to maintain compliance with the allowable amounts of discharge. Marine debris that may occur from OCS oil and gas activities within the proposed action area have multiple regulations to prevent introduction of waste material. These include the BSEE regulation (NTL 2012-BSEE-G01) to prohibit improper disposal of equipment, the National Marine Fisheries Service's (NMFS) Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols, and the International Convention for the Prevention of Pollution from Ships (MARPOL).

Effects Analysis

Eastern Black Rail

Data for the eastern black rail (EBR) is limited and populations are not well defined throughout the species range. Within Louisiana, the EBR currently has nine identified coastal parishes where habitat may be suitable. Cameron and Vermillion Parish have known occurrence for the EBR while Iberia, St. Mary, Terrebonne, Lafourche, Jefferson, Plaquemines, and St. Bernard Parishes have potential for occurrence. Potentially disturbing activities from the proposed OCS oil and gas activities, such as noise disturbance, air pollution, habitat loss or degradation, and environmental contaminants, could impact the EBR or known/potential habitat. Protocols and regulations provided within the BE, such as those mentioned above, should reduce the potential for harmful effects to the EBR or lessen the impact of those effects if OCS oil and gas activities were to interact directly or indirectly with the species. As mentioned within the BE, oil spills that may occur from these activities have the greatest potential to impact coastal birds like the EBR. Oil that makes its way inland to the coastal parishes inhabited by the EBR or into suitable habitats could negatively impact the species by causing displacement, reduced survival, or direct mortality. However, the probability of such an event occurring as a result of OCS oil and gas activities is relatively low. The Oil Spill Risk Analysis (OSRA) model is utilized within the BE to calculate the probability of an accidental oil spill across the coastal counties or parishes of TX, LA, MS, AL, and FL. For the state of Louisiana, the probability of an accidental oil spill (≥1,000 bbl) occurring and contacting the shoreline within 10 to 30 days as a result of EPA and WPA OCS oil and gas activities are between 0.5 – 1 percent. For the CPA, the probability for LA is between 0.5 – 8 percent varying significantly across the parishes. The probability for oil

spills occurring and contacting LA offshore waters is similar for the WPA and EPA, but the CPA is much higher, between 2 – 25 percent. For the EBR, a marsh bird primarily utilizing inland habitats, the increased potential for impact to offshore waters should not be a significant risk to the species or its known/potential habitats within Louisiana's coastal parishes.

Eastern black rails are considered year-round residents along the Texas Gulf Coast. They are known to occur and breed from Jefferson County to Cameron County, with Texas having one of the highest known population numbers of eastern black rails throughout the species range. As previously mentioned, oil that makes its way inland to coastal Texas counties inhabited by the EBR or into suitable habitats could negatively impact the species by causing displacement, reduced survival, or direct mortality. However, the probability of such an event occurring as a result of OCS oil and gas activities is relatively low. The OSRA model is utilized within the BE to calculate the probability of an accidental oil spill across the coastal counties or parishes of TX, LA, MS, AL, and FL. For the state of Texas, the probability of an accidental oil spill (≥1,000 bbl) occurring and contacting the shoreline within 10 to 30 days as a result of CPA OCS oil and gas activities are between 0.5 – 4 percent. For the EPA, the probability for TX is less than 0.5 percent. However, for the WPA, the probability for TX is between 0.5 – 3 percent varying significantly across the coastline. Per the BE, the OSRA modeling results (10- and 30-day probabilities) indicate that a large spill (>1,000 bbl) in Federal offshore waters, should one occur, would have a 3 – 5 percent and 9 – 16 percent probability (from CPA), 5 – 8 percent and 8 – 14 percent probability (from WPA), and ≤ 0.5 percent probability (from EPA) of impacting Texas offshore waters. For the EBR, a marsh bird primarily utilizing inland habitats, the increased potential for impact to offshore waters should not be a significant risk to the species or its known/potential habitats within Texas coastal counties.

The eastern black rail occurs year-round in Florida and has potential for occurrence in Alabama and Mississippi. As mentioned previously, oil that makes its way inland to coastal Florida counties inhabited by the EBR or into suitable habitats could negatively impact the species by causing displacement. Oil that goes into potential habitat for the EBR, such as the coastal counties of Alabama and Mississippi, could negatively impact those habitats by causing degradation or habitat loss. However, the probability of such an event occurring as a result of OCS oil and gas activities is relatively low. The OSRA model is utilized within the BE to calculate the probability of an accidental oil spill across the coastal counties or parishes of TX, LA, MS, AL, and FL. For AL, MS, and FL, the probability of an accidental oil spill (≥1,000 bbl) occurring and contacting the shoreline within 10 to 30 days as a result CPA, EPA, and WPA OCS oil and gas activities are ≤ 0.5 percent. Per the BE, the OSRA modeling results (10- and 30-day probabilities) indicate that a large spill (>1,000 bbl) in Federal offshore waters, should one occur, would have between a 0.5 – 2 percent chance of impacting offshore waters of AL, MS, and FL as a result of CPA, EPA, and WPA OCS oil and gas activities. For the EBR, a marsh bird primarily utilizing inland habitats, the increased potential for impact to offshore waters should not be a significant risk to the species or its known/potential habitats within Alabama, Mississippi, and Florida.

The proposed OCS oil and gas activities within the WPA, CPA, and EPA could potentially impact the EBR or its habitat within coastal counties or parishes within TX, LA, MS, AL, and FL. Effects such as displacement in response to noise disturbance or reduced survival from oil

spills could occur from the aforementioned project activities. However, taking into consideration the protocols and regulations that will be implemented to reduce environmental impacts and the risk analyses demonstrating a low probability of oil spills that could significantly impact the species, the OCS oil and gas activities are not likely to adversely affect the eastern black rail. Accordingly, the Service concurs with your determination that implementation of the proposed action is not likely to adversely affect the eastern black rail.

We appreciate the cooperation exhibited by your agencies and look forward to future coordination with BOEM/BSEE in the conservation of endangered and threatened species in the Gulf of Mexico and adjacent coastal habitats. If you have any questions regarding this letter, please contact Joe Hodges (337-291-3109) of this office.

Sincerely,

BRIGETTE FIRMIN

Digitally signed by BRIGETTE FIRMIN
Date: 2021.04.26 16:48:28 -05'00'

Brigette D. Firmin
Acting Field Supervisor
Louisiana Ecological Services Office

cc: FWS, Ecological Services, Houston, TX
FWS, Ecological Services, Jackson, MS
FWS, Ecological Service, Daphne, AL
FWS, Ecological Services, Panama City, FL
Tré Glenn, BOEM, New Orleans, LA
Arie Kaller, BOEM, New Orleans, LA
T.J. Brousssard, BSEE, New Orleans, LA
Daniel Leedy, BSEE, New Orleans, LA

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United States Department of the Interior
BUREAU OF OCEAN ENERGY MANAGEMENT
Gulf of Mexico Region
1201 Elmwood Park Blvd
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March 6, 2024

Brigette Firmin
Field Supervisor
U.S. Fish and Wildlife Service, Southeast Region
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Brigette_Firmin@fws.gov

Via Electronic Mail

Dear Ms. Firmin:

The Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE, collectively the Bureaus), request the U.S. Fish and Wildlife Service (USFWS) reinitiate informal consultation under section 7 of the Endangered Species Act (ESA), as amended (87 Stat. 884, as amended; 16 U.S.C §§ 1531, et seq.). The Bureaus reviewed new information related to USFWS's programmatic biological opinion (BO), dated April 20, 2018, on proposed oil and gas leasing, exploration, development, production, decommissioning, and all related activities in the Gulf of Mexico (GOM) Outer Continental Shelf (OCS) within existing leased areas and those areas proposed for future leasing in the Western Planning Area (WPA), the Central Planning Area (CPA), and the Eastern Planning Area (EPA).

Pursuant to 50 CFR § 402.16, a Federal agency is required and shall request reinitiation:

(1) If the amount or extent of taking specified in the incidental take statement is exceeded;
(2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
(3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or,
(4) If a new species is listed or critical habitat designated that may be affected by the identified action.

While we identified new information that "may affect listed species or critical habitat in a manner or to an extent not previously considered," we determined this new information does not change our conclusions. As applicable to the 2018 BO, the Bureaus' request concurrence with their determinations contained below in this letter, which remain consistent with the determinations in the 2018 BO, related to the following new information:

> (1) the final rule (88 FR 89611, 89626) listing the black-capped petrel (*Pterodroma hasitata*) as endangered on January 29, 2024;
> (2) the proposed rules to designate critical habitats for the threatened rufa red knot (*Calidris canutus rufa*; 88 FR 22530, 22693) and threatened North Atlantic distinct population segment (DPS) green sea turtle (*Chelonia mydas*; 88 FR 46376, 46570); and,
> (3) an analysis of new information regarding the recent use (2022 and 2023) of the Chandeleur Islands by nesting loggerhead and Kemp's ridley sea turtles.

The Bureau is also providing a discussion of the new oil spill analysis in Attachment 2 and the updated OSRA report (Ji and Schiff 2023) is provided as Attachment 3.

NEW INFORMATION AND CONFERENCING

The information below is new since publication of the 2018 BO. The Bureaus' assessment of new information found that it supports the conclusions or was largely already considered in previous analyses; thus, the conclusions reached in the 2018 BO remain valid. BOEM and BSEE continually review best-available science to keep informed on new data regarding ESA-listed species and critical habitats in the GOM and any potential effects from our activities.

Section 7(a)(4) of the ESA provides a mechanism for identifying and resolving potential conflicts between a proposed action and proposed species or proposed critical habitat at an early planning stage. Federal action agencies may request to confer on any Federal action which is likely to jeopardize the continued existence of any species proposed to be listed or result in the destruction or adverse modification of proposed critical habitat for such species. Because of the new information on the proposed critical habitats for the rufa red knot and the green sea turtle, the government is requesting to confer on these two species.

Geographic Scope of Action Area

For oil and gas leasing purposes, the GOM is divided into three geographic leasing areas: the Western Planning Area (WPA), the Central Planning Area (CPA), and the Eastern Planning Area (EPA) (Figure 1). The 2018 Programmatic BO consultation considered all activities associated with the oil and gas program occurring in areas under Federal jurisdiction in the WPA, CPA and EPA. The geographic scope includes all areas under Federal jurisdiction in the WPA, and the areas of the CPA and small portions of the EPA that are not currently withdrawn from leasing (and where oil and gas activities are not expected) (**Figure 1**). The action area for this consultation includes the Federal OCS waters in the GOM, as well as coastal areas, ports, airspaces, and waterways used by transport vessels related to coastal infrastructure, fabrication sites, and pipelines connecting to the offshore pipeline system, and other estuarine and marine areas affected directly and indirectly by the proposed action (see **Figure 1**). A small portion of

the CPA (within 100 miles of Florida and south of Alabama-Florida border) and a large portion of the EPA are currently under a presidential withdrawal[1] that replaced the moratorium in the Gulf of Mexico Energy Security Act of 2006 (GOMESA). There are a limited number of existing, active leases in the Eastern Planning Area that were leased before the enactment of the Gulf of Mexico Energy Security Act in 2006 or the 2020 withdrawal and, while some vessel and aircraft trips could occur in the EPA, the Bureaus expect program related traffic to be limited in that area, given the lack of activity in the EPA and the long distances required to travel across the EPA to the CPA and WPA, where most OCS oil and gas activities are ongoing.

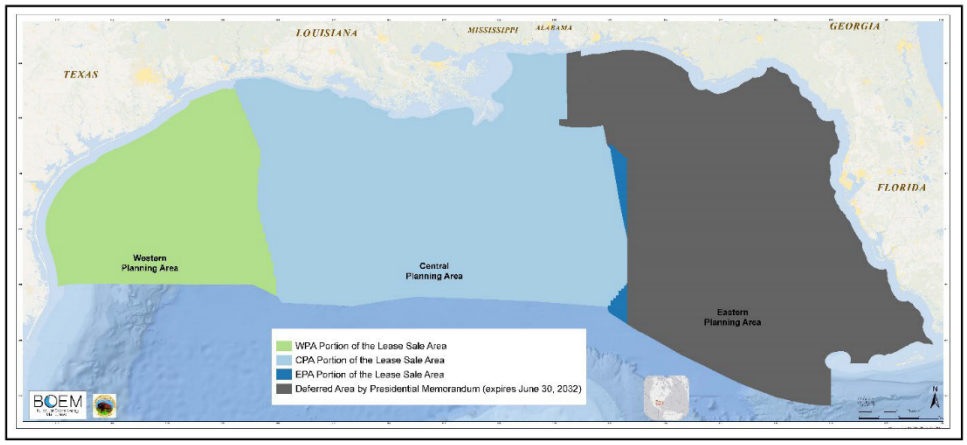


Figure 1. Action Area in the Northern Gulf of Mexico.

Black-Capped Petrel

On December 28, 2023, the USFWS published the final rule listing the black-capped petrel (*Pterodroma hasitata*) as endangered under the ESA as of January 29, 2024 (USFWS 2023a). The black-capped petrel nests on the island of Hispaniola and spends the rest of its life at sea. Recent studies have confirmed occurrences of black-capped petrels in the northern GOM, which extends the known pelagic seabird range to include the northern GOM (Jodice et al. 2021).

The USFWS determined that the black-capped petrel is an endangered species due to the following threats: habitat loss due to deforestation and forest fires and predation by nonnative mammals. Other factors that affect the species now to a lesser degree or could affect the species in the future include development, offshore oil and gas infrastructure and activities, offshore and coastal wind energy infrastructure and activities, collisions with communication towers, and disorientation and grounding due to artificial lighting. The effects of climate change are also

[1] Under authority granted in Section 12(a) of the OCSLA (43 U.S.C. § 1341(a)), the areas of the OCS designated by section 104(a) of the Gulf of Mexico Energy Security Act of 2006 were withdrawn from leasing disposition for a period of ten years, beginning on July 1, 2022, and ending on June 30, 2032.

expected to affect the species through increased storm intensity and frequency, resulting in flooding of burrows and erosion of suitable nesting habitat. Historically, human predation for consumption and natural disasters, such as earthquakes and volcanic eruptions, affected the viability of the species.

A portion of the black-capped petrel's range extension overlaps with the action area. Jodice et al. (2021) documented several observations in the action area, the majority of which were in the eastern GOM and concentrated in the EPA with only a small number of observations west of the Mississippi River. Due to the presidential withdrawal of most of the EPA, OCS oil and gas related activity in the eastern GOM are generally low, reducing the potential overall for interaction with black-capped petrel.

Low-altitude aircraft overflights could disturb black-capped petrels during foraging and resting periods. Individuals could leave areas of activity and cease using their preferred areas, resulting in increased energy expenditure via flight and alertness, and reduced energy intake via lower feeding rates. The USFWS, Federal Aviation Administration (FAA), National Park Service, and Bureau of Land Management have an Interagency Agreement to reduce low-level flights over natural resource areas. The recommended minimum flight altitude is 2,000 feet above ground level. This limitation is included on aeronautical maps. The FAA (FAA Advisory Circular 91-36C) and corporate helicopter policy also states that helicopters must maintain a minimum altitude of 700 feet while in transit offshore and 500 feet while working between platforms. However, due to low OCS-related activity in areas used by the black-capped petrel, impacts from helicopter and vessel traffic should be insignificant and are not likely to affect the species.

The OCSLA (43 USC § 1334(a)(8)) requires the Secretary of the DOI to promulgate and administer regulations that comply with National Air Quality Standards (NAAQS), pursuant to the CAA (42 USC § 7401 et seq.), to the extent that authorized activities significantly affect the air quality of any state. Under provisions of the CAA Amendments of 1990, the USEPA Administrator has jurisdiction in OCS areas in the GOM eastward of 87.5°W longitude. BOEM implementing regulations in 30 CFR § 550 Subpart C apply to those air emission sources in the GOM westward of 87.5°W longitude. BOEM issued NTL 2020-N03 and 2022-N01 that discuss collecting and reporting information through an online system for recent calendar years 2021 and 2023 to provide additional information on its oversight of air emissions on the OCS. The Bureaus anticipate minimal effects to air quality associated with OCS oil and gas emissions due to prevailing atmospheric conditions, emission heights and rates, and pollutant concentrations. Because emissions from OCS-related activities are not likely to impact ambient air quality offshore, effects to the black-capped petrel from decreased air quality are expected to be insignificant.

Produced water is an operational discharge containing hydrocarbons, trace heavy metals, radionuclides, sulfates, treatment chemicals, and produced solids that represents most of the waste discharged from offshore oil extraction production facilities (Veil et al., 2004; Welch and Rychel, 2004). Operational discharges or runoff in the offshore environment could affect seabirds that remain and feed in the immediate vicinity of offshore OCS structures and platforms (Wiese et al., 2001; Burke et al., 2005). These impacts could also be both direct and indirect. Impacts to birds from pollutants remaining in produced water may be from ingestion, contact

(direct), or from the changes in the abundance, distribution, or composition of preferred foods (indirect). O'Hara and Morandin (2010) documented measurable oil transfer to feathers and impacts to feather microstructure at sheen thickness as low as 0.1–0.3 micrometer. A light coating of hydrocarbons and other substances found in produced water is enough to negatively affect feather microstructure, potentially compromising its buoyancy, insulation (i.e., thermoregulatory function and capacity), and flight characteristics (Stephenson, 1997; O'Hara and Morandin, 2010). Routine discharges are restricted and regulated, including under the Clean Water Act through the USEPA's National Pollutant Discharge Elimination System (NPDES) permits and USCG regulations. Assuming compliance with these mitigating regulations, which is required by law, the impacts of produced waters on the black-capped petrel is expected to be discountable and undetectable.

There are numerous existing laws, regulations, and enforcement guidelines that prohibit and discourage the disposal of marine trash and debris in GOM waters. For example, BSEE prohibits the disposal of equipment, containers, and other materials into offshore waters by lessees (30 CFR 250.300). Also, BSEE requires annual awareness training and the posting of placards to minimize the unintentional loss of debris from industry structures or vessels. BSEE inspectors routinely conduct site visits and issue citations for noncompliance. The International Convention for the Prevention of Pollution from Ships (also known as MARPOL 73/78), Annex V., which the United States has adopted, went into effect on January 1, 1989, 33 U.S.C. §§ 1901 et seq., prohibits the disposal of any plastics, garbage, and other solid wastes at sea or in coastal waters, and is enforced by the USCG. Additionally, the Marine Debris Research, Prevention, and Reduction Act (MDRPR) (33 U.S.C. §§ 1951 et seq.) was enacted in December 2006 to amend MARPOL Annex V in the United States. The MDRPR established, within the National Oceanic and Atmospheric Administration (NOAA), a Marine Debris Prevention and Removal Program to reduce and prevent the occurrence and adverse impacts of marine debris (e.g., trash) on the marine environment and navigation safety. BSEE's Notice to Lessee (NTL) 2012-BSEE-G01(issued on January 1, 2012) provided standards for marine trash and debris awareness and elimination. Marine trash and debris guidance was further refined through the Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols included in the March 13, 2020 Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico (noaa.gov). Greatly improved handling of waste and trash by industry, along with the annual awareness training required by the marine debris mitigations, is decreasing OCS-related debris in the ocean and impacts to the black-capped petrel are, therefore, expected to be discountable.

In conclusion, routine activities associated with OCS oil and gas development are insignificant or discountable and therefore, "*may affect, - are not likely to adversely affect*" (NLAA) the black-capped petrel in the northern Gulf of Mexico. Discussion and conclusion of effects of accidental events (i.e., oil spills) are provided in Attachment 2. The Bureaus conclude the proposed action will not jeopardize the continued existence of this species.

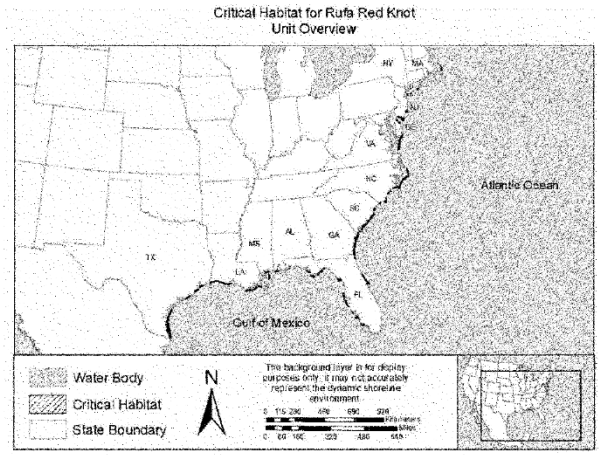
Conference on Proposed Critical Habitat for the Rufa Red Knot (*Calidris canutus rufa*)

On July 15, 2021, the USFWS proposed to designate critical habitat for the rufa red knot along the US east and Gulf coasts (USFWS 2021) including along the coasts of Texas, Louisiana, Mississippi, Alabama, and Florida. Physical or biological features essential to the conservation of the species (hereafter referred to as essential features) are defined as the features that occur in specific areas and that are essential to support the life-history needs of the species, including but not limited to, water characteristics, soil type, geological features, sites, prey, vegetation, symbiotic species, or other features. The USFWS identified the following essential features:

- Beaches and tidal flats used for foraging.
- Upper beach areas used for roosting, preening, resting, or sheltering.
- Ephemeral and/or dynamic coastal features used for foraging or roosting.
- Ocean vegetation deposits or surfcast wrack used for foraging and roosting.
- Intertidal peat banks used for foraging and roosting.
- Features landward of the beach that support foraging or roosting.
- Artificial habitat mimicking natural conditions or maintaining the physical or biological features listed above.

The action area of the existing ESA consultation includes the Western, Central and Eastern Gulf of Mexico OCS Planning Areas as well as "the coastal areas, ports, airspace and waterways used by related transport vessels, costal infrastructure, fabrication sites, pipelines connecting to the offshore pipeline system, transportation, and other estuarine and marine areas affected by OCS oil and gas activities" (USFWS 2018). Thus, the units of proposed critical habitat for rufa red knot along the coasts of Texas, Louisiana, Mississippi, and Alabama and along the Gulf coast of Florida are within the action area.

Figure 1 to Rufa Red Knot paragraph (5)



The Bureaus are not aware of any projects that have affected the seven essential features of the critical habitat listed above. Consistent with the 2018 BO, necessary onshore facilities to support offshore oil and gas activities are already in place and no major new facilities are anticipated as a result of the proposed lease sales. Due to the uncertain nature of oil and gas supply and demand, companies often prefer to use and expand existing areas and facilities as opposed to building new facilities. No new navigation channels are expected to be dredged and no new onshore infrastructure, except for possibly a few pipeline crossings, is expected to result from the proposed activities.

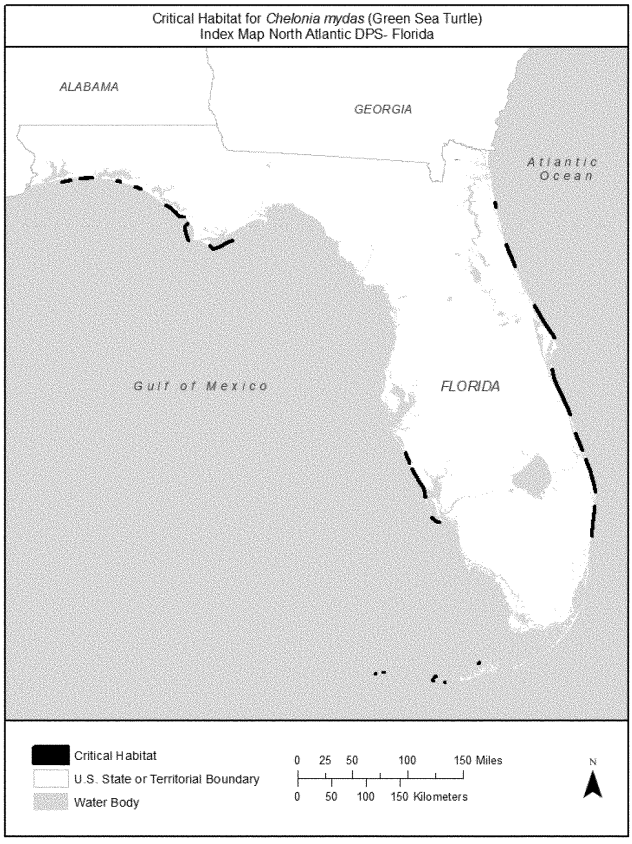
The rufa red knot's migration and wintering ranges include all GOM states. Aircraft traffic, routine discharges, and marine trash and debris may affect the proposed critical habitat for the rufa red knot. Given the guidelines for aircraft flight height and the amount of expected air traffic from the proposed action, effects to the proposed critical habitat for rufa red knot are expected to be discountable. Additionally, given required compliance with the Clean Water Act and USCG regulations, routine discharges will have an insignificant impact on the proposed rufa red knot critical habitat. Assuming compliance with the numerous existing laws, regulations, and enforcement guidelines that prohibit and discourage the disposal of marine trash and debris in GOM waters, expected impacts to the proposed critical habitat for the rufa red knot are discountable.

The Bureaus anticipate minimal effects to air quality associated with OCS oil and gas emissions due to prevailing atmospheric conditions, emission heights and rates, and pollutant concentrations. Because emissions from OCS-related activities are not likely to impact ambient air quality, effects to the proposed critical habitat for the rufa red knot from decreased air quality are expected to be insignificant.

Given that emissions from routine activities are transitory, diffuse rapidly, and are of limited extent compared to entire northern GOM, the Bureaus conclude effects from routine activities are either insignificant or discountable and therefore, "*may affect, - are not likely to adversely affect*" (NLAA) rufa red knot proposed critical habitat. No direct loss or permanent modification of rufa red knot critical habitat or its ecological function is anticipated as a result of the proposed action. In conclusion, the proposed action will not affect the ability of any of the essential habitat features listed above to perform their function. Further, the Bureaus conclude the proposed action will not jeopardize the continued existence of this species or result in the destruction or adverse modification of designated or proposed critical habitat for the rufa red knot.

Conference on Proposed Critical Habitat for the Green Turtle (*Chelonia mydas*)

On July 19, 2023, the USFWS proposed to designate critical habitat for five distinct population segments of the green sea turtle. This proposed designation includes some areas within the action area in coastal Florida (USFWS 2023b) for only the North Atlantic DPS green sea turtle.



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The USFWS determined that several terrestrial environments for the North Atlantic DPS were essential for the conservation of the species (see 88 FR 46376 46570).

The action area of the existing ESA consultation includes the Western, Central and Eastern Gulf of Mexico OCS Planning Areas as well as "the coastal areas, ports, airspace and waterways used by related transport vessels, costal infrastructure, fabrication sites, pipelines connecting to the offshore pipeline system, transportation, and other estuarine and marine areas affected by OCS oil and gas activities" (USFWS 2018 BO). Thus, there are several units of proposed critical habitat[2] for green sea turtles within the action area: Unit FL-11 (Sawyer Key), Unit FL-12 (Boca Brande and Marquesas Keys), Unit FL-13 (Dry Tortugas), Unit FL-14 (Sanibel Island West), unit FL-15 (Gasparilla Island), Unit Fl-16 (Don Pedro and Little Gasparilla Islands), Unit 17 (Manasota Key), Unit FL-18 (Casey and Siesta Keys), Unit FL-19 (Cape St. George and St. George Island), Unit FL-20 (St. Joseph Peninsula), Unit FL-21 (Inlet Beach), Unit FL-22 (Topsail Hill Preserve State Park), and Unit FL-23 (Gulf Islands National Seashore).

The Bureaus are not aware of any projects that have affected essential features of the critical habitat listed mentioned above. Consistent with the 2018 BO, necessary onshore facilities to support offshore oil and gas activities are already in place and no major new facilities are anticipated as a result of the proposed lease sales. Due to the uncertain nature of oil and gas supply and demand, companies often prefer to use and expand existing areas and facilities as opposed to building new facilities. No new navigation channels are expected to be dredged and no new onshore infrastructure except for very few pipeline crossings is expected to result from the proposed activities in Florida. Further, new coastal infrastructure is not expected in Florida, as the majority of OCS oil and gas activity occurs in the Western and Central GOM Planning Areas.

Routine activities associated with the proposed action will not affect the ability of any of the essential habitat features identified by USFWS to perform their function and will not destroy or adversely modify the proposed critical habitat for the green sea turtle. Because none of the activities associated with the proposed action have the potential to affect water bodies and adjacent nesting sites (e.g., water currents, water temperatures, concentrations of *Sargassum*, or the prey or other material associated with *Sargassum*), BOEM believes the proposed action will have *no effect* on any of the essential habitat features of North Atlantic DPS green sea turtle proposed critical habitat.

New information on the loggerhead and Kemp's ridley sea turtles

The Kemp's ridley sea turtle has a restricted distribution. The majority of Kemp's ridley nesting occurs on the beaches of the western Gulf of Mexico and ninety-five percent of worldwide Kemp's ridley nesting occurs in the state of Tamaulipas, Mexico. The three main nesting beaches in Tamaulipas are Rancho Nuevo, Tepehuajes, and Barra del Tordo. Nesting also occurs in

[2] Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads and other paved areas, abandoned military structures, and hardened shorelines) and the land on which they are located existing within the legal boundaries on the effective date of the final rule.

Veracruz, Mexico, and in Texas, but on a much smaller scale. Occasional nesting has been documented in North Carolina, South Carolina, Georgia, Florida, and Alabama (NMFS 2024a).

In the US, the Northwest Atlantic Ocean DPS of loggerhead sea turtles' nests primarily along the Atlantic coast of Florida, South Carolina, Georgia, and North Carolina and along the Florida and Alabama coasts in the Gulf of Mexico. Total estimated nesting in the United States is more than 100,000 nests per year (NMFS 2024b).

In 2022, loggerhead and Kemp's ridley nests were confirmed on the Chandeleur Islands off the coast of Louisiana (Lamont et al. 2023). Historic records suggest sea turtles have nested on the Chandeleur Islands, LA, for decades, but sea turtle nesting had not been documented on these islands since 1977 (Ogren et al. 1989). The work by Lamont et al. (2023) indicates that the loggerhead and Kemp's ridley have expanded their nesting range in the GOM, although the consistent use of these islands or other areas in Louisiana and Mississippi has yet to be confirmed.

A study by Garrison et al. (2020) found that dive-surface behaviors for Kemp's ridleys in the northern GOM indicated important seasonal, diurnal, and spatial effects on the time available at the surface. The authors also found that loggerheads in the northern GOM were typically found in shallow water in late spring-early summer, then migrated into deeper water during fall and/or winter months. Gredzens and Shaver (2020) tracked post-nesting Kemp's ridley sea turtles from beaches in Texas and Mexico. The study evaluated the proportion of nesting females from each nesting beach, and using these proportions estimated that up to 82 percent of adult female Kemp's ridley sea turtles may use the northern GOM, particularly waters shoreward of the 100-meter isobath, as their primary foraging area post-nesting.

Hart et al. (2020) identified high use foraging sites for loggerhead turtles in the northeastern GOM, specifically the Big Bend region off the northwest Florida coast. This region was found to be an important year-round foraging site for loggerheads from several distinct population segments. Iverson et al. (2020) identified the neritic waters west of Florida and in the Florida Straits as high- use migration corridors for post-nesting female adult loggerhead turtles in the GOM, with migration mainly occurring in July and August.

This new information does not change the existing general information, determinations, and conclusions for these two species of sea turtles within the 2018 BO; the proposed action "*may affect, - are not likely to adversely affect*" (NLAA) nesting sea turtles and their nests due to the low nesting numbers and the low probability of an oil spill occurring when those species and their nests could be present.

CONCLUSION

The Bureaus have examined the new information regarding oil spill risk and loggerhead and Kemp's ridley sea turtle habitat use. This new information does not change the conclusions of the 2018 BO; the proposed action "*may affect, - are not likely to adversely affect*" (NLAA) federally ESA-listed threatened or endangered species. The Bureaus have determined that the routine and accidental (see Attachment 2) activities associated with the proposed action in the

2018 BO "*may affect, - are not likely to adversely affect*" (NLAA) the black-capped petrel and the proposed critical habitats for the rufa red knot and the green sea turtle. Further, the conclusions in the 2018 BO regarding other species not discussed in this letter (e.g., the West Indian manatee) remain unchanged. The proposed action (i.e leasing, exploration, development, production, and decommissioning activities in the action area under the leasing and regulatory authorities of the Bureaus) is not likely to jeopardize the continued existence of the listed species under the Service's jurisdiction and is not likely to destroy or adversely modify their designated (proposed or otherwise) critical habitat. BOEM has used the best scientific and commercial data available to complete this analysis and requests your concurrence with these determinations.

The existing 2018 BO will remain in effect until FWS provides their concurrence on these conclusions, the reinitiated informal consultation is completed, and/or a new or amended BO, if warranted, becomes available. Based on the most recent and best available information at the time, the Bureaus will also continue to closely evaluate and assess risks to listed species and designated critical habitat in upcoming environmental compliance documentation under the National Environmental Policy Act and other statutes.

If you have any questions or require any additional information, please contact Dr. Tre Glenn, Protected Species Biologist, Office of Environment, at tre.glenn@boem.gov or 504-736-1749.

Sincerely,

AGATHA-MARIE KALLER

Digitally signed by AGATHA-MARIE KALLER
DN: c=US, o=U.S. Government, ou=Department of the Interior, ou=Bureau of Ocean Energy Management, cn=AGATHA-MARIE KALLER, 0.9.2342.19200300.100.1.1=14001001248643
Date: 2024.03.06 11:59:26 -06'00'

Dr. Arie Kaller
Regional Supervisor for Environment
New Orleans Office, BOEM
arie.kaller@boem.gov

I agree:

TOMMY BROUSSARD

Digitally signed by TOMMY BROUSSARD
Date: 2024.03.06 12:26:16 -06'00'

Mr. TJ Broussard
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Office of Environmental Compliance
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Attachment 1: References
Attachment 2: Updated Oil Spill Information
Attachment 3: 2023 Oil Spill Risk Analysis Report

United States Department of the Interior
BUREAU OF OCEAN ENERGY MANAGEMENT
Gulf of America Region
1201 Elmwood Park Blvd.
New Orleans, Louisiana 70123-2394

February 5, 2025

Brigette Firmin
Field Supervisor
U.S. Fish and Wildlife Service, Southeast Region
Louisiana Ecological Services Office
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Via electronic mail

Dear Ms. Firmin:

This letter provides additional information from the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE, collectively the Bureaus) to the U.S. Fish and Wildlife Service (USFWS) relevant to the Bureaus' request to reinitiate consultation under section 7 of the Endangered Species Act (ESA), as amended (87 Stat. 884, as amended; 16 U.S.C §§ 1531, et seq.).

The Bureaus reinitiated consultation with the USFWS in a letter dated March 6, 2024. Pursuant to 50 CFR § 402.16, the letter evaluated new information, including: (1) the final rule (88 FR 89611, 89626) listing the black-capped petrel (*Pterodroma hasitata*) as endangered on January 29, 2024; (2) the proposed rules to designate critical habitats for the threatened rufa red knot (*Calidris canutus rufa*; 88 FR 22530, 22693) and threatened North Atlantic distinct population segment (DPS) green sea turtle (*Chelonia mydas*; 88 FR 46376, 46570); and (3) an analysis of new information about the recent use (2022 and 2023) of the Chandeleur Islands by nesting loggerhead and Kemp's ridley sea turtles. The reinitiation letter also provided BOEM's updated 2023 Oil Spill Risk Analysis (OSRA), and a discussion of the OSRA.

This letter describes the evaluation performed by the Bureaus, pursuant to 50 CFR § 402.16, to determine which information warranted reinitiation of consultation, the information that the Bureaus determined did not reveal effects that may affect listed species or critical habitat in a manner or to an extent not previously considered, and provides additional clarification requested by USFWS (letter dated December 20, 2024). The Bureaus reviewed new information related to USFWS's programmatic biological opinion (BO), dated April 20, 2018, on proposed oil and gas leasing, exploration, development, production, decommissioning, and all related activities in the Gulf of

America (Gulf).[1] Outer Continental Shelf (OCS) within existing leased areas and those areas proposed for future leasing in the Western Planning Area (WPA), the Central Planning Area (CPA), and the Eastern Planning Area (EPA).

Greenhouse Gas Emissions

The Bureaus have considered whether the USFWS must analyze greenhouse gas (GHG) emissions, including downstream emissions from the proposed action as an "effect of the action" pursuant to 50 C.F.R. § 402.02 as part of the reinitiated consultation. Section 402.02 defines "effects of the action" as "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 but that are not part of the action." The regulations explain that "[a] consequence is caused by the proposed action if it would not occur *but for* the proposed action *and it is reasonably certain to occur*." 50 C.F.R. § 402.02 (emphasis added).

It is generally accepted that despite advances in climate science, global climate models are typically based on global-emission scenarios and not on program-specific scenarios. As a result, global climate model outputs have not identified local or regional effects on resources specifically resulting from emissions from BOEM- and BSEE-approved activities in the Gulf. Therefore, the Bureaus are unable to determine that GHG emissions from the proposed action are reasonably certain to cause consequences to listed species. Furthermore, there are accumulated and persisting GHG emissions already in the atmosphere, and the annual volume of GHG emissions will occur globally regardless of whether a particular Bureau lease sale is held, or plan or permit is approved. Because this data and the projected continued climate change, impacts to listed species from global warming caused by GHG emissions will occur whether or not the proposed action occurs. They are not consequences that occur "*but for* the proposed action." 50 C.F.R. § 402.02 (emphasis added).

Sea Level Rise

BOEM identified sea level rise as a factor closely related to climate change and, similar to GHG emissions, is not considered a consequence of the proposed action. The Bureaus have evaluated whether sea level rise must be analyzed as an "effect of the action" pursuant to 50 CFR 402.02 as part of the reinitiated consultation.

Global mean sea level rise is a consequence of climate change, primarily driven by the thermal expansion of warming ocean waters and the influx of meltwater from glaciers and ice sheets (Sweet et al., 2022). In the Gulf, relative sea level rise is influenced by both global and regional processes. Regional factors include land subsidence caused by natural geological processes and human activities, such as the extraction of groundwater, oil, and natural gas (Dokka, 2011; Sweet et al., 2022). Additionally, local coastal processes like erosion contribute to determining the total relative sea level change experienced along the Gulf Coast (Anderson et al. 2023). Extreme weather events, such as storm surge, are not direct components of sea level rise but can amplify its impacts (Bilskie et al. 2016).

[1] Pursuant to the recent Executive Order titled "Restoring Names That Honor American Greatness," the area formerly known as the Gulf of Mexico will be referred to in U.S. government maps and documents as the Gulf of America, going forward.

Oil- and gas-related activities contribute to GHG emissions, which exacerbate climate change. Notably, offshore platforms have been found to release significant amounts of methane, a potent GHG (Yacovitch et al., 2018). This climate change drives thermal expansion of ocean waters and the melting of land-based ice sheets and glaciers, both of which contribute to sea level rise (IPCC, 2019). The relationship between GHG emissions and sea level rise highlights how activities across various sectors and regions influence climate dynamics.

Isolating the contribution of oil- and gas-related activities in the Gulf to sea level rise is difficult due to the interconnectedness of these activities within the global context. Quantifying cumulative impacts requires consideration of various factors, including the variability of climate processes on both regional and local scales. This complexity makes it challenging to determine the exact contribution of specific activities when they are part of a broader system influencing climate change.

Studies indicate that, while the Gulf Coast is particularly vulnerable to rising sea levels, these effects are driven more by broader climate patterns and emissions, rather than by oil- and gas-related activities in the region (Sweet et al., 2022). As noted by Sweet et al. (2022), "higher global temperatures increase the chances of high sea level by the end of the century and beyond," highlighting sea level rise as a consequence of global climate change.

Because Gulf oil- and gas-related activities represent a small fraction of global GHG emissions, and global GHG emissions will continue to exacerbate global climate change resulting in sea level rise regardless of the Bureau lease sales, permits and plans, impacts on listed species will occur independently of the proposed action. Therefore, these impacts do not meet the "*but for*" requirement outlined in 50 CFR 402.02 (emphasis added).

Oil and Spill Analyses

In its March 6, 2024, reinitiation letter, the Bureaus provided a discussion titled Updated Oil Spill Risk Assessment and the 2023 Oil Spill Risk Assessment (OSRA). The discussion explains that the Bureaus reviewed the updated OSRA report and found no information that would alter the previously reached conclusions for ESA-listed species under the purview of USFWS in the Gulf.

The oil spill discussion also explains that the Bureaus continue to maintain that a low-probability catastrophic spill (over 1 million bbl) is not reasonably certain to occur and, therefore, is neither a direct nor an indirect effect of the proposed action.[2] The Bureaus request that the USFWS independently evaluate this analysis and the report to determine whether the USFWS concurs with our finding.

Infrastructure Lighting

Artificial lighting is required on offshore oil and gas platforms and other infrastructure for safety and operations. Potential effects of artificial lighting include species attraction, avoidance, changes in migration patterns, and/or changes in predator and/or prey interactions (Marangoni et al. 2022).

[2] BOEM's determination of the statistical risk of a catastrophic oil spill is based on Ji et al. (2014), which used the extreme value theory to estimate the probability of a catastrophic oil spills on the OCS with a volume greater than 1 million bbl. The Ji study found that the return period of a catastrophic oil spill in OCS areas is estimated to be 165 years, with a 95% confidence interval between 41 years and more than 500 years.

Due to the distance from shore, artificial lighting on OCS platforms and infrastructure is expected to have no effect on any ESA-listed species under USFWS authority whose habitat includes inland and nearshore coastal waters, beaches, barrier islands, and/or marsh. This includes species with inland and/or coastal migration routes (e.g., piping plovers, monarchs) and sea turtle hatchlings which use natural light cues for orientation towards the ocean (BOEM 2021).

Although there is evidence that some rufa red knots cross Gulf open waters while migrating (Russell 2005, Perkins 2023), the response of red knots to artificial lighting is not known (DOI USFWS 2014). Documented Gulf crossing locations for the rufa red knot have minimal overlap with BOEM-regulated oil- and gas-related activity on the OCS (Russell 2005, Perkins 2023); therefore, it is anticipated that oil and gas structure lighting has no effect on the rufa red knot population. The only ESA-listed species under USFWS authority that would be expected to use the OCS and could be affected by OCS lighting and flaring is the black-capped petrel (DOI USFWS 2023). Bright light sources are known to attract petrels, especially on nights with inclement weather (e.g., fog, rain). Inclement weather can obscure other light sources (e.g., stars, moon) which may hamper avian orientation and navigation (Coleman et al. 2022, Poot et al. 2008, Russell 2005). Some have postulated that the loss of visual cues to the horizon may result in birds being reluctant to leave and to circulate within the cone of light surrounding platforms (Russell 2005). Inexperienced black-capped petrel fledglings and juveniles are especially sensitive to artificial lighting, likely due their high dependence on visual cues for nocturnal navigation (DOI USFWS 2023), but the closest known nesting area is in southern Haiti (Jodice et al. 2021), distant from Bureau-regulated oil- and gas-related activity. Adult black-capped petrels do forage and migrate offshore and are known to occur on the OCS, feeding mostly at the surface at night (DOI USFWS 2023). OCS lighting could result in petrel disorientation, collisions with wires and structures, and/or wasting of energy (e.g., circling a platform) (Van de Lar 2007, Simons et al. 2013). Alternatively, the presence of lighted platforms could provide foraging opportunities with attraction of prey (Ronconi et al. 2015, Marangoni et al. 2022). Based on offshore observations, migrating or foraging adult petrels are most likely to occur in the eastern region of the Gulf (east of approximately 88° west longitude), predominantly outside of the area of Bureau-regulated oil- and gas-related activity (Jodice et al. 2021). For example, none were observed on platforms or flying above platforms during a three-year BOEM observational study (Russell 2005). Thus, small number of individual black-capped petrels may encounter and respond to oil and gas structure lighting, but it is not likely to adversely affect (NLAA) the species.

Oil- and gas-related vessels transiting onto and off the OCS create transient lighting within coastal habitat. Vessel lights are a source of artificial lighting above water and could also create a light field within the upper water column. Any effects to ESA-listed species (e.g., disorientation, avoidance) would be localized and temporary within any one area. Oil- and gas-related vessels are transiting into and out of established port areas (see Attachment 2) using lighting similar in nature to other vessel types in the area (e.g., barges, fishing boats). Oil- and gas-related vessel lighting may affect ESA-listed species under USFWS authority but is expected to be NLAA for any species.

Consultation History

Following the Bureaus' initial request for reinitiation in 2010, the consultation expanded in scope to include a programmatic approach for oil- and gas-related activities in the Gulf. The Bureaus submitted a biological assessment (BA) to USFWS, dated February 28, 2014, that included an analysis of OCS oil- and gas-related activities in the Gulf including exploration, development, and production related to prior and future lease sales, and potential impacts to federally listed species associated with those activities. An updated BA, dated August 2015, was provided to the Service in response to their November 7, 2014, request for additional information. Following review of the August 2015 BA, USFWS again requested additional information via a memorandum dated October 22, 2015, which the Bureaus provided, including additional breakout sections including seven species of birds, two sea turtles, and manatee. On March 8, 2016, USFWS acknowledged that sufficient information had been received from the Bureaus to initiate formal consultation. Under mutual agreement, agency coordination continued until issuance of the BO on April 20, 2018.

On April 20, 2018, the USFWS issued a BO covering 1) all oil and gas leases issued as a result of sales held during the ten-year period, including associated exploration, development, production, and decommissioning activities authorized by BOEM or BSEE under those leases; 2) those associated exploration, development, production, and decommissioning activities authorized by BOEM or BSEE during this 10-year period under all other oil and gas leases, regardless of the date of issuance of the lease; and 3) those geological and geophysical permits issued by BOEM during the ten-year period. The BO covered five sea turtle species, Gulf sturgeon, seven bird species, four beach mouse species, and West Indian manatee.

In a February 12, 2021, letter, the Bureaus requested concurrence with their effect determinations on the newly designated threatened eastern black rail (*Laterallus jamaicensis jamaicensis*), including a biological evaluation (BE). On April 26, 2021, USFWS responded:

> *For the eastern black rail (EBR), a marsh bird primarily utilizing inland habitats, the increased potential for impact to offshore waters should not be a significant risk to the species or its known/potential habitats within Alabama, Mississippi, and Florida. The proposed OCS oil and gas activities within the WPA, CPA, and EPA could potentially impact the EBR or its habitat within coastal counties or parishes within TX, LA, MS, AL, and FL. Effects such as displacement in response to noise disturbance or reduced survival from oil spills could occur from the aforementioned project activities. However, taking into consideration the protocols and regulations that will be implemented to reduce environmental impacts and the risk analyses demonstrating a low probability of oil spills that could significantly impact the species, the OCS oil and gas activities are not likely to adversely affect the eastern black rail. Accordingly, the Service concurs with your determination that implementation of the proposed action is not likely to adversely affect the eastern black rail.*

On March 6, 2024, the Bureaus requested the USFWS reinitiate informal consultation under section 7 of the Endangered Species Act (ESA), as amended (87 Stat. 884, as amended; 16 U.S.C §§ 1531, et seq.). As applicable to the 2018 BO, the Bureaus' requested concurrence with their determinations contained in the reinitiation request, which remain consistent with the determinations in the 2018 BO. The new information assessed in the reinitiation request includes:

(1) the final rule (88 FR 89611, 89626) listing the black-capped petrel (*Pterodroma hasitata*) as endangered on January 29, 2024;
(2) the proposed rules to designate critical habitats for the threatened rufa red knot (*Calidris canutus rufa*; 88 FR 22530, 22693) and threatened North Atlantic distinct population segment (DPS) green sea turtle (*Chelonia mydas*; 88 FR 46376, 46570); and,
(3) an analysis of new information regarding the recent use (2022 and 2023) of the Chandeleur Islands by nesting loggerhead and Kemp's ridley sea turtles.

The Bureau also provided a discussion of the new oil spill analysis and the updated OSRA report (Ji and Schiff 2023). To date, the reinitiated consultation remains ongoing.

Analysis

1. New information on the West Indian manatee

The Bureaus reviewed recent publications (as discussed in detail below) with new information relevant to the assessment of program effects and for consideration in the 2024 reinitiation request. The review identified publications covering a range of information, including unusual mortality events (UMEs), human interactions with manatees, harmful algal blooms, and noise, among other topics.

The 2018 USFWS BO discusses the effects from the major impact producing factors on manatees (i.e., degradation of water quality from operational discharges, noise disturbance, collisions with vessel traffic, and effects from trash and debris). The greatest threat to manatees associated with OCS oil and gas development is oil spills. However, data show that manatees are generally not in offshore areas of the Gulf and specifically not present west of Florida within the winter months (approximately November to March). Even if manatees were commonly found west of Florida during summer months, manatees inhabit shallow, coastal waters, remaining within 100 meters from shore in Mississippi and Alabama and within about 1000 m from shore along the West Florida Shelf where shallow waters extend further offshore (Slone et al. 2022). Manatee habitat is well shoreward of the action area and the probability of an oil spill contacting their Gulf habitats is very low (4% or less chance within 30 days of a spill; BOEM 2023), and thus not reasonably certain to occur.

The eastern and near-shore distribution pattern limits potential manatee interaction with OCS oil- and gas-related related activity which, aside from vessel traffic, occurs almost exclusively offshore and outside the manatee's distribution. Furthermore, BOEM's analysis of vessel traffic associated with the proposed action originates primarily from ports west of areas inhabited by manatees and is not expected to impact this species (see Attachment 2). The 2020 Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico from the National Marine Fisheries Service included a reasonable and prudent alternative to reduce the risk of vessel strike to the Rice's whale in the Eastern Planning Area. Subsequently, lessees have been required to report vessel transits across the Rice's Whale Area in the Eastern Gulf. To date, only eight trips have been logged.

The 2018 USFWS BO included a discussion of the ongoing UME for manatees. Updated information from NOAA (2024) on active and closed UMEs states that UME No. 58 (January 1 to December 26, 2013) for the Indian River Lagoon, Florida-East Coast is closed. The determined cause was infectious disease secondary to ecological factors (e.g. change in forage). This information would not change the impact determinations for the manatee in the BO nor would trigger reinitiation, because the UME was previously covered in the 2018 BO and the updated information does not change the conclusions of this analysis nor did the updates provide new information on the routes to effect to manatees. Moreover, the cause of the UME is not related to the proposed action. There is currently an active UME, declared in 2021 (No. 71), for the Atlantic Florida manatee. The cause is attributed to malnutrition secondary to ecological factors (e.g., change in forage). Because the Atlantic Ocean is outside the consultation action area, as specified in the USFWS BO, this information does not reveal an effect of the action.

There is increasing evidence of increased use by the manatee of the northern Gulf, especially those regions close to Florida (Hostetler et al. 2021). This region has an active sighting network that actively solicits sighting reports (Pabody et al. 2009; Hieb et al. 2017) which likely contributed to an increased sighting rate (Slone et al. 2022). Hieb et al. (2017) focused on public sightings with the coastal and/or inshore waters Alabama and Mississippi, which further supports conclusions made in the 2018 USFWS BO that manatees leave Florida in the summer months.

Any new information on potential impacts on manatees from exposure to hydrocarbons (e.g. oil spill impacts) available since the 2018 USFWS BO did not change any of the effect determinations therein because this information did not identify any new pathways to or intensity the effects of the action on the manatee in a manner or to an extent not previously considered. No new pathways to effect were identified and the risk of an oil spill reaching manatee habitat is very low, less than 4% chance within 30 days of a spill (BOEM 2023).

Based on the above, it is the Bureaus' position that this new information since the publication of the 2018 USFWS BO would not modify the impact determinations reached and conclusions therein, because this information did not identify any new pathways to or intensity of the effects of the action on the manatee in a manner or to an extent not previously considered and therefore reinitiation with regard to impacts on the manatee is not warranted at this time.

Some of the new information reviewed includes:

Slone DH, Butler SM, Reid JP, Beck CA, Bonde RK (USGS, Gainesville, FL). 2022. Movements and Habitat Use of the Florida Manatee (Trichechus manatus latirostris) in the Northern Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 282 p. Obligation No.: M13PG00030. Report No: BOEM 2022-075.

Although manatee occurrence west of Mississippi Sound is rare, sightings generally corroborate habitat use patterns similar to those documented in the eastern Gulf. Manatees are generally found within shallow waters less than 4 m (13 ft) deep except when actively traveling, and almost always found within 1,000 m (328 ft) of the shore (often much closer). Operation of offshore, deep-water energy infrastructure, including oil and gas wells, wind turbines or ships are unlikely to conflict with manatee movements or behavior, due to distance from shore and water depth far beyond normal manatee behavior.

Cloyed CS, Heib E, Dacosta K. 2021. West Indian manatees use partial migration to expand their geographic range into the Northern Gulf of Mexico. Front Mar Sci. 8:725837.

This paper confirms that partial migrations are part of the normal Florida manatee spring-summer movements. Migrations most frequently stopped at Mobile Bay, Alabama and ranged from 10 to 133 days. Variation in duration was linked to the use of stopover sites and directedness of travel. Two different manatees migrated as far west as Lake Pontchartrain, Louisiana, but all manatees in this study returned to Florida during winter.

Marsh H, Arrault EM, Diagne LK, Edwards H, Marmontel M. 2017. Impact of Climate Change and Loss of Habitat on Sirenians. In: Butterworth A, editor Marine Mammal Welfare, Vol. 17. p. 333–357. Cham (CH): Springer International Publishing.

Marsh et al. (2017) specifically address Amazonian manatees, a species of manatee that lives in the Amazon Basin in Brazil, Peru, Colombia, and Ecuador. The paper discusses potential effects on distribution in the mouth of the Amazon, an area not shared by both Amazonian and West Indian manatees. Climate change effects would be expected to differ geographically and for populations of species in different areas of the world due to differing environmental conditions, competition, and other factors.

Climate change also poses a threat to West Indian manatees by increasing extreme weather events (e.g., tropical storms and hurricanes) that can lead to increased mortality from standings, loss of food resources, mother-calf separations, and habitat loss and alterations (Marsh et al. 2017). Climate change will also lead to increased harmful algae blooms that will have increasingly toxic impacts on manatees and disease[3]. The potential adverse effects to manatee populations of climate-change-associated increases in hurricanes and red tide blooms were addressed in the 2018 USFWS BO.

2. New information on sea turtles

The Bureaus considered new information on sea turtles. The USFWS BO discusses (pg. 26) that "most Kemp's ridleys nest on the beaches of the western Gulf, primarily in Tamaulipas, Mexico. Nesting also occurs in Veracruz and Campeche, Mexico, although a small number of Kemp's ridleys nest consistently along the Texas coast (NMFS et al. 2011). In addition, rare nesting events have been reported in Alabama, Florida, Georgia, South Carolina, and North Carolina."

The Bureaus' 2024 reinitiation letter included new information that both loggerhead and Kemp's ridley sea turtles were expanding their nesting range with confirmed nests on the Chandeleur Islands off the coast of Louisiana (Lamont et al. 2023). The work by Lamont et al. (2023) indicates that the loggerhead and Kemp's ridley have expanded their nesting range in the Gulf, although the consistent use of these islands or other areas in Louisiana and Mississippi has yet to be confirmed.

[3]Florida Fish & Wildlife Conservation Communication, Red Tide Manatee Mortalities, https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/red-tide/ (last visited May 5, 2023); WaymerJ., Coronavirus clouds causes of manatee deaths in 2020. Florida Toda., Dec. 4, 2020, https://www.floridatoday.com/story/news/local/environment/lagoon/2020/12/04/coronavi rus-clouds-causesmanatee-deaths/3808350001/.

The Bureaus' review of new information concluded that information published since 2018, aside from information on expanded nesting locations, this information did not identify any new pathways to or intensity of the effects of the action on sea turtles in a manner or to an extent not previously considered in the 2018 BO and, therefore, was not included in the reinitiation request. The USFWS BO provides an effects summary on page 30: "Our evaluation only addresses nesting loggerhead and Kemp's ridley sea turtles. Consultation with the NMFS will address the effects to sea turtles in the marine environment. Potential sources of impacts to nesting loggerhead and Kemp's ridley sea turtles from existing and proposed oil- and gas-related activities are habitat loss and fragmentation, disturbance from aircraft and boat vessel traffic, effects from trash and debris, and OCS-related air emissions" as no effect (NE) or NLAA.

The Bureaus' BA (Kemp's and Loggerhead Breakout Sections) and the 2018 USFWS BO (page 33) both concluded that the probability of an oil spill occurring and contacting loggerhead or Kemp's ridley sea turtle nests is very low, based on the analysis presented in the supporting OSRA report used in the BO (BOEM 2017). Furthermore, spilled oil contact with habitat does not necessarily mean contact with individual organisms. BOEM's Oil Spill Risk Analysis provides contact probabilities which overestimate potential effects because it does not account for naturally occurring events such as weathering and activities included in the proposed action (e.g., clean up, and containment).

Some of the new information reviewed includes:

Shaver D, Frandsen HR, Walker JS, George JA. 2020. Threats to Kemp's ridley sea turtle (Lepidochelys kempii Garman, 1880) nests incubating in situ on the Texas coast, 13. Herpetol Notes. 90–923.

According to Shaver et al., Kemp's ridley sea turtle nests are in decline on the Texas coast. Observations of in situ nests for the last 40 years show impacts from five threat types (tidal inundation, predator interaction, human tampering, vehicle drive-over, and plant root penetration). The authors also mention the 2010 *Deepwater Horizon* incident as a potential cause but acknowledge that reductions in prey availability and increases in the re-migration interval of nesting females could also have contributed to the recently observed population decreases within NMFS purview. The long-term trend is unknown. Overall, protected incubation and hatchling release must continue as has been done for decades in Texas. None of the impacts described in the document are related to ongoing BOEM- and BSEE-regulated oil- and gas-related activities.

Ramirez MD, Avens L, Goshe LR, Snover ML, Cooke M, et al. 2020. Regional environmental drivers of Kemp's ridley sea turtle somatic growth variation. Mar Biol. 167:146.

The study analyzed the humerus bones of dead Kemp's ridley sea turtles from over 30 years of strandings. Beginning in 2012, the growth rates for oceanic and small neritic juveniles had a simultaneous decrease. The authors hypothesize that this decrease is due in part to the *Deepwater Horizon* oil spill of 2010 and habitat changes (e.g., climate variability, population size, habitat use, and prey availability). Further collections are needed to clarify mechanisms for this observed gross growth patterns.

Shaver DJ, Gredezens C, Walker JS, Godard-Codding CAJ, Yacabucci JA, et al. 2021. Embryo deformities and nesting trends in Kemp's ridley sea turtles Lepidochelys kempii before and after the Deepwater Horizon oil spill. Endanger Species Res. 44:278-289.

A total of 1,094 Kemp's ridley sea turtle nests were observed within Padre Island National Seashore during the 2008–2013 seasons. Over these six years, 99.7% of the turtles that hatched survived and were released. Clutch size did not significantly differ pre- and post-*Deepwater Horizon* oil spill and response. The study suggested continued evaluation of data from nesting beaches (i.e., nest numbers, nest success, remigration intervals, growth rates, and recruitment) to determine whether oil contamination affects reproductive success.

Benscoter AM, Smith BJ, Hart KM. 2021. Loggerhead marine turtles (Caretta caretta) nesting at smaller sizes than expected in the Gulf of Mexico: implications for turtle behavior, population dynamics, and conservation. Conserv Sci Pract. 4(1): e581. https://doi.org/10.1111/csp2.581

The study observed 13% of the loggerheads nesting on three beaches in the Gulf with smaller overall standard sizes considered for a reproductive female: Gulf Shores, Alabama; Dry Tortugas National Park, Florida; and Everglades National Park, Florida. Tracking data indicated that these smaller nesters swam in shallower waters and shorter distances compared to larger loggerheads. The study provides previously unknown information for the Everglades National Park nesters.

Bevan EI, Wibbels T, Shavers DJ, Walker J, Illescas F, et al. 2019. Comparison of beach temperatures in the nesting range of Kemp's ridley sea turtles in the Gulf of Mexico, Mexico and USA. Endanger Species Res. 40:31-40. https://doi.org/10.3354/esr0097

Over three years, Bevan et al. evaluated sand temperatures of Kemp's ridley sea turtle nesting areas in southern Texas and northern Mexico. The authors found that the temperatures measured during the study were appropriate to sustain viable hatches with normal sex ratios. However, the authors project that rapid climate change will not provide sufficient time for sea turtles to adapt, especially given the narrow geographic range of nesting Kemp's ridley.

The Bureaus conclude that the new information available since the publication of the 2018 USFWS BO would not modify the impact determinations reached and conclusions therein, because this information did not identify any new pathways to or intensity of the effects of the action on sea turtles in a manner or to an extent not previously considered in the 2018 BO.

BOEM and BSEE continue to maintain that a low-probability catastrophic spill is not reasonably certain to occur and, therefore, is neither a direct nor an indirect effect of the proposed action. The 2018 BO assessed potential risk of an oil spill based on results of BOEM's previous OSRA for the Gulf (BOEM 2017). As stated in the Bureau's reinitiation letter dated March 6, 2024, the updated OSRA report (BOEM 2023) does not contain any information that would alter the previously reached conclusions for ESA-listed species under the purview of USFWS in the Gulf Region.

Further, the Bureaus maintain that any reasonably foreseeable oil spills that may occur as a result of the proposed action will not jeopardize the continued existence of the five sea turtle species found in the Gulf Region or result in the destruction or adverse modification of designated or proposed

critical habitat because the probability of an oil spill occurring and contacting sea turtle nests is very low, based on the analysis presented in the previous and updated OSRA reports (e.g. BOEM 2023).

3. Listing of the eastern black rail

On October 8, 2020, the USFWS issued the final rule listing the eastern black rail as threatened under Section 4 of the ESA (FR 2020-19661). On February 12, 2021, the Bureaus' requested concurrence with their effect determinations on the new listing of the threatened eastern black rail (*Laterallus jamaicensis jamaicensis*). This request was sent in a letter with an attached biological evaluation (BE). On April 26, 2021, USFWS responded and concurred that the proposed action was not likely to adversely affect (NLAA) the eastern black rail.

The Bureaus' 2021 BA discusses habitat loss and fragmentation on pages 7–8. The analysis of the potential impacts to coastal environments concludes that WPA, CPA, or EPA OCS oil- and gas-related activities are not expected to adversely alter barrier beach configurations beyond existing, ongoing impacts in localized areas downdrift of artificially jettied and maintained channels. The proposed action does not include any onshore wetland draining or development.

The Bureaus addressed the 2020 listing of the eastern black rail in 2021 through an informal consultation with a determination that the Bureaus' oil and gas program in the Gulf was "not likely to adversely affect" (NLAA) the eastern black rail.

4. Information on whooping cranes

The Bureaus addressed the whooping crane in the consultation documents provided to USFWS for inclusion in the 2018 BO. The whooping crane is considered endangered throughout its range in the U.S. except where nonessential, experimental flocks have been established. Nonessential, experimental flocks have been established in the Gulf Coast states of Alabama, Louisiana, Mississippi, and Florida.

The 2018 USFWS BO discussed nonessential experimental populations (NEPs) of whooping cranes within species table on pages 2–3. An NEP population is a reintroduced population believed not to be essential for the survival of the species, but important for its full recovery and eventual removal from the endangered and threatened list. Though these populations are treated as "threatened" species, the Endangered Species Act's Section 7 consultation regulations do not apply, except for where the species occurs within national parks or national wildlife refuges. The BO found that no NEPs of whooping cranes within national parks or national wildlife refuges would be impacted by the proposed action, and therefore considered only the endangered (not experimental) wintering population in Texas. The BO concluded that the "the majority of the effects from the major-impact producing factors are sublethal, causing discountable or insignificant effects" on this wintering population.

There is no new relevant information or circumstances since the publication of the 2018 USFWS BO that would modify the impact determinations reached and conclusions made in the 2018 BO for the nonessential, experimental flocks of whooping cranes. If these flocks were to be addressed separately, similar effect determinations would be made as those for the endangered wintering population in Texas of NLAA.

Conclusion

This letter documents that new information has become available since the publication of the 2018 USFWS BO. The most relevant of this new information was included in the Bureaus' 2021 and 2024 requests for reinitiation. The Bureaus found no new information that would modify the impact determinations reached in the 2018 BO, the 2021 reinitiation request concerning the eastern black rail, the 2024 reinitiation request concerning the listing of the black-capped petrel, critical habitats for the green sea turtle and rufa red knot, and the expanded nesting range of the loggerhead and Kemp's ridley sea turtles. The Bureaus conclude that any other new information available about relevant listed species or their designated critical habitat does not warrant further reinitiation under the requirements of the Endangered Species Act (see 50 CFR § 402.16).

If you have any questions or require any additional information, please contact Dr. Tre Glenn, Protected Species Biologist, Office of Environment, at tre.glenn@boem.gov or 504-736-1749.

Sincerely,

AGATHA-MARIE KALLER Digitally signed by AGATHA-MARIE KALLER Date: 2025.02.05 11:55:21 -06'00'

Dr. Arie Kaller
Regional Supervisor for Environment
New Orleans Office, BOEM
arie.kaller@boem.gov

I agree:

TOMMY BROUSSARD Digitally signed by TOMMY BROUSSARD Date: 2025.02.05 12:53:51 -06'00'

Mr. TJ Broussard
Regional Environmental Officer
Environmental Compliance Section
Environmental Compliance Division, BSEE
t.j.broussard@bsee.gov

Attachment 1: References

United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive
Lafayette, Louisiana 70506

March 28, 2025

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Regional Supervisor for Environment
Bureau of Ocean Energy Management
New Orleans Office
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Mr. Tommy Broussard
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SUBJECT: Reinitiation of Endangered Species Act consultation for proposed oil and gas leasing, exploration, development, production, decommissioning, and all related activities in the Gulf of America

Dear Dr. Kaller and Mr. Broussard:

Please reference the Bureau of Ocean Energy Management's (BOEM) and Bureau of Safety and Environmental Enforcement's (BSEE) (collectively, the Bureaus) March 6, 2024, request to reinitiate informal consultation under Section 7 of the Endangered Species Act (ESA), as amended (87 Stat. 884, as amended; 16 U.S.C. §§ 1531 et seq.). The Bureaus reviewed new information related to the Fish and Wildlife Service's (Service) April 20, 2018, programmatic biological opinion (2018 BiOp) on proposed oil and gas leasing, exploration, development, production, decommissioning, and all related activities in the Gulf of America (Gulf) Outer Continental Shelf (OCS) within existing leased areas and those areas proposed for future leasing in the Eastern Planning Area (EPA), the Central Planning Area (CPA), and the Western Planning Area (WPA). On December 20, 2024, the Service requested additional clarification and information regarding this consultation which was provided by the Bureaus on February 5, 2025.

The 2018 BiOp consultation considered all activities associated with the oil and gas program occurring in areas under Federal jurisdiction in the EPA, CPA, and WPA. The geographic scope includes all areas under Federal jurisdiction in the WPA, and the areas of the CPA and small portions of the EPA that are not currently withdrawn from leasing. The action area for this consultation includes the Federal OCS waters in the Gulf, as well as coastal areas, ports, airspaces, and waterways used by transport vessels related to coastal infrastructure, fabrication sites, and pipelines connecting to the offshore pipeline system, and other estuarine and marine areas affected directly and indirectly by the proposed action.

While the Bureaus identified new information that "may affect listed species or critical habitat in a manner or to an extent not previously considered," and that became available following the issuance of the 2018 BiOp, it was determined this new information does not change the

conclusions in the 2018 BiOp. Assessment of the new information found that it supports the previous conclusions or was largely already considered in the previous analysis; thus, concurrences in the 2018 BiOp remain valid.

New information available since the 2018 BiOp includes the listing of the black-capped petrel (*Pterodroma hasitata*) and proposed critical habitat designations for the rufa red knot (*Calidris canutus rufa*) and green sea turtle (*Chelonia mydas*). The Bureaus are now requesting concurrence with their determination that the proposed action is not likely to adversely affect the endangered black-capped petrel and proposed critical habitat for the threatened rufa red knot, and the proposed action will have no effect on the proposed critical habitat for the threatened green sea turtle North Atlantic distinct population segment (DPS). New information regarding threatened green, threatened loggerhead (*Caretta caretta*), and endangered Kemp's ridley (*Lepidochelys kempii*) sea turtles nesting on the Chandeleur Islands (2022-2025) is also analyzed in this consultation.

Additional Clarification and Information

Greenhouse Gas Emissions

In our December 20, 2024, request for additional clarification and information, the Service asked if the Bureaus could clarify whether and how the effects of any potential greenhouse gas emissions (GHG), including emissions resulting from the subsequent use of OCS oil and gas produced by activities covered in this consultation, were considered. Pursuant to the definition of "effects of the action" in 50 C.F.R § 402.02, "a consequence is caused by the proposed action if it would not occur *but for* the proposed action *and it is reasonably certain to occur*" (emphasis added). In the Bureaus' February 5, 2025, letter, they stated that they are unable to determine that GHG emissions from the proposed action are reasonably certain to cause consequences to listed species because existing global climate models cannot attribute local or regional effects to an area from GHG emitted from particular areas (such as the Gulf) or specific oil and gas wells. Furthermore, accumulated and persisting GHG emissions already in the atmosphere and the annual volume of GHG emissions will occur globally regardless of whether a particular Bureau lease sale is held, or plan or permit is approved.

The economics of oil markets are multifaceted, especially considering that oil and gas are a worldwide commodity affected by complex forces, such as but not limited to geopolitical events, severe weather, and OPEC pricing (U.S. Energy Information Administration (USEIA) 2023). Supply sources of oil and production capacity are fixed in the near term, as it takes some time to develop new ones (USEIA 2023). Demand in petroleum does not necessarily decrease following price changes, in part because the world's transportation systems heavily rely on petroleum products (USEIA 2023). Moreover, because markets will eventually adjust to changes in supply, reduction in petroleum production from sources in the Gulf would eventually be replaced by other sources, especially as worldwide demand for oil grows as a result of economic development (USEIA 2023). Impacts to listed species from global warming caused by GHG emissions are expected to occur, but they will occur with or without the proposed action.

Furthermore, there are numerous other influences on total GHG emissions, certainly in the U.S., beyond petroleum production, which will likewise influence future emissions, making them difficult to predict. At the global level, predictions would be even more challenging. In addition, sources other than petroleum-related ones emit GHGs, such as agriculture and industry, and changes in these sources' emissions also need to be factored in (Environmental Protection Agency 2025). Moreover, in the U.S., land use, land-use change, and forestry are a net sink, absorbing carbon dioxide from the atmosphere and offsetting 13 percent of total gross GHG emissions (Environmental Protection Agency 2025). "Since 1990, gross U.S. greenhouse gas emissions have decreased by just over 3 percent" (Environmental Protection Agency 2025). While GHG emissions in the U.S. are trending downward, past results do not necessarily dictate future ones. This discussion demonstrates the complexity and multifaceted nature of oil economics, its influence on U.S. GHG emissions, and therefore the attenuated causal chain between emissions from Gulf sources (the proposed action) and effects of any resulting GHGs on species in the action area. As a result, the Service concurs that potential effects of GHG emissions are not consequences that occur "*but for* the proposed action." 50 C.F.R § 402.02 (emphasis added).

Sea Level Rise

The Service also asked the Bureaus to clarify whether or to what extent the proposed action could lead to sea level rise that results in potential effects to nesting sea turtles, beach mice, or other threatened or endangered species. The Bureaus responded that sea level rise is a consequence of global warming, mostly driven by the thermal expansion of warming ocean waters and the influx of water from melting glaciers and ice sheets, as well as other regional processes (Sweet et al. 2022). Sea level rise in the Gulf is influenced by both global and regional processes, such as subsidence. Therefore, it is difficult to isolate the contribution of oil- and gas-related activities in the Gulf to sea level rise due to the interconnectedness of these activities in both a global and regional context. While the Gulf Coast is vulnerable to rising sea levels, these effects are driven more by climate patterns and regional processes, than by oil- and gas-related activities (Sweet et al. 2022). Oil- and gas-related activities in the Gulf represent a small fraction of global GHG emissions, and as noted above, those global emissions will continue to exacerbate global warming. This will result in sea level rise regardless of the proposed action, so impacts to listed species will occur independently of the proposed action. Therefore, the Bureaus concluded that sea level rise and resulting impacts from the proposed action do not meet the "*but for*" requirement outlined in 50 C.F.R § 402.02 (emphasis added).

In addition, the Service considered potential global warming effects to coastal habitats for listed species within the Gulf. Over the past 100 years, the globally averaged sea level has risen approximately 3.9 to 9.8 inches (Rahmstorf et al. 2007), a rate that is an order of magnitude greater than that seen in the past several thousand years (Douglas et al. 2001 as cited in Hopkinson et al. 2008). Potential effects of sea level rise on coastal beaches may vary regionally due to subsidence or uplift as well as the geological character of the coast and near-shore habitats (Galbraith et al. 2002). In the last century, for example, sea level rise along the U.S. Gulf Coast exceeded the global average by 5.1 to 5.9 inches because coastal lands west of Florida are subsiding (Environmental Protection Agency 2015), and sediment compaction and oil and gas extraction compound tectonic subsidence (Penland and Ramsey 1990; Morton et al. 2003;

Hopkinson et al. 2008). Low elevations and proximity to the coast make all coastal habitats vulnerable to the effects of rising sea level. Furthermore, areas with small astronomical tidal ranges (e.g., portions of the Gulf Coast where intertidal range is less than 1 meter) are the most vulnerable to loss of intertidal wetlands and flats induced by sea-level rise (Environmental Protection Agency 2015). Mapping by Titus and Richman (2001) showed that more than 80 percent of the lowest land along the Atlantic and Gulf coasts was in Louisiana, Florida, Texas, and North Carolina.

However, as noted above, it is difficult to isolate the contribution of oil- and gas-related activities in the Gulf to sea level rise due to global warming and subsidence on both a global and regional scale. Accordingly, the Service concurs with the Bureaus' determination that the impacts of sea level rise are occurring beyond the activities of the proposed action and do not meet the "*but for*" requirement outlined in 50 C.F.R § 402.02 (emphasis added).

Artificial Lighting

In the Service's December 20, 2024, letter, the Bureaus were also asked to clarify whether or to what extent lighting on offshore oil and gas platforms and applicable infrastructure affects listed species. The following paraphrases the information in their February 5, 2025, letter:

> For safety and operations, artificial lighting is required on offshore oil and gas platforms and other infrastructure. This artificial lighting could cause potential effects such as species attraction, avoidance, changes in migration patterns, or changes in predator/prey interactions (Marangoni et al. 2002). However, due to the distance from shore, artificial lighting on OCS platforms and infrastructure is not expected to impact federally listed species under the Service's jurisdiction whose habitat includes inland and/or coastal waters, beaches, barrier islands, and/or marsh (i.e., piping plovers, sea turtle hatchlings, etc.). While there is evidence that the rufa red knot cross Gulf waters while migrating, their response to artificial lighting is not known (Russell 2005; Perkins 2023; USFWS 2014). Based on documented Gulf crossing locations for the rufa red knot, there is minimal overlap with BOEM regulated oil- and gas-related activity on the OCS.

Based on that information, the previous conclusions for the rufa red knot from the 2018 BiOp does not change. The only listed species under the Service's jurisdiction that could be impacted by OCS lighting is the black-capped petrel and will be further discussed in the Effects Analysis section below.

Updated Oil Spill Risk Assessment

The Service also considered the risks of oil spills to listed species. In the March 6, 2024, reinitiation letter, the Bureaus provided a discussion titled Updated Oil Spill Risk Assessment and the 2023 Oil Spill Risk Assessment (OSRA). The 2018 BiOp assessed the potential risk of an oil spill based on results from a previous OSRA for the Gulf (Ji et al. 2017). The reinitiation letter explains that the Bureaus reviewed the updated OSRA and found no information that would alter the previously reached conclusions for federally listed species under the Service's jurisdiction in the Gulf. The updated OSRA shows that while oil spill rates from OCS platforms remained the same between 1996-2010 and 2000-2015, rates of spills from OCS pipelines and OCS tankers decreased (Anderson et al. 2012; ABS 2016). While coastal waters of the action

area are expected to be impacted by frequent small spills, according to the updated OSRA, the probability that an oil spill greater than or equal to 1,000 barrels is less than 0.5 to 4 percent (Ji and Schiff 2023). According to Ji et al. (2014), the probability of a catastrophic oil spill (over 1 million bbl) is low, and the Bureaus determined that it is not reasonably certain to occur.

In reviewing the Bureaus' updated OSRA, the Service analyzed National Response Center (NRC) spill reports for this fiscal year (beginning October 1, 2024) up to March 20, 2025, that were forwarded to the Louisiana Ecological Services Office by the Office of Environmental Policy and Compliance (OEPC) to determine whether the results of the OSRA are reasonable. Approximately 110 NRC reports were reviewed for spills in Louisiana (86 percent), Mississippi (10 percent), and Arkansas (3 percent). Of the 110 reports reviewed, 45 reports were for incidents within the Gulf, with two in Mississippi, five in federal waters, and the rest in Louisiana state waters. Approximately 60 percent of the 110 reports required further coordination with various partners to determine the extent of potential impacts to federally listed species and critical habitat, regardless of spill amounts. Of those 60 percent, a subset of 25 percent required some level of technical assistance to or informal consultation with the U.S. Coast Guard (USCG) regarding potential effects to federally listed species and critical habitat as a result of the USCG's response actions to the spills. Due to partner cooperation, technical assistance, implementation of conservation measures, relatively small spill amounts, and most incidents not occurring in suitable habitat for federally listed species within the Service's purview, the USCG's response actions to those incidents did not require formal consultation for Arkansas, Louisiana, and Mississippi. Furthermore, the Service has not had to conduct formal consultation with the USCG for spill response actions this fiscal year within other Gulf states. (Note: the Service consults with the USCG on their response actions to clean up spills, but not on the illegal releases themselves.) None of those releases have resulted in high risks of impacts to federally listed species or their critical habitat within the Service's purview. Accordingly, based on the Service's experience with reviewing NRC spill reports, the revised OSRA oil spill probabilities are reasonable.

Based on our review of the Bureaus' information, as well as our knowledge of and experience with reviewing NRC reports for spills occurring along the Gulf coast, the Service finds that the previously reached conclusions for federally listed species in the 2018 BiOp are still valid. Impacts of the proposed action to the species covered under the reinitiation will be further discussed in the Effects Analysis section below.

Effects Analysis

Black-capped Petrel

The black-capped petrel, listed as endangered under the ESA as of January 29, 2024, nests on the island of Hispaniola and spends the rest of its life at sea (USFWS 2023a). The occurrence of the species in the northern Gulf has been confirmed by recent studies, extending the known range of the species to include the northern Gulf (Jodice et al. 2021). A portion of the black-capped petrel's range extension overlaps with the action area; the majority of the species' range is in the eastern Gulf and concentrated in the EPA with only a small number of observations west of the Mississippi River. OCS oil- and gas-related activity in the eastern Gulf is generally low, reducing the overall potential for interaction with the species.

Artificial lighting and infrastructure used for safety and operations on OCS platforms have the potential to impact the black-capped petrel. While inexperienced fledglings and juveniles are sensitive to artificial lighting (USFWS 2023a), the closest known nesting area is on the island of Hispaniola in the Caribbean Sea, which is not located within the proposed action area for Bureau-regulated oil- and gas-related activities. Adult black-capped petrels forage and migrate offshore and are known to occur on the OCS, to which lighting could result in disorientation, collisions, and wasting of energy; however, lighted platforms could also provide foraging opportunities with attraction of prey (Van de Lar 2007; Simons et al. 2013; Ronconi et al. 2015; Marangoni et al. 2022). Offshore observations have shown that migrating or foraging adult petrels mostly occur in the eastern region of the Gulf, predominantly outside areas of Bureau-related oil- and gas-related activity (Jodice et al. 2021). Thus, the opportunity for petrels to be impacted by artificial lighting is insignificant.

Low-altitude aircraft overflights could disturb black-capped petrels during foraging and resting periods; however, the Service, Federal Aviation Administration (FAA), National Park Service, and Bureau of Land Management have an Interagency Agreement to reduce low-level flights over natural resource areas for wildlife and sensitive ecosystems. The recommended minimum flight altitude is 2,000 feet above ground level. The FAA (FAA Advisory Circular 91-36C) and corporate helicopter policy also states that helicopters must maintain a minimum altitude of 700 feet while in transit offshore and 500 feet while working between platforms. According to Haney (1987), black-capped petrels fly at altitudes ranging from the surface of the sea to approximately 100m (328ft) above sea level. Due to low OCS-related activity in the areas used by black-capped petrels and the low altitude of flight for black-capped petrels, impacts from helicopter and vessel traffic should be insignificant.

The Outer Continental Shelf Lands Act (OCSLA; 43 U.S.C. § 1334(a)(8)) requires the Secretary of the Department of the Interior to promulgate and administer regulations that comply with National Air Quality Standards pursuant to the Clean Air Act (CAA; 42 U.S.C. §§ 7401 et seq.), to the extent that authorized activities significantly affect the air quality of any state. The Environmental Protection Agency Administrator has jurisdiction in OCS areas in the Gulf eastward of 87.5 degrees west (°W) longitude. The BOEM implementing regulations in 30 C.F.R. § 550 Subpart C apply to those air emission sources in the Gulf westward of 87.5°W longitude. The Bureaus anticipate minimal effects to air quality associated with OCS oil and gas emissions due to prevailing atmospheric conditions, emission heights and rates, and pollutant concentrations. Emissions from OCS-related activities are not likely to impact ambient air quality offshore; therefore, any potential impacts to the black-capped petrel from decreased air quality is expected to be insignificant.

Produced water is an operational discharge containing hydrocarbons, trace heavy metals, radionuclides, sulfates, treatment chemicals, and produced solids that represents most of the waste discharged from offshore oil extraction production facilities (Veil et al. 2004; Welch and Rychel 2004). Operational discharges or runoff in the offshore environment could affect seabirds that remain and feed in the immediate vicinity of offshore OCS structures and platforms (Wiese et al. 2001; Burke et al. 2005). Routine discharges are restricted and regulated, including under the Clean Water Act through the Environmental Protection Agency's National Pollutant Discharge Elimination System permits and USCG regulations. Impacts of produced waters on the black-capped petrel is expected to be discountable and undetectable due to compliance with these mitigating regulations which are required by law.

Black-capped petrels foraging or resting in the action area could potentially be exposed to hydrocarbon releases during accidental oil spills; however, based on the 2023 OSRA, the probability that an oil spill greater than or equal to 1,000 barrels is less than 0.5 to 4 percent (Ji and Schiff 2023) and probability of direct contact with an individual is unlikely because less than five percent of prime marine habitat for the black-capped petrel overlaps with the oil and gas platforms in the Gulf and due to the rare occurrence of the species within the action area (USFWS 2023a; Michael et al. 2022). Furthermore, accidental spills are considered an illegal release, and the Service does not consult on illegal actions. Should the USCG need to conduct response actions for an illegal release, the USCG would consult with the Service regarding those response actions at that time.

Black-capped petrels forage out in the open ocean and while they are not usually attracted to feeding activities or assemblages of marine mammals, they have been shown to be attracted to chum. Perceiving other waste discarded from ships and fishing vessels to be chum, they may be attracted to the waste when there are times of low or unpredictable natural food abundance (USFWS 2023a; Simons et al. 2013). According to the Bureaus' letter, numerous laws, regulations, and enforcement guidelines prohibit and discourage the disposal of marine trash and debris in Gulf waters. The improved handling of waste and trash by industry, along with annual awareness training required by the marine debris mitigation conditions, is decreasing OCS-related debris in the Gulf and impacts to the black-capped petrel. Based on this information, the Service concurs with your determination that the proposed action is not like to adversely affect the black-capped petrel in the Gulf.

Proposed Critical Habitat for the Rufa Red Knot

Migration and wintering ranges for the rufa red knot include all Gulf states. Critical habitat was proposed for the rufa red knot on July 15, 2021, along the U.S. east and Gulf coasts (USFWS 2021) including along the coasts of Texas, Louisiana, Mississippi, Alabama, and Florida, all of which are within the action area. The physical and biological features of proposed critical habitat for red knot include: 1) beaches and tidal flats used for foraging; 2) upper beach areas used for roosting, preening, resting, or sheltering; 3) ephemeral and/or dynamic coastal features used for foraging or roosting; 4) ocean vegetation deposits or surf-cast wrack used for foraging and roosting; 5) intertidal peat banks used for foraging and roosting; 6) features landward of the beach that support foraging or roosting; and 7) artificial habitat mimicking natural conditions or maintaining the physical or biological features 1 to 6 (USFWS 2021).

Consistent with the 2018 BiOp, necessary onshore facilities to support offshore oil and gas activities are already in place, and no major new facilities are anticipated as a result of the proposed lease sales. No new navigation channels are expected to be dredged and no new onshore infrastructure, except for possibly a few pipeline crossings, is expected to result from the proposed activities. Any proposed pipeline installations would require a Department of the Army permit from the U.S. Army Corps of Engineers (USACE), and the USACE would be required to conduct ESA consultation with the Service for those specific activities.

Aircraft traffic, marine trash and debris, and routine discharges may impact proposed critical habitat, but those activities already exist as part of the environmental baseline and would not increase in volume or intensity to such an extent that it would detrimentally affect proposed

critical habitat. Given the guidelines for aircraft flight height and the expected air traffic from the proposed action, impacts to proposed critical habitat are expected to be discountable. Compliance with the numerous existing laws, regulations, and enforcement guidelines that prohibit and discourage the disposal of marine trash and debris in Gulf waters would result in discountable impacts to proposed critical habitat. Additionally, given required compliance with the Clean Water Act and USCG regulations, routine discharges will have an insignificant impact on proposed critical habitat.

Minimal effects to air quality associated with OCS oil and gas emissions due to prevailing atmospheric conditions, emission heights and rates, and pollutant concentrations are anticipated; thus, emissions from OCS-related activities are not likely to impact ambient air quality and any potential impacts to proposed critical habitat would be insignificant. Emissions from routine activities are transitory, diffuse rapidly, and are of limited extent compared to the entire northern Gulf, making impacts to proposed critical habitat insignificant or discountable. Direct impacts or permanent modification to proposed critical habitat as a result of potential oil spills is not anticipated due to the low probability of an oil spill occurring and contacting this habitat. No direct loss or permanent modification of rufa red knot proposed critical habitat is anticipated because of the proposed action. Furthermore, accidental spills are considered an illegal release, and the Service does not consult on illegal actions. Should the USCG need to conduct response actions for an illegal release, the USCG would consult with the Service regarding those response actions at that time. Based on this information, the Service concurs with the Bureaus' determination that the proposed action is not likely to adversely affect or result in the destruction or adverse modification of proposed critical habitat for the rufa red knot.

Proposed Critical Habitat for the Green Sea Turtle

The Service proposed critical habitat for five DPSs of the green sea turtle on July 19, 2023. The proposed critical habitat includes some areas within the action area in coastal Florida for only the North Atlantic DPS green sea turtle (USFWS 2023b) – specifically, on beaches on Florida's Gulf Coast. The Bureaus are not aware of any projects that have impacted essential features of proposed critical habitat for the green sea turtle. Consistent with the 2018 BO, the necessary onshore facilities to support offshore oil and gas activities are already in place and no major new facilities are anticipated as a result of the proposed action. There are no new navigation channels that are expected to be dredged and no new onshore infrastructure except for very few pipeline crossings that are expected to result from the proposed activities in Florida. No new coastal infrastructure is expected in Florida, as the majority of OCS oil and gas activity occurs in the WPA and CPA. Regarding the risk of oil spills on proposed critical habitat for green sea turtles along Florida beaches, the probability of oil from a spill reaching it is projected to be less than 0.5 percent (Ji and Schiff 2023). Furthermore, accidental spills are considered an illegal release, and the Service does not consult on illegal actions. Should the USCG need to conduct response actions for an illegal release, the USCG would consult with the Service regarding those response actions at that time.

Activities associated with the proposed action will not affect the ability of any of the physical or biological features of proposed critical habitat to perform their function, and none of the activities have the potential to affect waterbodies and adjacent nesting sites. Based on this information, the Service agrees that the proposed action is not likely to adversely affect proposed critical habitat for green sea turtles of the North Atlantic DPS.

New information on Kemp's ridley, loggerhead, and green sea turtles

The Kemp's ridley sea turtle has a restricted distribution with the majority of nesting occurring on beaches of the western Gulf and 95 percent of worldwide nesting occurring in the state of Tamaulipas, Mexico. On a smaller scale, nesting also occurs in Veracruz, Mexico, and in Texas with occasional nesting being documented in North Carolina, South Carolina, Georgia, Florida, and Alabama (National Marine Fisheries Service (NMFS) 2024a).

The Northwest Atlantic Ocean DPS of loggerhead sea turtle nests primarily along the Atlantic coast of Florida, South Carolina, Georgia, and North Carolina and along the Florida and Alabama coasts of the Gulf. The total estimated nesting in the U.S. is more than 100,000 nests per year (NMFS 2024b).

Green sea turtles occur worldwide and nest in over 80 countries (NMFS 2025). In the U.S., the green sea turtle nests in the Hawaiian Islands, U.S. Pacific Island territories, Puerto Rico, the Virgin Islands, Florida, Georgia, South Carolina, North Carolina, and Texas (NMFS 2025).

New information regarding the turtles' presence on the Chandeleur Islands has come available. Kemp's ridley and loggerhead nests were confirmed on the Chandeleur Islands off the coast of Louisiana in 2022 (Lamont et al. 2023). Since our request to the Bureaus for clarification, green sea turtle nests have also been confirmed on the Chandeleur Islands (Baker et al. 2025); thus, the Service is also addressing that species. While historic records suggest sea turtles have nested on the Chandeleur Islands for decades, nesting had not been documented on the islands since 1977 (Ogren et al. 1989). Lamont et al. (2023) indicates that the Kemp's ridley and loggerhead have expanded their nesting range in the Gulf; however, consistent use of these islands or other areas in Louisiana and Mississippi has yet to be confirmed.

Garrison et al. (2020) found that dive-surface behaviors for Kemp's ridleys in the northern Gulf indicated important seasonal, diurnal, and spatial effects on the time available at the surface. The study also found that loggerheads in the northern Gulf were typically found in shallow water in the late spring-early summer, then migrated into deeper water during fall and/or winter months. A study by Gredzens and Shaver (2020) tracked post-nesting Kemp's ridley sea turtles from beaches in Texas and Mexico. The authors evaluated the proportion of nesting females from each nesting beach and estimated that up to 82 percent of adult female Kemp's ridley sea turtles may use the northern Gulf, particularly waters shoreward of the 100-meter isobath, as their primary foraging area post-nesting.

A study by Hart et al. (2020) identified high-use foraging sites for loggerhead turtles in the northeastern Gulf, specifically the Big Bend region off the northwest Florida coast. This region was found to be an important year-round foraging site for loggerheads from several DPSs. The neritic waters west of Florida and in the Florida Straits were identified as high-use migration corridors for post-nesting female adult loggerhead turtles in the Gulf (Iverson et al. 2020).

The overall nesting range for the green sea turtle North Atlantic DPS is vast, and turtles spend the majority of their lives foraging in fairly shallow coastal waters of both open coastline and protected bays and lagoons (NMFS 2015). The green sea turtle is an herbivorous species that relies on marine algae and seagrass as their primary diet, and their marine habitats are often

highly dynamic areas with annual fluctuations in water and air temperatures (NMFS 2015). While natural oscillations of environmental conditions affect food availability and abundance, a better understanding is needed concerning how environmental variability influences green sea turtle migration and reproduction (NMFS 2015).

The greatest concern regarding nesting sea turtles is the threat of an oil spill reaching nesting habitat during the nesting season. This new information concerning sea turtle nesting on the Chandeleur Islands does not change the existing general information, determinations, and conclusions for these species of sea turtles within the 2018 BiOp, which addressed the threat of spills oiling nesting habitat. Furthermore, accidental spills are considered an illegal release, and the Service does not consult on illegal actions. Should the USCG need to conduct response actions for an illegal release, the USCG would consult with the Service regarding those response actions at that time. Accordingly, the Service's concurrence that the proposed action is not likely to adversely affect nesting sea turtles and their nests remains valid.

Summary

Based on our review of the proposed action and new information, the new information does not change the conclusions of the 2018 BiOp. Regarding new listings, critical habitats, and proposed rules, the Service concurs with the Bureaus' determinations that the routine activities associated with the proposed action in the 2018 BiOp are not likely to adversely affect the black-capped petrel and not likely to destroy or adversely modify the proposed critical habitats for the rufa red knot and the green sea turtle. No further ESA consultation with the Service for the proposed action will be necessary, unless required by 50 C.F.R § 402.16.

We appreciate the Bureaus' continued coordination and cooperation in the conservation of threatened and endangered species and their critical habitats. If you require further assistance regarding ESA coordination, or have questions regarding the content of this letter, please contact Ms. Amy Trahan (337-291-3126) of this office.

Sincerely,

Brigette D. Firmin

Brigette D. Firmin BRIGETTE FIRMIN Digitally signed by BRIGETTE FIRMIN Date: 2025.03.28 11:53:52 -05'00'
Field Supervisor
Louisiana Ecological Services Office

cc: Protected Species Coordinator, BSEE, New Orleans, LA
Energy Coordinator, Ecological Services, FWS, Atlanta, GA (ES/CPA)
ESA Consultation Coordinator, FWS, Southeast Region, Tallahassee, FL
Field Supervisor, Ecological Services, FWS, Daphne, AL
Field Supervisor, Ecological Services, FWS, Jacksonville, FL
Field Supervisor, Ecological Services, FWS, Panama City, FL
Field Supervisor, Ecological Services, FWS, Vero Beach, FL

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

May 20, 2025
Refer to NMFS No.: OPR-2022-03526

Dr. Arie Kaller
Bureau of Ocean Energy Management
Regional Supervisor, Office of Environment
Room 632
Mail Stop: 633C
New Orleans, LA

Mr. T.J. Broussard
Bureau of Safety and Environmental Enforcement, Environmental Compliance Division
Gulf of America Section
1201 Elmwood Park Boulevard
New Orleans, LA 70123-2394

RE: Endangered Species Act Section 7 Final Biological and Conference Opinion on the Bureau of Ocean Energy Management and the Bureau of Safety and Environmental Enforcement's Oil and Gas Program Activities in the Gulf of America

Dear Dr. Kaller and Mr. Broussard:

Enclosed is the National Marine Fisheries Service's (NMFS) biological and conference opinion (BiOp) on the effects on endangered and threatened species under NMFS's jurisdiction and critical habitat that has been designated and proposed for those species of the Bureau of Ocean Energy Management and the Bureau of Safety and Environmental Enforcement's (the Bureaus') Federally Regulated Oil and Gas Program Activities in the Gulf of America. We have prepared this final biological and conference opinion pursuant to section 7(a)(2) of the Endangered Species Act, as amended (ESA; 16 U.S.C. 1536(a)(2)).

Our analysis is based on the best available scientific and commercial data. Based on our assessment, we concluded that the proposed action will adversely affect individual animals, but is *not likely* to jeopardize the continued existence of sperm whale, Northwest Atlantic loggerhead sea turtle, Kemp's ridley sea turtle, North Atlantic Distinct Population Segment (DPS) green sea turtle, leatherback sea turtle, hawksbill sea turtle, and Gulf sturgeon. The proposed action may affect, but is *not likely to adversely affect*, blue whale, sei whale, North Atlantic right whale, smalltooth sawfish, Nassau grouper, giant manta ray, oceanic whitetip shark, queen conch, boulder star coral, elkhorn coral, lobed star coral, mountainous star coral, and designated Northwest Atlantic Ocean DPS loggerhead sea turtle critical habitat. Further, the proposed action is *not likely* to destroy or adversely modify Gulf sturgeon designated critical habitat; or proposed Rice's whale and North Atlantic DPS green turtle critical habitat. The BiOp finds, however, that the proposed action *is likely* to jeopardize the continued existence of the Rice's whale due to the

risk of lethal vessel strike. The opinion proposes a Reasonable and Prudent Alternative containing measures to avoid such jeopardy

This concludes consultation under the ESA for ESA-listed species and designated critical habitat under NMFS' purview on this action by the Bureaus. Reinitiation of consultation is required and shall be requested by the Bureaus where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this consultation; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered in this consultation; or (4) a new species is listed or critical habitat designated that may be affected by the action (50 CFR §402.16).

It has been a pleasure working with you and your teams on this effort. We look forward to continuing to work with you on the BiOp's implementation and are available to assist.

If you have any questions regarding this biological opinion, please contact Colette Cairns, Program Manager, at (301) 427-8414 or Colette.Cairns@noaa.gov, or Tanya Dobrzynski at (240) 723-6321 or Tanya.Dobrzynski@noaa.gov.

Sincerely,

BETTRIDGE.SHANNON.M.1365827920 Digitally signed by BETTRIDGE.SHANNON.M.1365827920 Date: 2025.05.20 16:31:00 -04'00'

Shannon Bettridge, Ph.D.
Performing the duties of Deputy Director
Office of Protected Resources
National Marine Fisheries Service

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

July 29, 2022 F/SER4:DD

Mr. Michael A. Celata, Regional Director
Bureau of Ocean Energy Management (BOEM)
Gulf of Mexico OCS Region (GM 670)
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Dear Mr. Celata:

NOAA's National Marine Fisheries Service (NMFS) has reviewed the Essential Fish Habitat (EFH) Assessment for Oil and Gas Activities in the Gulf of Mexico (BOEM 2022-032) dated May 2022.

Background

Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires federal agencies to consult with the Secretary of Commerce, through NOAA's National Marine Fisheries Service (NMFS), with respect to "any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH identified under this Act." NMFS published the final rule implementing the EFH provisions of the Magnuson-Stevens Act on January 17, 2002. BOEM oversees the National Outer Continental Shelf Oil and Gas Leasing Program pursuant to Section 18 of the Outer Continental Shelf Lands Act (OCSLA). Certain activities authorized by BOEM may result in adverse effects to EFH and require consultation.

In 1999, our agencies consulted on a programmatic level to address EFH issues related to operational activities, including pipeline rights-of-way, plans for exploration and production, and platform removal in the Gulf of Mexico Central and Western Planning Areas. That programmatic EFH consultation was subsequently amended in 2007 to also include operational activities within a small portion of the Eastern Planning Area. Following the Mississippi Canyon Block 252 spill event in April 2010, BOEM requested re-initiation of Endangered Species Act consultation with both the U.S. Fish and Wildlife Service and NMFS. NMFS responded by letter dated September 24, 2010, requesting a review of the EFH consultation as well. At that time, regional NMFS and BOEM staff agreed to procedures which would incorporate a programmatic EFH consultation within the National Environmental Policy Act (NEPA) document prepared for the 2012-2017 five-year multi-lease sale program. Another EFH Assessments was prepared for the 2017-2022 program.

Proposed Actions

The proposed actions addressed in the BOEM EFH Assessment include reasonably foreseeable oil and gas activities on the Gulf of Mexico's Outer Continental Shelf (OCS), including proposed

lease sales and activities related to exploration, development, production, and decommissioning, including, but not limited to, geological and geophysical (G&G) activities, drilling, construction, support, removal, and site clearance operations. Related activities not occurring on the OCS, such as inshore and onshore activities (e.g., vessel traffic, navigation channel maintenance, and new pipeline landfalls) are also addressed and assessed for potential impacts to EFH and federally managed fisheries species (i.e., species managed under a fisheries management plan (FMP)) in the Gulf of Mexico.

EFH Assessment

Section 2.0 of the BOEM EFH Assessment details measures implemented through operating regulations, lease stipulations, Notices to Lessees and Operators (NTLs), and project-specific requirements or conditions of approval to minimize potential impacts on EFH that could result from BOEM-regulated activities on the OCS. Such measures also address concerns related to endangered and threatened species, geologic and human made hazards, military warning and ordnance disposal areas, archaeological sites, air and water quality, sensitive benthic communities, artificial reefs, operations in hydrogen sulfide prone areas, and shunting of drill effluents in the vicinity of biologically sensitive features. Additionally, BOEM reviews proposed activities for compliance with regulatory requirements and applies conditions of approval as needed. Section 5.0 describes how mitigation measures are applied in specific categories of EFH. Section 8.0 provides the views of BOEM on the effects of regulated activities and proposed mitigation measures to avoid and minimize the potential for adverse effects to EFH and managed species.

To ensure adverse impacts to EFH and federally managed fisheries from activities managed by BOEM Gulf of Mexico Region are avoided, minimized, and offset, the implementation of EFH conservation measures is necessary.

EFH Conservation Recommendations

1. The NMFS incorporates by reference and adopts the mitigation measures described in Section 2.0 and 5.0 as EFH conservation recommendations. Those measures are based on prior programmatic EFH consultations between BOEM and NMFS and specifically include the following NTLs:

    a. NTL 2009-G39; Biologically-Sensitive Underwater Features and Areas including the Topographic Features and Live-Bottom (Pinnacle Trend) Stipulations. This NTL protects and minimizes impacts to sensitive topographic features, pinnacle trend features, and low relief, potentially sensitive features through avoidance and exclusion zones.

        i. The Topographic Features Stipulation minimizes potential impacts on topographic features from bottom-disturbing activities (structure removal and emplacement) and operational discharges associated with the proposed action through avoidance, by requiring individual activities to be located at specified

distances from the feature or zone.

ii. The Live-Bottom (Pinnacle Trend) Stipulation minimizes the potential impacts from oil and gas operations, including accidental oil spills and blowouts, on the biota of Pinnacle Trend features by increasing the distance of such events from the features.

b. NTL 2009-G40 Deepwater Benthic Communities. This NTL greatly reduces the risk of physical impacts by requiring the avoidance of potential chemosynthetic communities. It includes requirements to avoid potential chemosynthetic communities identified on required geophysical survey records or photo-documentation to establish the absence of potential hard-bottom communities prior to approval of the structure emplacement. BOEM Gulf of Mexico Region shall initiate project-specific EFH consultation with NMFS whenever a shorter separation distance is proposed for seafloor disturbing activities and BOEM determines this may result in adverse effects to EFH.

2. NTL 2015-G03 Marine Trash and Debris Awareness and Elimination is adopted as an EFH conservation recommendation. This NTL describes Bureau of Safety and Environmental Enforcement's (BSEE) requirements for prevention of marine debris from oil- and gas-related activities and outlines annual training and reporting requirements.

3. NTL 2009-G04 Significant OCS Sediment Resources of the Gulf of Mexico is adopted as an EFH conservation recommendation. This NTL identifies BOEM's responsibility as stewards of significant sand resources on the OCS and provides guidance for the avoidance and protection of significant OCS sediment resources essential to coastal restoration initiatives in the Gulf of Mexico. Additionally, this NTL discourages abandoning pipelines in areas with significant sediment resources. OCS sediment resources are necessary for coastal resiliency and restoration projects and programs, which can protect and restore EFH.

4. NTL 2009-G34 Ancillary Activities is adopted as an EFH conservation recommendation. This NTL provides guidance on conducting ancillary activities that disturb the seafloor in the Gulf of Mexico OCS.

5. NTL 2008-G05 Shallow Hazards Program is adopted as an EFH conservation recommendation. This NTL describes surveys, reports, analyses, and mitigation to ensure exploration, development, production, and transportation operations are conducted with a minimum risk to human life and the environment.

6. NTL 2019-G05 Site Clearance and Verification for Decommissioned Wells, Platforms, and Other Facilities is adopted as an EFH conservation recommendation. This NTL ensures that any object (i.e., wellheads, platforms, etc.) installed on an OCS lease is properly removed and the site cleared so as not to conflict with other uses of the OCS.

7. NTL 2009-G27 Submitting Exploration Plans and Development Operations Coordination Documents is adopted as an EFH conservation recommendation. This NTL provides policy

for revising OCS plans when operators propose to change approved anchor patterns or anchor areas.

8. NTL 2012-N06 Guidance to Owners and Operators of Offshore Facilities Seaward of the Coast Line Concerning Regional Oil Spill Response Plans is adopted as an EFH conservation recommendation. This NTL provides guidance concerning the preparation of regional Oil Spill Response Plans.

9. BOEM continue to provide NMFS with yearly summaries describing:
    a. The number and type of permits issued in each planning area each year and describing the number and type of activities located in the Live-Bottom (Pinnacle Trend) and Topographic Features blocks for that year.
    b. The decommissioning activities completed in Live-Bottom (Pinnacle Trend) and Topographic Features blocks for that year.
    c. The number of seismic surveys proposing to utilize ocean-bottom surveys that year.
    d. The number of and/or miles of decommissioned pipelines including the number of waivers, if any, granted for the burial requirement, thereby allowing self-burial that year.

Please be advised the Magnuson-Stevens Act and the regulations to implement the EFH provisions (50 CFR Section 600.920) require your office to provide a written response to this letter. That response must be provided within 30 days and at least 10 days prior to final agency action. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH conservation recommendation(s), you must provide an explanation of the reasons for not implementing those recommendation(s).

Review and Revision

BOEM requests this EFH consultation not be tied to a specific five-year OCS Leasing Program but rather to focus on the suite of BOEM and BSEE authorized activities associated with any National OCS Leasing Program. If any modifications are made to BOEM or BSEE programs, site and activity specific review procedures, lease stipulations, and NTLs described in the EFH Assessment that result in changes to potential adverse effects on EFH, the BOEM Gulf of Mexico Region should notify the NMFS Southeast Region Habitat Conservation Division to initiate discussions regarding the necessity to modify this EFH consultation.

Reinitiation will occur as necessary, such as when NMFS and BOEM jointly agree to reinitiate consultation, when BOEM significantly alters the proposed action, or upon meeting conditions for site-specific EFH consultation. In addition, BOEM subject-matter experts routinely review activities for proposed technologies, methods, locations, and other sources of potential effects to species and habitats. This process includes concurrent reviews for circumstances that could result in the initiation of site-specific EFH consultation as determined by the above EFH conservation recommendations. BOEM will continue to evaluate and assess risks to federally managed species and EFH in upcoming environmental compliance documentation under NEPA

and other statutes based on the most recent and best available information. Additionally, BOEM currently has an environmental study underway in the northern Gulf of Mexico investigating pipeline displacement for both active and abandoned pipeline segments. If new or additional information affecting EFH conservation recommendations becomes available, NMFS will consider whether to request additional consultation with BOEM and/or provide additional EFH conservation recommendations.

Finally, NMFS advises BOEM that at this time the Gulf of Mexico Fishery Management Council in the early phases of amending EFH information in their FMPs and the NMFS Highly Migratory Species Management Branch released Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species FMP in 2017 updating EFH information from the 2009 Final Amendment 1 referenced in the BOEM EFH Assessment.

Thank you for your consideration of these recommendations. If we can be of further assistance, please do not hesitate to contact David Dale at 727-824-5317 or by email at david.dale@noaa.gov.

Sincerely,

FAY.VIRGINIA.M.1365817320 Digitally signed by FAY.VIRGINIA.M.1365817320 Date: 2022.07.29 11:56:08 -04'00'

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: via electronic mail
F/SER4 – Swafford
GMFMC – Simmons
NOS/FGNMS – Schmall
BOEM – Kaller, Belter

5

United States Department of the Interior
BUREAU OF OCEAN ENERGY MANAGEMENT
New Orleans Office
1201 Elmwood Park Blvd
New Orleans, Louisiana 70123-2394

Ms. Virginia Fay
Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue, South
Saint Petersburg, Florida 33701

Via Electronic Mail

Dear Ms. Fay:

This letter is in response to the conservation recommendations (CRs) received from the National Marine Fisheries Service's (NMFS) Southeast Regional Office (SERO) for reasonably foreseeable oil and gas activities on the Gulf of Mexico (GOM) Outer Continental Shelf (OCS). Reasonably foreseeable activities include proposed lease sales and activities related to exploration, development, production, and decommissioning, including, but not limited to, geological and geophysical activities, drilling, construction, support, removal, and site clearance operations. In the enclosed letter, NMFS/SERO proposes to adopt several of the Bureau of Ocean Energy and Management's (BOEM) Notices to Lessees and Operators (NTLs), including mitigation measures, as CRs and specifies annual reporting requirements. In addition, NMFS requests that BOEM subject matter experts (SMEs) continue to use the most recent and best available science when assessing risks to federally managed species and EFH in environmental compliance documentation under NEPA and other statues; requests notification if new information from BOEM's ongoing pipeline displacement study becomes available and could inform mitigation revisions to better avoid potential impacts to EFH; and specifies additional circumstances in which modifications or reinitiation of this programmatic EFH consultation could be warranted.

EFH Conservation Recommendations

BOEM concurs with the adoption of the following NTLs and any included mitigation measures as CRs:

- NTL 2009-G39 (Biologically-Sensitive Underwater Features and Areas Including the Topographic Features and Live-Bottom (Pinnacle Trend) Stipulations).
- NTL 2009-G40 (Deepwater Benthic Communities)
- NTL 2015-G03 (Marine Trash and Debris and Elimination)
- NTL 2009-G04 (Significant OCS Sediment Resources of the GOM)
- NTL 2009-G34 (Ancillary Activities)
- NTL 2019-G05 (Site Clearance and Verification for Decommissioned Wells, Platforms, and Other Facilities)

- NTL 2012-N06 (Guidance to Owners and Operators of Offshore Facilities Seaward of the Coast Line Concerning Regional Oil Spill Response Plans)

BOEM concurs to provide the following information as annual reporting requirements:

- Number and type of permits issued in each planning area each year and describing the number and type of activities located in the Live Bottom (Pinnacle Trend) and Topographic Features blocks.
- Decommissioning activities completed in Live Bottom (Pinnacle Trend) and Topographic Features blocks.
- The number of seismic surveys proposing to utilize ocean-bottom surveys.
- The number of and/or miles of decommissioned pipelines, including the number of waivers granted for the burial requirement, thereby allowing self-burial that year.

BOEM does not concur with the adoption of the following NTLs as they have little to no direct impacts on the environmental and mitigation process:

- NTL 2008-G05 (Shallow Hazards Program)
- NTL 2009-G27 (Submitting Exploration Plans and DOCDs)

However, BOEM will inform NMFS/SERO of any revisions to the aforementioned NTLs that could potentially result in adverse impacts to EFH or the environmental review process and application of mitigations.

Review and Revision

NMFS requested that BOEM continue to evaluate and assess risks to federally managed species and EFH in upcoming environmental compliance documentation under NEPA and other statues based on the most recent and best available information. This is a routine part of BOEM's environmental review process and BOEM SMEs in the New Orleans Office (NOO) will continue this practice.

Upon completion of BOEM's pipeline displacement study, BOEM/NOO will provide NMFS/SERO with a summary of the findings. Additionally, the Bureau of Safety and Environmental Enforcement (BSEE) is developing a study to better assess the potential environmental impacts from abandoned pipelines and pipeline infrastructure, which will include coordination between BOEM and BSEE environmental SMEs. Findings will also be shared with NMFS/SERO and incorporated into the bureaus' NEPA and compliance/enforcement programs. The summaries will include any new information on potential adverse effects to EFH and the bureaus' recommendation(s) if it is determined new information resulting from the studies could inform changes to mitigations or CRs.

BOEM requested in their programmatic *EFH Assessment for Oil and Gas Activities in the Gulf of Mexico* (BOEM 2022-032), submitted to NMFS/SERO on May 25th, 2022, that consultation no longer be tied to a specific 5-year National OCS Oil and Gas Leasing Program but rather to focus on the suite of BOEM and BSEE authorized activities associated with any National OCS Oil and Gas Leasing Program. Specifically, BOEM requested programmatic EFH consultation be reinitiated under the following circumstances:

- NMFS and BOEM jointly agree to reinitiate consultation
- BOEM significantly alters the proposed action
- Upon meeting conditions for site-specific EFH consultation

NMFS/SERO requested that they also be notified of changes to the following if the change or revision may affect EFH, BOEM's ability to implement agreed upon measures, or BOEM's ability to mitigate potential impacts:

- BOEM and BSEE Programs (e.g., initiation of carbon sequestration activity);
- BOEM and BSEE site- and activity-specific review procedures;
- Lease stipulations; and
- NTLs or other guidance (e.g., Best Management Practices).

BOEM/NOO will notify NMFS/SERO of any changes to Programs, review processes, lease stipulations, or guidance that could result in changes to potential adverse effects on EFH. Finally, BOEM/NOO proposes to coordinate with NMFS/SERO every 5-years to review the programmatic EFH consultation for needed updates or reinitiation.

Thank you for your continued collaboration on the review of activities associated with oil and gas leasing on the OCS in the GOM. If you have any questions, please feel free to contact Mariana Steen at (504) 736-2642 or mariana.steen@boem.gov.

Sincerely,

AGATHA-MARIE KALLER

Digitally signed by AGATHA-MARIE KALLER
DN: c=US, o=U.S. Government, ou=Department of the Interior, ou=Bureau of Ocean Energy Management, cn=AGATHA-MARIE KALLER, 0.9.2342.19200300.100.1.1=14001001248643
Date: 2022.09.26 15:27:53 -05'00'

Dr. Agatha-Marie Kaller
Regional Supervisor
Office of Environment
BOEM

In concurrence:

TOMMY BROUSSARD

Digitally signed by TOMMY BROUSSARD
Date: 2022.09.27 07:34:45 -05'00'

Mr. TJ Broussard
Regional Environmental Officer
Office of Environmental Compliance
BSEE

Enclosure

cc: Mr. Rusty Swafford
Branch Chief
Habitat Conservation Division
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue, South
Saint Petersburg, Florida 33701

United States Department of the Interior
BUREAU OF OCEAN ENERGY MANAGEMENT
New Orleans Office
1201 Elmwood Park Blvd
New Orleans, Louisiana 70123-2394

29 September 2023

[Name and address]

Dear [Tribal Leader]:

I am writing to notify you of the Bureau of Ocean Energy Management's (BOEM) intent to prepare a Gulf of Mexico (GOM) Regional Outer Continental Shelf (OCS) Oil and Gas Programmatic Environmental Impact Statement (GOM Oil and Gas Programmatic EIS), and to invite the [Tribe] to engage in government-to-government consultation with BOEM on these activities as the Tribal government deems appropriate.

The GOM Oil and Gas Programmatic EIS will analyze the potential impacts of a representative oil and gas lease sale in available OCS areas of the Western, Central, and Eastern Planning Areas and the associated potential site and activity-specific approvals resulting from a sale. A map of the three Planning areas is enclosed. The purpose of the Federal Proposed Action is to offer for lease, and ultimately to allow for potential post-lease development through plan and permit approvals (subject to additional environmental review and regulatory oversight), those areas that may contain economically recoverable oil and gas. Each individual proposed lease sale would provide qualified bidders the opportunity to bid upon and lease available acreage in the GOM OCS in order to explore, develop, and produce oil and natural gas. This Programmatic EIS is expected to be used to inform the decision for the first GOM lease sale proposed in the 2024-2029 National OCS Oil and Gas Leasing Program. It also is expected to be used and supplemented as appropriate for decisions on future proposed GOM lease sales. In addition, this Programmatic EIS will be used for tiering of associated post-lease site and activity-specific OCS oil- and gas-related activity analyses and approvals. Specifically, the GOM Oil and Gas Programmatic EIS will provide a programmatic environmental analysis and framework to support future decision-making on individual plan and permit submittals.

In this PEIS, BOEM is proposing to analyze four alternatives to the Proposed Action: a no action alternative and three action alternatives. Because this Programmatic EIS analyzes a representative lease sale, Alternative A (No Action) is the cancellation of a single proposed GOM lease sale. A complete description of the alternatives considered may be found here: https://www.boem.gov/Gulf-of-Mexico-Oil-and-Gas-PEIS. The draft Programmatic EIS will

include a summary of all alternatives, information, and analyses submitted during the scoping process for consideration by BOEM and the cooperating agencies. After the draft Programmatic EIS is completed, the U.S. Environmental Protection Agency will publish a notice of availability (NOA). BOEM will also request public comments on the draft Programmatic EIS through its own NOA for the draft PEIS. BOEM currently expects both NOAs for the draft Programmatic EIS to be published in summer 2024. After the public comment period ends, BOEM will review and respond to comments received and will develop the final PEIS. BOEM will make the final Programmatic EIS available to the public at least 30 days prior to issuance of any Record of Decision (ROD). If the decision is to hold a sale, a ROD will document the final decision on the area and terms to be offered in the sale, including any required mitigation (e.g., through lease stipulations).

As the first public step in this process, BOEM published a Notice of Intent (NOI) to prepare the GOM Oil and Gas Programmatic EIS in the Federal Register on September 29th, 2023. Information and materials related to the GOM Oil and Gas Programmatic EIS can be found at: https://www.boem.gov/Gulf-of-Mexico-Oil-and-Gas-PEIS. This NOI announces the scoping process BOEM will use to identify significant issues and potential alternatives for consideration in the GOM Oil and Gas PEIS.

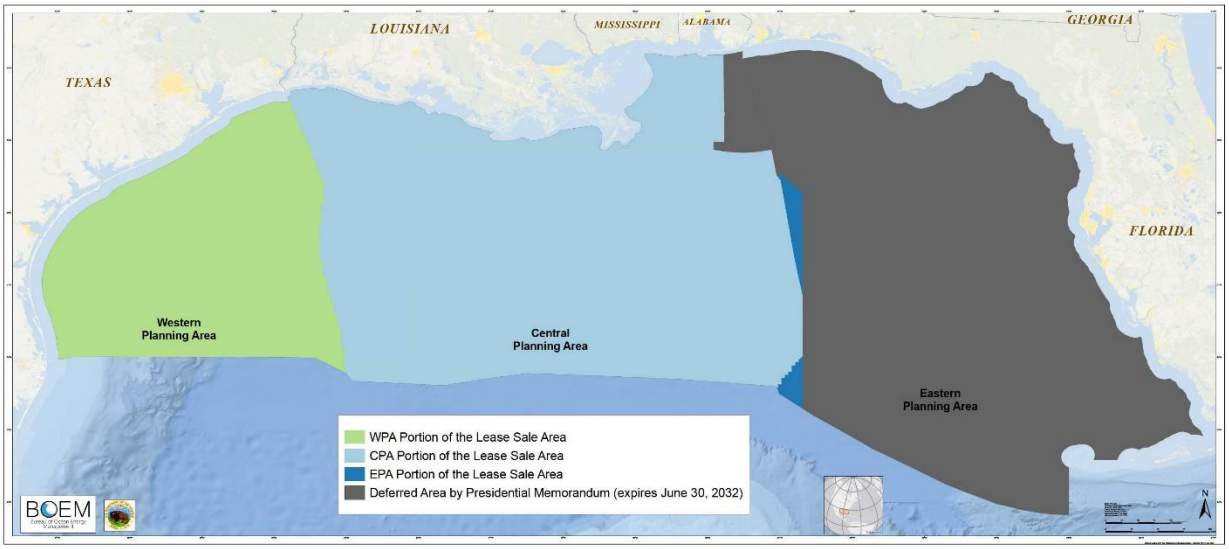
BOEM invites the [Tribe] to engage in dialog through government-to-government consultation on the GOM Oil and Gas Programmatic EIS and its implications for the Tribe. If you would like to schedule a government-to-government meeting or are interested in becoming a cooperating agency on the Programmatic EIS, please contact the acting BOEM Gulf of Mexico Region Tribal Liaison, Mr. Chris Page, at christopher.page@boem.gov or (504) 736-1742. We will send a follow-up letter near the time of publication of the draft Programmatic EIS unless we receive a response requesting otherwise. We look forward to engaging with your tribe on this action.

Sincerely,

James Kendall
Regional Director

Enclosures:
Planning Area Map

cc:


LOUISIANA
MISSISSIPPI
ALABAMA
GEORGIA
TEXAS
FLORIDA
Western Planning Area
Central Planning Area
Eastern Planning Area
WPA Portion of the Lease Sale Area
CPA Portion of the Lease Sale Area
EPA Portion of the Lease Sale Area
Deferred Area by Presidential Memorandum (expires June 30, 2032)
BOEM
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APPENDIX I

STATE COASTAL MANAGEMENT PROGRAMS

I STATE COASTAL MANAGEMENT PROGRAMS

Each State's Coastal Management Program (CMP), federally approved by NOAA, is a comprehensive statement setting forth objectives, enforceable policies or guidelines, and standards for public and private use of land and water resources and uses in that State's coastal zone. The program provides for direct State land and water use planning and regulations. The program also includes a definition of what constitutes permissible land uses and water uses. Federal consistency is the CZMA requirement where Federal agency activities that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone must be consistent to the maximum extent practicable with the enforceable policies or guidelines of a coastal state's federally approved coastal management program. The latest Federal consistency regulations concerning State coastal zone management (CZM) programs are found in the *Federal Register* (65 FR 77124 ; 71 FR 788).

Each Gulf States' official coastal boundary can be identified on NOAA's website at https://coast.noaa.gov/data/czm/media/StateCZBoundaries.pdf. Once a State's CMP is federally approved, Federal agencies must ensure that their actions are consistent to the maximum extent practicable with the enforceable polices of the approved program. Federal agencies provide feedback to the States through each Section 312 evaluation conducted by NOAA.

To ensure conformance with State CMP policies or guidelines and local land use plans, BOEM prepares a Federal consistency determination for each proposed OCS lease sale. Through the designated State CZM agency, local land use entities are provided numerous opportunities to comment on the OCS Program. Local land-use agencies also have the opportunity to comment directly to BOEM at any time, and during formal public comment periods related to the announcement of the Five-Year Program, Call for Information/Notice of Intent, EIS scoping, public hearings on the Draft EIS, and the Proposed Notice of Sale.

A State's approved CMP may also provide for the State's review of OCS plans, permits, and license activities to determine whether they will be conducted in a manner consistent with the State's CMP. This review authority is applicable to activities conducted in any area that has been leased under OCSLA and that affect any land or water use or natural resource within the State's coastal zone (16 U.S.C. 1456(c)(3)(B)).

State of Texas Coastal Management Program

The Texas Coastal Management Program (TCMP) Final EIS was published in August 1996. On December 23, 1996, NOAA approved the TCMP, and the requirements therein were made operational as of January 10, 1997. The TCMP is based primarily on the Coastal Coordination Act (CCA) of 1991 (33 Tex. Nat. Res. Code Ann. Ch. 201 et seq.), as amended by House Bill 3226 (1995), which calls for the development of a comprehensive coastal program based on existing statutes and regulations. The CCA established the geographic scope of the program by identifying the program's inland, interstate, and seaward boundaries. The program's seaward boundary is the State's territorial seaward limit (3 leagues or 10.36 mi or 16.67 km). The State's inland boundary is based on the State's Coastal Facilities Designation Line (CFDL). The CFDL was developed in

response to the Oil Pollution Act of 1990 and basically delineates those areas within which oil spills could affect coastal waters or resources. For the purposes of the TCMP, the CFDL has been modified to capture wetlands in upper reaches of tidal waters. The geographic scope also extends upstream 200 mi (322 km) from the mouths of rivers draining into coastal bays and estuaries in order to manage water appropriations on those rivers. The program's boundaries encompass all or portions of 18 coastal counties (including Cameron, Willacy, Kenedy, Kleberg, Nueces, San Patricio, Aransas, Refugio, Calhoun, Victoria, Jackson, Matagorda, Brazoria, Galveston, Harris, Chambers, Jefferson, and Orange Counties), roughly 8.9 million ac (3.6 million ha) of land and water.

Within this coastal zone boundary, the scope of the TCMP's regulatory program is focused on the direct management of 16 generic "Areas of Particular Concern," called coastal natural resource areas (CNRAs). These CNRAs are associated with valuable coastal resources or vulnerable or unique coastal areas and include the following: waters of the open GOA; waters under tidal influence; submerged lands; coastal wetlands; seagrasses; tidal sand and mud flats; oyster reefs; hard substrate reefs; coastal barriers; coastal shore areas; GOA beaches; critical dune areas; special hazard areas; critical erosion areas; coastal historic areas; and coastal preserves.

The State has designated the WPA as the geographical area in which Federal consistency shall apply outside of the coastal boundary. The TCMP also identifies Federal lands excluded from the State's coastal zone, such as U.S. DoD facilities and wildlife refuges.

Land and water uses subject to the program generally include the siting, construction, and maintenance of electric generating and transmission facilities; oil and gas exploration and production; and the siting, construction, and maintenance of residential, commercial, and industrial development on beaches, critical dune areas, shorelines, and within or adjacent to critical areas and other CNRAs. Associated activities also subject to the program include canal dredging; filling; placement of structures for shoreline access and shoreline protection; on-site sewage disposal, storm-water control, and waste management for local governments and municipalities; the siting, construction, and maintenance of public buildings and public works such as dams, reservoirs, and flood control projects and associated activities; the siting, construction, and maintenance of roads, highways, bridges, causeways, airports, railroads, and nonenergy transmission lines and associated activities; certain agricultural and silvicultural activities; water impoundments and diversions; and the siting, construction, and maintenance of marinas, State-owned fishing cabins, artificial reefs, public recreational facilities, structures for shoreline access and shoreline protection, boat ramps, and fishery management measures in the GOA.

The TCMP is a networked program that is implemented primarily through 8 State agencies, 18 local governments, and the Coastal Coordination Advisory Committee (Committee). The program relies primarily on direct State control of land and water uses, although local governments will implement State guidelines related to beach and dune management. Implementation and enforcement of the coastal policies is primarily the responsibility of the networked agencies and local governments through their existing statutes, regulatory programs, or other authorizations. Networked agencies include the General Land Office/School Land Board, Texas Commission on Environmental

Quality, Railroad Commission of Texas, Texas Parks and Wildlife Commission, Texas Department of Transportation, Texas Water Development Board, Texas State Soil and Water Conservation Board, and the Texas Sea Grant College Program at Texas A&M University. Other members on the Council include four gubernatorial appointees: (1) a coastal business representative; (2) an agriculture representative; (3) a local elected official; and (4) a coastal citizen. Similarly, 18 county and municipal governments, in those counties with barrier islands, are also networked entities with responsibilities for program implementation vis-a-vis beaches and dunes.

Regulations, programs, and expertise of State, Federal, and local government entities are linked to the management of Texas CNRAs in the TCMP. Local governments are notified of relevant TCMP decisions, including those that may conflict with local land-use plans or zoning ordinances. The Committee includes a local government representative as a full-voting member. An additional local government representative can be added to the Committee as a non-voting member for special local matters under review. The Committee established a permanent advisory committee to ensure effective communication for local governments with land-use authority.

In 1994, the Minerals Management Service, now BOEM, entered into an MOU with the Texas General Land Office to address similar mineral resource management responsibilities between the two entities and to encourage cooperative efforts and promote consistent regulatory practices. This MOU, which encompasses a broad range of issues and processes, outlines the responsibilities and cooperative efforts, including leasing and CZMA review processes, agreed to by the respective agencies. Effective January 10, 1997, all operators were required to submit to BOEM certificates of consistency with the TCMP for proposed operations in the WPA.

This Agency developed coordination procedures with the State for submittal of offshore lease sale consistency determinations and plans of operation. The WPA Lease Sale 168 was this Agency's first Federal action subject to State consistency review. This Agency and the State of Texas revised CZM consistency information for OCS plans, permits, and licenses to conform to the revised CZM regulations that were effective January 8, 2001, and updated on January 5, 2006, and have also incorporated streamlining improvements into the latest NTLs (NTLs 2008-G04, 2009-G27, and 2015-BOEM-N01). The State of Texas requires an adequate description, objective, and schedule for the project; site-specific information on the onshore support base, support vessels, shallow hazards, oil-spill response, wastes and discharges, transportation activities, and air emissions; and a Federal consistency certification, assessment, and findings. The State's requirements for Federal consistency review are based specifically on DOI's regulations at 30 CFR 250, 254, 256, and 550, and NOAA's Federal consistency regulations at 15 CFR 930. This Agency will be continuing a dialogue with the State of Texas on reasonably foreseeable coastal effects for pipelines and other permits, and the result of these discussions will be incorporated into future updates of this Agency's NTLs and/or permitting procedures.

State of Louisiana, Office of Coastal Management

The statutory authority for Louisiana's coastal zone management program, the Louisiana Office of Coastal Management (LOCM), is the State and Local Coastal Resources Management Act of 1978 et seq. (Louisiana Administrative Code, Volume 17, Title 43, Chapter 7, Coastal Management, June 1990 revised). The State statute puts into effect a set of State coastal policies and coastal use guidelines that apply to coastal land and water use decision making. A number of existing State regulations are also incorporated into the program, including those concerning oil and gas and other mineral operations; leasing of State lands for mineral operations and other purposes; hazardous waste and radioactive materials; management of wildlife, fish, other aquatic life, and oyster beds; endangered species; air and water quality; and the Louisiana Superport.

The State statute also authorized establishment of Special Management Areas. Included as Special Management Areas are the LOOP and the Marsh Island Wildlife Refuge. For purposes of the CZMA, only that portion of LOOP within Louisiana’s coastal zone is part of the Special Management Area. In April 1989, the Louisiana Legislature created the Wetlands Conservation and Restoration Authority and established a Wetlands Conservation and Restoration Trust Fund to underwrite restoration projects. The Legislature also reorganized part of the Louisiana Department of Natural Resources (LDNR) by creating the Office of Coastal Restoration and Management.

Local governments (parishes) may assume management of uses of local concern by developing a local coastal program consistent with the State CMP. The State of Louisiana has 10 approved local coastal management programs (Calcasieu, Cameron, Jefferson, Lafourche, Orleans, St. Bernard, St. James, Plaquemines, Terrebonne, and St. Tammany Parishes). In addition, two additional parishes, St. John the Baptist and St. Charles, have worked towards developing local coastal management programs. Eight other programs (Assumption, Iberia, Livingston, St. Charles, St. Martin, St. Mary, Tangipahoa, and Vermilion Parishes) have not been formally approved by NOAA. The parish planning and/or permits offices often serve as the permitting agency for projects limited to local concern. Parish-level programs, in addition to issuing permits for uses of local concern, also function as a commenting agency to Louisiana’s CZM agency, the LOCM, regarding permitting of uses of State concern.

Appendix C2 of the LOCM outlines the rules and procedures for the State’s local CMP. Under the LOCM, parishes are authorized, though not required, to develop local CMPs. Approval of these programs gives parishes greater authority in regulating coastal development projects that entail uses of local concern. Priorities, objectives, and policies or guidelines of local land use plans must be consistent with the policies and objectives of Act 361, the LOCM, and the State guidelines, except for a variance adopted in Section IV.D of Appendix C2 of the LOCM. The Secretaries of LDNR and Wildlife and Fisheries may jointly rule on an inconsistent local program based on local environmental conditions or user practices. State and Federal agencies review parish programs before they are adopted.

The coastal use guidelines are based on several general policies or guidelines. State concerns that could be relevant to an OCS lease sale and its possible direct effects or associated facilities and non-associated facilities are (a) any dredge and fill activity that intersects more than one waterbody, (b) projects involving the use of State-owned lands or water bottoms, (c) national interest projects, (d) pipelines, and (e) energy facility siting and development. Some coastal activities of concern that could be relevant to a lease sale include wetland loss due to channel erosion from OCS traffic; activities near reefs and topographic highs; activities that might affect endangered, threatened, or commercially valuable wildlife; and potential socioeconomic impacts due to offshore development. Secondary and cumulative impacts to coastal resources, such as onshore facility development, cumulative impacts from infrastructure development, salt intrusion along navigation channels, etc. are also of particular concern.

Effective August 1993, the LOCM required that any entity applying for permits to conduct activities along the coast must notify the landowner of the proposed activity. An affidavit must also accompany any permit application. Through this regulation, the State strives to minimize coastal zone conflicts.

This Agency and the State of Louisiana revised CZM consistency information for OCS plans, permits, and licenses to conform to the revised CZM regulations that were effective January 8, 2001, and updated on January 5, 2006, and have also incorporated streamlining improvements into the latest NTLs (NTLs 2008-G04, 2009-G27, and 2015-BOEM-N01). Federal consistency for ROW pipelines is addressed in NTL 2007-G20. The State of Louisiana requires an adequate description, objective, and schedule for the project. Also, the State requires site-specific information on the onshore support base, support vessels, shallow hazards, oil-spill response, wastes and discharges (including any disposal of wastes within the State coastal zone and waters and municipal, parish, or State facilities to be used), transportation activities, air emissions, and secondary and cumulative impacts; and a Federal consistency certification, assessment, and findings. In addition, the State receives consistency reviews on a case-by-case basis for decommissioning activities within OCS Significant Sediment Blocks that the State use marine mineral resources for restoration projects. The State requirements for Federal consistency review are based specifically on DOI's regulations at 30 CFR 250, 254, 256, and 550, and NOAA's Federal consistency regulations at 15 CFR part 930. BOEM is continuing a dialogue with the State of Louisiana on reasonably foreseeable coastal effects associated with pipelines and other permits, and the result of these discussions will be incorporated into future updates of BOEM's NTLs and/or permitting procedures.

State of Mississippi Coastal Program

The Mississippi Coastal Program (MCP) is administered by the Mississippi Department of Marine Resources. The MCP is built around several enforceable goals that promote comprehensive management of coastal resources and encourage a balance between environmental protection/preservation and development in the coastal zone. The primary coastal management statute is the Coastal Wetlands Protection Law. Other major features of the MCP include statutes related to fisheries, air and water pollution control, surface and groundwater, cultural resources, and

the disposal of solid waste in marine waters. The Department of Marine Resources, the Department of Environmental Quality, and the Department of Archives and History are identified collectively as the "coastal program agencies." Mississippi manages coastal resources by regulation and by promoting activities that use resources in compliance with the MCP. The State developed a coastal wetlands use plan, which includes designated use districts in coastal wetlands and Special Management Area Plans that steer development away from fragile coastal resources and help to resolve user conflicts.

For the purposes of the coastal program, the coastal zone encompasses the three coastal counties of Hancock, Harrison, and Jackson and all coastal waters. The Mississippi coast has 359 mi (594 km) of shoreline, including the coastlines of offshore barrier islands (Cat, Ship, Horn, and Petit Bois Islands). According to NOAA, there are no approved local CMPs for the State of Mississippi. The Southern Mississippi Planning and Development District serves in an advisory capacity to the State coastal agencies.

This Agency developed coordination procedures with the State for submittal of offshore lease sale consistency determinations and plans of operation. This Agency and the State of Mississippi revised CZM consistency information for OCS plans, permits and licenses to conform to the revised CZM regulations that were effective January 8, 2001, and updated on January 5, 2006, and have also incorporated streamlining improvements into the latest NTLs (NTLs 2008-G04, 2009-G27, and 2015-BOEM-N01). Federal consistency for ROW pipelines is addressed in NTL 2007-G20. The State of Mississippi requires an adequate description, objective, and schedule for the project; site-specific information on the onshore support base, support vessels, shallow hazards, oil-spill response, wastes and discharges, transportation activities, and air emissions; and a Federal consistency certification, assessment, and findings. The State requirements for Federal consistency review are based specifically on DOI's regulations at 30 CFR 250, 254, 256, and 550, and NOAA's Federal consistency requirements at 15 CFR 930. BOEM is continuing a dialogue with the State of Mississippi on reasonably foreseeable coastal effects associated with pipelines and other permits, and the result of these discussions will be incorporated into future updates of BOEM's NTLs and/or permitting procedures.

State of Alabama Coastal Area Management Program

The Alabama Coastal Area Act (ACAA) provides statutory authority to review all coastal resource uses and activities that have a direct and significant effect on the coastal area. The Alabama Department of Conservation and Natural Resources (ADCNR) Lands Division, Coastal Section Office, the lead coastal management agency, is responsible for the management of the State's coastal resources through the Alabama Coastal Area Management Program (ACAMP). The ADCNR is responsible for the overall management of the program, including fiscal and grants management and public education and information. The department also provides planning and technical assistance to local governments and financial assistance to research facilities and units of local government when appropriate. The State Lands Division, Coastal Section, also has authority over submerged lands in regard to piers, marinas, bulkheads, and submerged land leases.

The Alabama Department of Environmental Management (ADEM) is responsible for coastal area permitting, regulatory, and enforcement functions. Most programs of ADCNR Coastal Section that require environmental permits or enforcement functions are carried out by the ADEM with the exception of submerged land issues. The ADEM has the responsibility of all permit, enforcement, regulatory, and monitoring activities, and the adoption of rules and regulations to carry out the ACAMP. The ADEM must identify specific uses or activities that require a State permit to be consistent with the coastal policies noted above and the more detailed rules and regulations promulgated as part of the ACAMP. Under the ACAA, State agency activities must be consistent with ACAMP policies and ADEM findings. Further, ADEM must make a direct permit-type review for uses that are not otherwise regulated at the State level. The ADEM also has authority to review local government actions and to assure that local governments do not unreasonably restrict or exclude uses of regional benefit. Ports and major energy facilities are designated as uses of regional benefit. The ADCNR Lands Division manages all lease sales of State submerged bottomlands and regulates structures placed on State submerged bottomlands.

Local governments have the option to participate in the ACAMP by developing local codes, regulations, rules, ordinances, plans, maps, or any other device used to issue permits or licenses. If these instruments are certified to be consistent with ACAMP, ADEM may allow the local government to administer them by delegating its permit authority, thereby eliminating the need for ADEM's case-by-case review.

The South Alabama Regional Planning Commission provides ongoing technical assistance to ADCNR for Federal consistency, clearinghouse review, and public participation procedures. Uses subject to the Alabama's CZM program are divided into regulated and nonregulated categories. Regulated uses are those that have a direct and significant impact on the coastal areas. These uses either require a State permit or are required by Federal law to be consistent with the management program. Uses that require a State permit must receive a certificate of compliance. Nonregulated uses are those activities that have a direct and significant impact on the coastal areas that do not require a State permit or Federal consistency certification. Nonregulated uses must be consistent with ACAMP and require local permits to be administered by ADEM.

This Agency developed coordination procedures with the State for submittal of offshore lease sale consistency determinations and plans of operation. This Agency and the State of Alabama have revised CZM consistency information for OCS plans, permits, and licenses to conform to the revised CZM regulations that were effective January 8, 2001, and updated on January 5, 2006, and have also incorporated streamlining improvements into the latest NTLs (NTLs 2008-G04, 2009-G27, and 2015 BOEM-N01). Federal consistency for ROW pipelines is addressed in NTL 2007-G20. The State of Alabama requires an adequate description, objective, and schedule for the project; site specific information on the onshore support base, support vessels, shallow hazards, oil-spill response, wastes and discharges, transportation activities, and air emissions; and a Federal consistency certification, assessment, and findings. The State's requirements for Federal consistency review are based specifically on DOI's regulations at 30 CFR 250, 254, 256, and 550, and NOAA's Federal consistency requirements at 15 CFR 930. BOEM is continuing a dialogue with

the State of Alabama on reasonably foreseeable coastal effects associated with pipelines and other permits, and the result of these discussions will be incorporated into future updates of BOEM's NTLs and/or permitting procedures.

State of Florida Coastal Management Program

For purposes of the CZMA, the State of Florida's coastal zone includes the area encompassed by the State's 67 counties and its territorial seas. Lands owned by the Federal Government and the Seminole and Miccosukee Indian tribes are not included in the State's coastal zone; however, Federal activities in or outside the coastal zone, including those on Federal or tribal lands, that affect any land or water or natural resource of the State's coastal zone are subject to review by Florida under the CZMA. The Florida Coastal Management Act, codified as Chapter 380, Part II, Florida Statutes, authorized the development of a coastal management program. In 1981, the Florida Coastal Management Program (FCMP) was approved by NOAA.

The policies identified by the State of Florida as being enforceable in the FCMP are the 24 chapters that NOAA approved for incorporation in the State's program. The 2011 Florida Statutes are the most recent version approved by NOAA and include the listing of OCSLA permits under Subpart E and the addition of draft EAs and EISs as necessary data and information for Federal consistency review.

A network of eight State agencies and five regional water management districts implement the FCMP's 24 statutes. The water management districts are responsible for water quantity and quality throughout the State's watersheds. The State agencies include the following: the Department of Environmental Protection (DEP), the lead agency for the FCMP and the State's chief environmental regulatory agency and steward of its natural resources; the Department of Community Affairs, which serves as the State's land planning and emergency management agency; the Department of Health, which, among other responsibilities, regulates on-site sewage disposal; the Department of State, Division of Historical Resources, which protects historic and archaeological resources; the Fish and Wildlife Conservation Commission, which protects and regulates fresh and saltwater fisheries, marine mammals, and birds and upland species, including protected species and the habitat used by these species; the Department of Transportation, which is charged with the development, maintenance, and protection of the transportation system; the Department of Agriculture and Consumer Services, which manages State forests and administers aquaculture and mosquito control programs; and the Governor's Office of Planning and Budget, which plays a role in the comprehensive planning process.

Effective July 1, 2000, the Governor of Florida assigned the State's responsibilities under OCSLA to the Secretary of the Florida DEP. The DEP's Office of Intergovernmental Programs coordinates the review of OCS plans with FCMP member agencies to ensure that the plan is consistent with applicable State enforceable policies and the Governor's responsibilities under the Act.

This Agency developed coordination procedures with the State for the submittal of offshore lease sale consistency determinations and plans of operation. In 2003, this Agency and the State revised CZM consistency information for OCS plans, permits, and licenses to conform with the revised CZM regulations that were effective on January 8, 2001, and updated on January 5, 2006, and they have also incorporated streamlining improvements into the latest NTLs (NTLs 2008-G04, 2009-G27, and 2015-BOEM-N01). Federal consistency for ROW pipelines is addressed in NTL 2007-G20.

The State of Florida requires an adequate description, objective, and schedule for all activities associated with a project; specific information on the natural resources potentially affected by the proposed activities; and specific information on onshore support base, support vessels, shallow hazards, oil-spill response, wastes and discharges, transportation activities, and air emissions; and a Federal consistency certification, assessment, and findings. As identified by the State of Florida, the State enforceable policies that must be addressed for OCS oil- and gas-related activities are found at http://www.boem.gov/CZM-Program-Policies-for-GOM-States.aspx. These requirements have been incorporated into the Plans and Regional Oil-Spill Response NTLs. The State requirements for Federal consistency review are based on the requirements of State statutes, CZMA regulations at 15 CFR 930, and DOI's regulations at 30 CFR 250, 254, 256, and 550. BOEM is continuing a dialog with the State of Florida on reasonably foreseeable coastal effects associated with OCS plans, pipelines, and other permits; the result of these discussions will be incorporated into future updates of the BOEM's NTLs and/or permitting procedures.

APPENDIX J

PROPOSED LEASE MITIGATING MEASURES

J PROPOSED LEASE MITIGATING MEASURES

J.1 STIPULATIONS

J.1.1 Introduction

Mitigations can be applied at the lease sale stage, typically through applying what are commonly referred to as lease stipulations to OCS oil and gas leases as a result of any given lease sale. Stipulations are attached to OCS oil and gas leases and are legally binding. Stipulations are applied to leases when a lessee obtains a lease, while conditions of approval are applied to permits during the post-lease review process. Since publication of the draft Programmatic EIS, the One Big Beautiful Bill Act (Pub. L. 119-21) was enacted. Among other things, the Act requires DOI to hold on average two mandated sales in the Gulf of America OCS Region, with specific limitations on acreage size and requires the application of the financial terms, economic conditions, and lease stipulations previously applied in Gulf of Mexico Lease Sale 254. For those congressionally mandated sales, therefore, the required stipulations will be applied; the discussion of the stipulations included in this Programmatic EIS would be applicable only to GOAR sales not mandated by Pub. L. 119-21.

This appendix discusses the potential lease stipulations that could be considered for a lease sale. These potential lease stipulations were developed from numerous scoping efforts from previous lease sales. The Topographic Features and Live Bottom (Pinnacle Trend) Stipulations have been applied as programmatic mitigation in the 2024-2029 National OCS Oil and Gas Program Programmatic EIS (BOEM 2023a) and Record of Decision (BOEM 2023b) and, therefore, would apply to all leases issued for GOA lease sales under the 2024-2029 National OCS Oil and Gas Program in designated lease blocks. The other eight lease stipulations described below could be considered for future GOA lease sales, as applicable. The analysis of any stipulations for any particular alternative does not ensure that the Assistant Secretary for Land and Minerals Management will decide to apply the stipulations to OCS oil and gas leases that may result from any OCS oil and gas lease sale nor does it preclude minor modifications in wording during subsequent steps in the prelease process if comments indicate changes are necessary or if conditions change.

Lease stipulations are considered for adoption by the Assistant Secretary for Land and Minerals Management, under authority delegated by the Secretary, and any stipulations to be included in a lease sale are described in the ROD for that lease sale. Mitigating measures in the form of lease stipulations are added to the lease terms and are therefore enforceable as part of the lease. In addition, each exploration and development plan, as well as any pipeline applications that result from a lease sale, will undergo a NEPA review, and additional project-specific mitigations may be applied as conditions of plan approval at the post-lease stage. BSEE has the authority to monitor and enforce these conditions and, under 30 CFR 250.N, may seek remedies and penalties from any operator that fails to comply with those conditions, stipulations, and mitigating measures.

Some lease stipulations apply to all blocks that may be offered, while other lease stipulations apply only to specified blocks. Each Final Notice of Sale (Final NOS) package will include maps indicating which blocks will have potential lease stipulations, and the “List of Blocks Available for

Leasing" contained in the Final NOS package will identify the lease stipulations applicable to each block. The Final NOS package will contain the Final NOS, information to lessees, and lease stipulations. In addition, the Final NOS package will show any additional areas not available for lease, including areas that have been removed from leasing in the ROD. A list of potential lease stipulations for Gulf of America OCS oil and gas lease sales includes the following:

- Stipulation No. 1 – Military Areas;
- Stipulation No. 2 – Evacuation;
- Stipulation No. 3 – Coordination;
- Stipulation No. 4 – Protected Species;
- Stipulation No. 5 –Topographic Features;
- Stipulation No. 6 – United Nations Convention on the Law of the Sea Royalty Payment;
- Stipulation No. 7 – Agreement between the United States of America and the United Mexican States Concerning Transboundary Hydrocarbon Reservoirs in the Gulf of Mexico;
- Stipulation No. 8 – Live Bottom;
- Stipulation No. 9 – Blocks South of Baldwin County, Alabama; and
- Stipulation No. 10 – Restrictions due to Rights-of-Use and Easements for Floating Production Facilities.

J.2 STIPULATION NO. 1 – MILITARY AREAS

J.2.1 Stipulation Overview

Stipulation No. 1 may be included in leases issued as a result of an OCS oil and gas lease sale that are located within the Military Warning Areas and Eglin Water Test Areas, as shown in **Figure J.2-1**. The Military Areas Stipulation has been applied to all blocks leased in military areas since 1977 and reduces potential impacts, particularly in regard to safety, but it does not reduce or eliminate the actual physical presence of OCS oil- and gas-related operations in areas where military operations are conducted. The stipulation contains a "hold harmless" clause (holding the U.S. Government harmless in case of an accident involving military operations) and requires lessees to coordinate their activities with appropriate local military contacts.

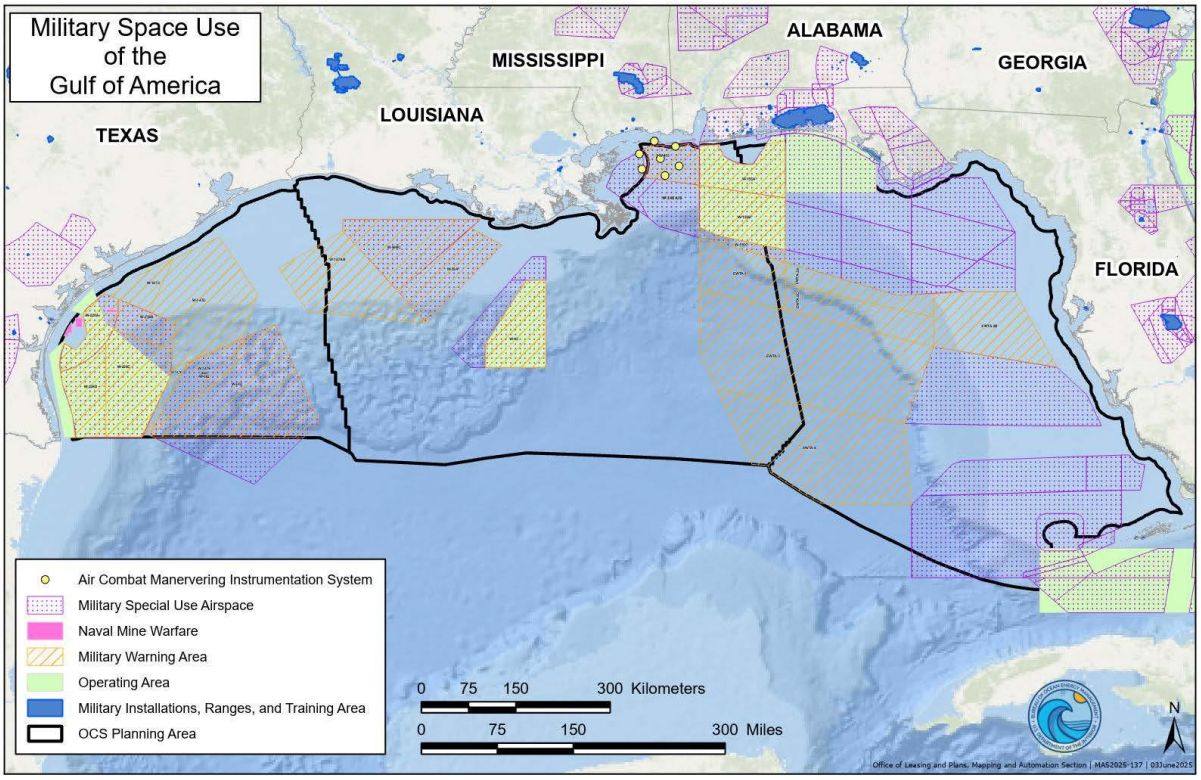

Figure J.2-1. Military Warning Areas and Eglin Water Test Areas in the Gulf of America.

J.2.2 Potential Stipulation Language

The potential stipulation reads as follows:

A. Hold and Save Harmless

Whether compensation for such damage or injury might be due under a theory of strict or absolute liability or otherwise, the lessee assumes all risks of damage or injury to persons or property that occur in, on, or above the Outer Continental Shelf (OCS), and to any persons or to any property of any person or persons who are agents, employees, or invitees of the lessee, its agents, independent contractors, or subcontractors doing business with the lessee in connection with any activities being performed by the lessee in, on, or above the OCS if such injury or damage to such person or property occurs by reason of the activities of any agency of the United States (U.S.) Government, its contractors or subcontractors, or any of its officers, agents, or employees, being conducted as a part of, or in connection with, the programs and activities of the command headquarters listed in the table in Section C, Operational.

Notwithstanding any limitation of the lessee's liability in Section 14 of the lease, the lessee assumes this risk whether such injury or damage is caused in whole or in part by any act or omission, regardless of negligence or fault, of the U.S. Government, its contractors or subcontractors, or any of its officers, agents, or employees. The lessee

further agrees to indemnify and save harmless the U.S. Government against all claims for loss, damage, or injury sustained by the lessee, or to indemnify and save harmless the U.S. Government against all claims for loss, damage, or injury sustained by the agents, employees, or invitees of the lessee, its agents, or any independent contractors or subcontractors doing business with the lessee in connection with the programs and activities of the aforementioned military installation, whether the same be caused in whole or in part by the negligence or fault of the U.S. Government, its contractors or subcontractors, or any of its officers, agents, or employees, and whether such claims might be sustained under a theory of strict or absolute liability or otherwise.

B. Electromagnetic Emissions

The lessee agrees to control its own electromagnetic emissions and those of its agents, employees, invitees, independent contractors, or subcontractors emanating from individual designated defense warning areas in accordance with the requirements specified by the commander of the command headquarters listed in the following table to the degree necessary to prevent damage to, or unacceptable interference with, Department of Defense flight, testing, or operational activities conducted within individual designated warning areas. Necessary monitoring, control, and coordination with the lessee, its agents, employees, invitees, independent contractors, or subcontractors will be affected by the commander of the appropriate onshore military installation conducting operations in the particular warning area, provided, however, that control of such electromagnetic emissions shall in no instance prohibit all manner of electromagnetic communication during any period of time between a lessee, its agents, employees, invitees, independent contractors, or subcontractors, and onshore facilities.

C. Operational

The lessee, when operating, or causing to be operated on its behalf, a boat, ship, or aircraft traffic in an individual designated warning area, must enter into an agreement with the commander of the individual command headquarters listed in the following list, prior to commencing such traffic. Such an agreement will provide for positive control of boats, ships, and aircraft operating in the warning areas at all times.

Warning and Water Test Area	Command Address	Contacts	Email	Phone
W-59	Naval Air Station JRB 159 Fighter Wing 400 Russell Avenue, Box 27 Building 285 (Operations) New Orleans, Louisiana 70143-0027	MSgt. Michael Frisard TSgt. Russhelle Gremillion	micheal.frisard@usaf.mil resshelle.gremillion@usaf.mil	(504) 391-8637 (504) 391-8695 (504) 391-8696
W-92	Fleet Area Control and Surveillance Facility Attention: Deputy Airspace Officer 118 Albemarle Ave. P.O. Box 40 Jacksonville, Florida 32212	Donald Vatick	donald.j.vatick@navy.mil	(904) 542-2112
W-147	147 OSS/OSA 14657 Sneider Street Houston, Texas 77034-5586	TSgt. David Rios	David.rios.16@us.af.mil	(281) 929-2142
W-155	NASP Sector Control Attention: Facility (FACSFAC) NAS Pensacola 1860 Perimeter Road, Building 3963 NASP Florida 32508-5217	Facility (FACSFAC) NAS	NASP.SECTORCONTROL@navy.mil	(850) 452-2735 Base Operations: (850) 452-2431
W-228	Chief, Naval Air Training Code N386 (ATC and Air Space Management) Naval Air Station Corpus Christi, Texas 78419-5100	Thomas Ormrod	thomas.v.ormrod.civ@us.navy.mil	(361) 961-1913
W-453	Air National Guard – CRTC 4715 Hewes Avenue, Building 60 Gulfport, Mississippi 39507-4324	N/A	usaf.ms.ms-crtc.mbx.mscrtc-director-of-operations@mail.mil	(228) 214-6027
W-602	VQ-4 Operations Department 7791 Mercury Road Tinker AFB, Oklahoma 73145-8704	N/A	TNKR_VQ4_Dep_Skeds@navy.mil	(405) 739-5700
Eglin Water Test Areas 1, 2, 3, and 4	101 West D Ave, Bldg. 1, Suite 116 Eglin AFB, Florida 32562	Michael R. Contratto, Technical Director (96TW/CT)	michael.contratto.1@us.af.mil	(850) 882-0762
Eglin Water Test Areas 1, 2, 3, and 4	Range and Operations Sustainment Section 96 TW/XPO Eglin AFB, Florida 32542	Mr. Charles Smith	charles.smith.7@us.af.mil	(850) 882-5614

J.2.3 Effectiveness of the Lease Stipulation

The hold harmless section of the military stipulation serves to protect the U.S. Government from liability in the event of an accident involving the lessee and military activities. This serves to reduce the impact of OCS oil- and gas-related activity on the communications of military missions and reduces the possible impacts of electromagnetic energy transmissions on missile testing, tracking, and detonation. The operations of the military and the lessee and its agents will not be affected by this section.

The operational section requires notification to the military of OCS oil- and gas-related activity to take place within a military use area. This allows the base commander to plan military missions and maneuvers that will avoid the areas where OCS oil- and gas-related activities are taking place or to schedule around these activities. Prior notification helps reduce the potential impacts associated with vessels and helicopters traveling unannounced through areas where military activities are underway.

This stipulation reduces potential impacts, particularly in regard to safety, but it does not reduce or eliminate the actual physical presence of OCS oil- and gas-related operations in areas where military operations are conducted. The reduction in potential impacts resulting from this stipulation makes multiple-use conflicts between military operations and OCS oil- and gas-related activities unlikely. Without the stipulation, some potential conflict is likely. The best indicator of the overall effectiveness of the stipulation may be that there has never been an accident involving a conflict between military operations and OCS oil- and gas-related activities.

J.3 STIPULATION NO. 2 – EVACUATION

J.3.1 Stipulation Overview

Stipulation No. 2 may be included in leases issued as a result of an OCS oil and gas lease sale located in the eastern-most portion of the CPA and any blocks leased in the EPA. An evacuation stipulation has been applied to all blocks leased in these areas since 2001. The Evacuation Stipulation is designed to protect the lives and welfare of offshore oil and gas personnel. The OCS oil- and gas-related activities have the potential to occasionally interfere with specific requirements and operating parameters for the lessee's activities in accordance with the military stipulation clauses contained herein. If it is determined that the operations will result in interference with scheduled military missions in such a manner as to possibly jeopardize the national defense or to pose unacceptable risks to life and property, then a temporary suspension of operations and the evacuation of personnel may be necessary

J.3.2 Potential Stipulation Language

A. The lessee, recognizing that oil and gas resource exploration, exploitation, development, production, abandonment, and site cleanup operations on the leased area of submerged lands may occasionally interfere with tactical military operations, hereby recognizes and agrees that the United States

reserves and has the right to temporarily suspend operations and/or require evacuation on this lease in the interest of national security. Such suspensions are considered unlikely in this area. Every effort will be made by the appropriate military agency to provide as much advance notice as possible of the need to suspend operations and/or evacuate. Advance notice of 14 days normally will be given before requiring a suspension or evacuation, but in no event will the notice be less than 4 days.

Temporary suspension of operations may include the evacuation of personnel and appropriate sheltering of personnel not evacuated. Appropriate shelter means the protection of all lessee personnel for the entire duration of any Department of Defense activity from flying or falling objects or substances; it will be implemented by a written order from the Bureau of Safety and Environmental Enforcement (BSEE) Gulf of America Regional Supervisor for District Field Operations (RSDFO), after consultation with the appropriate command headquarters or other appropriate military agency or higher authority.

The appropriate command headquarters, military agency, or higher authority will provide information to allow the lessee to assess the degree of risk, and provide sufficient protection for, the lessee's personnel and property. Such suspensions or evacuations for national security reasons normally will not exceed 72 hours; however, any such suspension may be extended by order of the BSEE Gulf of America RSDFO. During such periods, equipment may remain in place, but all production, if any, must cease for the duration of the temporary suspension if the BSEE Gulf of America RSDFO so directs. Upon cessation of any temporary suspension, the BSEE Gulf of Mexico RSDFO immediately will notify the lessee that such suspension has terminated and operations on the leased area can resume.

B. The lessee must inform BSEE of the persons/offices to be notified to implement the terms of this stipulation.

C. The lessee is encouraged to establish and maintain early contact and coordination with the appropriate command headquarters to avoid or minimize the effects of conflicts with potentially hazardous military operations.

D. The lessee is not entitled to reimbursement for any costs or expenses associated with the suspension of operations or activities or the evacuation of property or personnel in fulfillment of the military mission in accordance with subsections A through C above.

E. Notwithstanding subsection D, the lessee reserves the right to seek reimbursement from appropriate parties for the suspension of operations or activities, or the evacuation of property or personnel, associated with conflicting commercial operations.

J.3.3 Effectiveness of the Lease Stipulation

This stipulation would provide for the evacuation of personnel and shut-in of operations during any events conducted by the military that could pose a danger to ongoing OCS oil- and gas-related operations. It is expected that the invocation of these evacuation requirements would be extremely rare. It is expected that these measures would eliminate dangerous conflicts between OCS oil- and gas-related activities and military operations. Continued close coordination between BSEE and the military may result in improvements in the wording and implementation of these stipulations.

J.4 STIPULATION NO. 3 – COORDINATION

J.4.1 Stipulation Overview

Stipulation No. 3 may be included in leases issued as a result of an OCS oil and gas lease sale located in the easternmost portion of the CPA or any blocks leased in the EPA. A coordination stipulation has been applied to all blocks leased in these areas since 2001. The Coordination Stipulation is designed to increase communication and cooperation between military authorities and offshore oil and gas operators. Specific requirements and operating parameters are established for the lessee's activities in accordance with the Military Areas Stipulation clauses. For instance, if it is determined that the operations will result in interference with scheduled military missions in such a manner as to possibly jeopardize the national defense or to pose unacceptable risks to life and property, then certain measures become activated and the OCS oil- and gas-related operations may be curtailed in the interest of national defense.

J.4.2 Potential Stipulation Language

A. The placement, location, and planned periods of operation of surface structures on this lease during the exploration stage are subject to approval by the Bureau of Ocean Energy Management (BOEM) Gulf of America Regional Director (RD) after the review of an operator's Exploration Plan (EP). Prior to approval of the EP, the lessee must consult with the appropriate command headquarters regarding the location, density, and planned periods of operation of such structures, and to maximize exploration while minimizing conflicts with Department of Defense activities.

   When determined necessary by the appropriate command headquarters, the lessee will enter into a formal Operating Agreement with such command headquarters, which delineates the specific requirements and operating parameters for the lessee's activities in accordance with the military stipulation clauses contained herein. If it is determined that the operations will result in interference with scheduled military missions in such a manner as to possibly jeopardize national defense or to pose unacceptable risks to life and property, then the BOEM Gulf of America RD may approve the EP with conditions, disapprove it, or require modification in accordance with 30 CFR 550. The

BOEM Gulf of America RD will notify the lessee in writing of the conditions associated with plan approval, or the reason(s) for disapproval or required modifications.

Moreover, if there is a serious threat of harm or damage to life or property, or if it is in the interest of national security or defense, pending or approved operations may be suspended or halted in accordance with 30 CFR part 250. Such a suspension will extend the term of a lease by an amount equal to the length of the suspension. The Bureau of Safety and Environmental Enforcement (BSEE) Gulf of America RD will attempt to minimize such suspensions within the confines of related military requirements. It is recognized that the issuance of a lease conveys the right to the lessee, as provided in Section 8(b)(4) of the Outer Continental Shelf Lands Act (OCSLA), 43 U.S.C. 1337(b)(4), to engage in exploration, development, and production activities conditioned upon other statutory and regulatory requirements.

B. The lessee is encouraged to establish and maintain early contact and coordination with the appropriate command headquarters to avoid or minimize the effects of conflicts with potentially hazardous military operations.

C. If national security interests are likely to be in continuing conflict with an existing Operating Agreement, EP, Development and Production Plan, or Development Operations Coordination Document, the BSEE Gulf of America RD, in consultation with BOEM, will direct the lessee to modify any existing Operating Agreement or to enter into a new Operating Agreement to implement measures to avoid or minimize the identified potential conflicts, subject to the terms and conditions and obligations of the legal requirements of the lease.

J.4.3 Effectiveness of the Lease Stipulation

This stipulation would provide for review of pending oil and gas operations by military authorities and could result in delaying oil and gas operations if military activities have been scheduled in the area that may put the oil and gas operations and personnel at risk or if such operations could result in serious threat of harm or damage to life or property, or jeopardize national security or defense.

J.5 STIPULATION NO. 4 – PROTECTED SPECIES

J.5.1 Stipulation Overview

Stipulation No. 4 may be included in all leases issued as a result of an OCS oil and gas lease sale. However, mandated sales under the OBBBA have a required specific stipulation for protected species (see **Chapter 2.3.1**). A Protected Species Stipulation has been applied to all blocks leased in the GOA since December 2001. This stipulation was developed in consultation with the U.S. Department of Commerce's NOAA, NMFS, and DOI's FWS, in accordance with consultation

requirements under ESA and MMPA, and is designed to minimize or avoid potential adverse impacts to federally protected species under both Acts. The version of the stipulation applied at the leasing stage would reflect the current requirements for compliance.

J.5.2 Potential Stipulation Language

A. The Endangered Species Act (16 U.S.C. 1531 et seq.) and the Marine Mammal Protection Act (16 U.S.C. 1361 et seq.), as amended, are designed to protect threatened and endangered species and marine mammals and apply to activities authorized under the Outer Continental Shelf Lands Act (OCSLA, 43 U.S.C. 1331 et seq.). The Congressional Declaration of Policy included in OCSLA provides that it is the policy of the United States that the OCS should be made available for expeditious and orderly development, subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs (see 43 U.S.C. 1332). Both the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE) comply with these laws on the OCS and as subject to USFWS (https://www.boem.gov/regions/gulf-america-ocs-region/oil-and-gas-esa-consultations-and-protocols) and NMFS biological opinions, as amended.

B. The lessee, its operators, and their recognized representative must:

1. Comply with the Reasonable and Prudent Measures and implementing Terms and Conditions of the Biological Opinion issued by the National Marine Fisheries Service (NMFS) on May 20, 2025 (2025 NMFS BiOp), as amended. This includes mitigation, particularly any attachments and protocols in the proposed action and Terms and Conditions applicable to the activity, as well as record-keeping and reporting sufficient to allow BOEM and BSEE to comply with reporting and monitoring requirements under the 2025 NMFS BiOp; applicable Conditions of Approval (COAs); and any additional reporting required by BOEM or BSEE developed as a result of implementation of the 2025 NMFS BiOp. The 2025 NMFS BiOp and supporting documents (as amended) may be found here: https://www.fisheries.noaa.gov/resource/document/biological-and-conference-opinion-bureau-ocean-energy-management-and-bureau. The 2025 NMFS BiOp Attachments and Appendices may be found here: https://www.fisheries.noaa.gov/resource/document/attachments-and-appendices-2025-gulf-america-oil-and-gas-biological-opinion.
2. Operators and their appointed representatives, personnel, and subcontractors must follow the required vessel measures from the 2020 Biological Opinion's RPA in the Rice's Whale Area (2020 RWA), incorporated into the 2025 NMFS BiOp (A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's

Reasonable and Prudent Alternative (2020 RWA)). These measures apply to all vessels associated with this lease or the operator's activities related to the OCS oil and gas program in the Gulf of America, generally. If transiting through any portion of the 2020 RWA, the BOEM Permit/Plan holder must fulfil the reporting requirements as stated (https://www.fisheries.noaa.gov/resource/document/attachments-and-appendices-2025-gulf-america-oil-and-gas-biological-opinion) to BOEM and BSEE (protectedspecies@boem.gov and protectedspecies@bsee.gov). Additional reporting and transit requirements related to the 2020 RWA may be applied as a COA to any plan or permit issued under this lease.

3. Immediately report all sightings and locations of injured or dead protected species (e.g., marine mammals and sea turtles) to the appropriate hotlines listed at https://www.fisheries.noaa.gov/report (phone numbers vary by state), as required in the Attachments and Appendices for the 2025 Gulf of America Oil and Gas Biological Opinion (https://www.fisheries.noaa.gov/resource/document/attachments-and-appendices-2025-gulf-america-oil-and-gas-biological-opinion). At all times, vessel operators must report sightings of any injured or dead aquatic protected species as soon as possible but no greater than 24 hours, regardless of whether the injury or death was caused by the operator's vessel. If the injury or death was caused by a collision with the operator's vessel, the operator must immediately report the incident to the appropriate NMFS contact for 24-hour response. The operator must further notify BOEM, BSEE, and NMFS immediately of the strike by email to protectedspecies@boem.gov and protectedspecies@bsee.gov and takereport.nmfsser@noaa.gov.

C. The lessee and its operators, personnel, and subcontractors, while undertaking activities authorized under this lease and all activities associated therein, must implement and comply with the specific mitigation measures outlined in the following Attachments of the 2025 NMFS BiOp (https://www.fisheries.noaa.gov/resource/document/attachments-and-appendices-2025-gulf-america-oil-and-gas-biological-opinion):

- Operational National Mitigation Protocols for Geophysical Surveys
- Marine Debris Protocol
- Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols
- In-water Line Precaution Protocol
- Moon Pool Monitoring Protocol
- Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA)
- Sea Turtle Resuscitation Guidelines Protocol
- Explosive-Severance Scenario Mitigation Protocol

- Pile Driving Monitoring and Reporting Requirements Protocol
- Site-clearance Trawling Protocol

D. Certain post-lease approvals (e.g., for activities proposing new and unusual technologies, certain seismic surveys and all geological and geophysical (G&G) surveys, including G&G surveys that utilize High Resolution Geophysical (HRG) acoustic sources) will require an ESA review by BOEM, and applicable protocols and/or COAs will be applied per the 2025 NMFS BiOp, subject to additional mitigations to protect ESA-listed species. Therefore, lessees must notify BOEM prior to conducting any G&G surveys, including, for example, ancillary G&G surveys that use HRG acoustic sources. At the lessee's option, the lessee, its operators, personnel, and contractors may comply with the most current measures to protect species in place at the time an activity is undertaken under this lease, including but not limited to, new or updated versions of the 2025 NMFS BiOp or through new or activity-specific consultations. The most current applicable terms and conditions and reasonable and prudent measures from the 2025 NMFS BiOp or other relevant consultations will be applied to all post-lease approvals. Any future biological opinions, amendments, terms and conditions, reasonable and prudent measures, and COAs implementing them will be binding on post-lease approvals. The lessee and its operators, personnel, and subcontractors will be required to comply with the mitigation measures identified in the above referenced 2025 NMFS BiOp (including all applicable Attachments and Appendices) and additional applicable measures in the COAs for their plans or permits.

J.5.3 Effectiveness of the Lease Stipulation

This stipulation was developed in consultation with NMFS and FWS, and is designed to minimize or avoid potential adverse impacts to federally protected species. The stipulation immediately implements existing mitigations on post-lease activities and notifies lessees that subsequent approvals for OCS oil- and gas-related activities may include additional mitigations (as conditions of approval) when those actions have the potential to impact marine mammals, sea turtles, and other federally protected species.

J.6 STIPULATION NO. 5 – TOPOGRAPHIC FEATURES

J.6.1 Stipulation Overview

High-relief topographic features that provide habitat for coral-reef-community organisms are located in the WPA and CPA. BOEM protects these features from OCS oil- and gas-related activities through stipulations attached to leases. There are currently no identified topographic features protected under this stipulation in the EPA.

The OCS oil- and gas-related activities resulting from an OCS oil and gas lease sale could have potentially severe impacts on or near hard bottom communities in the GOA. DOI has recognized this issue and has made the Topographic Features Stipulation part of leases on or near these biotic communities since 1973 to mitigate potential impacts. By applying the stipulation, potential impacts from nearby OCS oil- and gas-related activities are substantially mitigated. This stipulation does not prevent the recovery of oil and gas resources, but it would serve to protect valuable and sensitive biological resources.

Because this stipulation has been applied as programmatic mitigation in the 2024-2029 National OCS Oil and Gas Program Programmatic EIS (BOEM 2023a) and Record of Decision (BOEM 2023b), it would apply to all leases issued for GOA lease sales under the 2024-2029 National OCS Oil and Gas Program in designated lease blocks within the areas indicated in **Figure F.6-2**. The detailed topographic features map package is available from BOEM's New Orleans Office, Public Information Office and at http://www.boem.gov/Topographic-Features-Stipulation-Map-Package/. BOEM policy, as it relates to the Topographic Features Stipulation, is described in NTL No. 2009-G39, "Biologically-Sensitive Underwater Features and Areas," and can be found at https://www.boem.gov/sites/default/files/regulations/Notices-To-Lessees/2009/09-G39.pdf. Specific OCS blocks affected by the Topographic Features Stipulation are listed at https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Gulf-of-Mexico-Region/topoblocks.pdf. A detailed map showing the locations of the affected blocks can be found at https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Gulf-of-Mexico-Region/topomap.pdf.

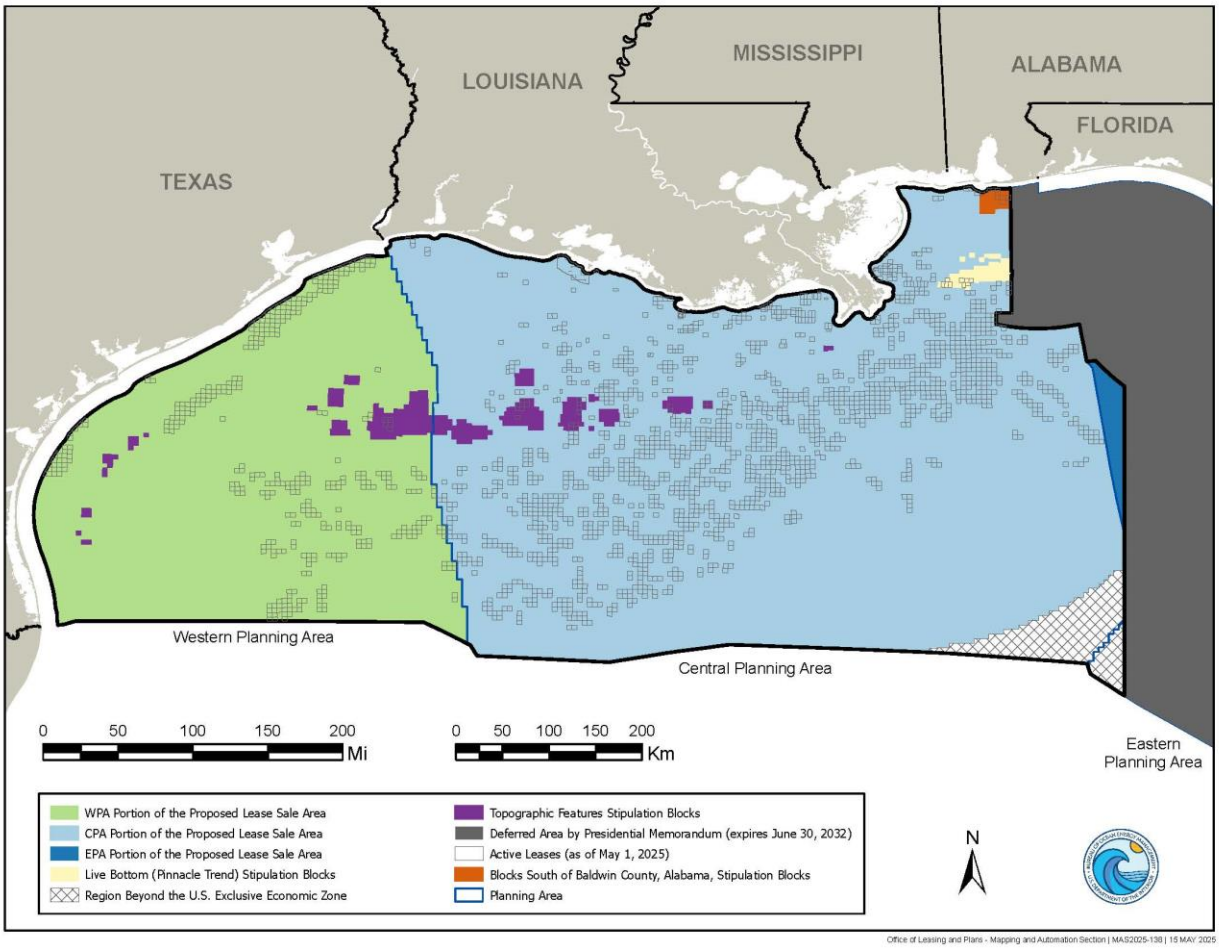

Figure J.6-1. Blocks That Could Be Subject to the Topographic Features Stipulation, Live Bottom Stipulation, or the Blocks South of Baldwin County, Alabama, Stipulation in the Gulf of America Overlaid with Potential Lease Sale Areas of the Gulf of America.

The Topographic Features Stipulation was formulated based on consultation with various Federal agencies and comments solicited from the States, industry, environmental organizations, and academic representatives. The stipulation is based on years of scientific information collected since the inception of the stipulation. This information includes various Bureau of Land Management- and MMS (BOEM)-funded studies of topographic highs in the GOA; numerous stipulation-imposed, industry-funded monitoring reports; and the National Research Council's report entitled *Drilling Discharges in the Marine Environment* (National Research Council 1983). The blocks affected by the previously applied Topographic Features Stipulation are shown in **Figure J.6-1**.

This stipulation would establish No Activity Zones at the topographic features where no bottom-disturbing activity, including anchoring and structure emplacement, would be allowed. The No Activity Zone would protect the most sensitive reef biota that are found at the peaks of the topographic features within the No Activity Zone. Each bank-specific No Activity Zone is described in the table in **Appendix J.6.2** below. Outside the No Activity Zone, additional restrictive buffer zones based on an essential fish habitat programmatic consultation with NOAA Fisheries would be

established to distance OCS oil- and gas-related, bottom-disturbing activities from the No Activity Zone. Oil and gas operations could occur within these buffer zones, but drilling discharges would be shunted to near the seafloor within the zones. Shunting of the drilling effluent to near the seafloor allows cuttings to be discharged deeper than the portions of the high-relief topographic feature where the most sensitive reef-building corals live. Low-relief banks would likely have a No Activity Zone and restrictive buffer zones surrounding the No Activity Zone, but they would not have a shunting requirement. Shunting near these low-relief banks would discharge drilling muds in the same water-depth range as the features' associated biota that are being protected and could potentially smother those features.

Three topographic features (i.e., the East Flower Garden Bank, West Flower Garden Bank, and Stetson Bank) have been withdrawn from leasing, as of the July 2008 Memorandum on Withdrawal of Certain Areas of U.S. OCS from Leasing Disposition, and are protected to a greater degree than the other topographic features, as outlined in the table in **Appendix F.6.2** below. Under BOEM's Topographic Features Stipulation and based on an essential fish habitat programmatic consultation with NOAA Fisheries, the added provisions at the East and West Flower Garden Banks include a larger and deeper No Activity Zone and a larger shunting zone (4 miles [mi]; 6 kilometers [km] surrounding the No Activity Zone) than the other BOEM-protected topographic features. Stetson Bank, which was made part of the Flower Garden Banks National Marine Sanctuary in 1996, does not have the same biological complexity as the East and West Flower Garden Banks, and therefore has similar No Activity Zone and shunting zone protections to the other BOEM-protected topographic features.

J.6.2 Potential Stipulation Language

The stipulation provides for protection of the following banks through the applicable mitigating measures in the Western Planning Area.

Bank Name	No Activity Zone (defined by isobaths in meters)
Shelf Edge Banks	
West Flower Garden Bank	100 (Defined by 1/4 x 1/4 x 1/4 system)
East Flower Garden Bank	100 (Defined by 1/4 x 1/4 x 1/4 system)
MacNeil Bank	82
29 Fathom Bank	64
Rankin Bank	85
Bright Bank[1]	85
Stetson Bank	52
Appelbaum Bank	85
Low-Relief Banks[2]	
Mysterious Bank	74, 76, 78, 80, 84
Coffee Lump	Various

Bank Name	No Activity Zone (defined by isobaths in meters)
Blackfish Ridge	70
Big Dunn Bar	65
Small Dunn Bar	65
32 Fathom Bank	52
Claypile Bank[3]	50
South Texas Banks[4]	
Dream Bank	78, 82
Southern Bank	80
Hospital Bank	70
North Hospital Bank	68
Aransas Bank	70
South Baker Bank	70
Baker Bank	70

Notes:
[1] CPA bank in the GOA with a portion of its "1-Mile Zone" and/or "3-Mile Zone" in the WPA.
[2] Only paragraph A applies.
[3] Paragraphs A and B apply. In paragraph B, monitoring of the effluent to determine the effect on the biota of Claypile Bank is required rather than shunting.
[4] Only paragraphs A and B apply.

The stipulation provides for protection of the following banks through the applicable mitigating measures in the CPA:

Bank Name	No Activity Zone (defined by isobaths in meters)
Alderdice Bank	80
Bouma Bank	85
Bright Bank[1]	85
Diaphus Bank[2]	85
Elvers Bank	85
Ewing Bank	85
Fishnet Bank[2]	76
Geyer Bank	85
Jakkula Bank	85
McGrail Bank	85
Parker Bank	85
Rezak Bank	85
Sackett Bank[2]	85
Sidner Bank	85
Sonnier Bank	55
Sweet Bank[3]	85

Notes:
[1] Gulf of America CPA bank with a portion of its "3-Mile Zone" in the Gulf of America WPA.

[2] Only paragraphs A and B apply.
[3] Only paragraph A applies.

The lessee and its operators, personnel, and subcontractors are responsible for carrying out the specific mitigating measures outlined in the most current Notice To Lessees and Operators (NTLs) as described at https://www.boem.gov/guidance, which provide guidance on how to follow the requirements of this stipulation (NTL No. 2009-G39). See the "Topographic Features Stipulation Map" and the figures in the "Western and Central Gulf of Mexico Topographic Features Stipulation Map package" at http://www.boem.gov/Topographic-Features-Stipulation-Map-Package/. In addition to the foregoing, the lessee, its operators, personnel, and subcontractors, as applicable, shall comply with the following:

A. No activity, including the placement of structures, drilling rigs, pipelines, or anchoring, will be allowed within the listed isobath ("No Activity Zone") of the banks listed above.

B. Operations within the area shown as the "1,000-Meter Zone" on the "Topographic Features Stipulation Map" must be restricted by shunting all drill cuttings and drilling fluids to the bottom through a structurally sound downpipe that terminates at an appropriate distance, but no more than 10 meters, from the bottom.

C. Operations within the area shown as the "1-Mile Zone" on the "Topographic Features Stipulation Map" must be restricted by shunting all drill cuttings and drilling fluids to the bottom through a structurally sound downpipe that terminates at an appropriate distance, but no more than 10 meters, from the bottom. Where a "1-Mile Zone" is designated, the "1,000-Meter Zone" in paragraph B is not designated. This restriction on operations also applies to areas surrounding the Flower Garden Banks, namely the "4-Mile Zone" surrounding the East Flower Garden Bank and the West Flower Garden Bank.

D. Operations within the area shown as "3-Mile Zone" on the "Topographic Features Stipulation Map" (http://www.boem.gov/Topographic-Features-Stipulation-Map-Package/) must be restricted by shunting all drill cuttings and drilling fluids from development operations to the bottom through a structurally sound downpipe that terminates at an appropriate distance, but no more than 10 meters, from the bottom. If more than two exploration wells are to be drilled from the same surface location within the "3-Mile Zone," all drill cuttings and drilling fluids must be restricted by shunting to the bottom through a downpipe that terminates at an appropriate distance, but no more than 10 meters, from the bottom.

J.6.3 Effectiveness of the Lease Stipulation

The purpose of the stipulation is to protect the biota of the topographic features from adverse impacts due to routine OCS oil- and gas-related activities. Such impacts include physical damage from anchoring and rig emplacement and potential toxic and smothering impacts from muds and

cuttings discharges. The Topographic Features Stipulation has been used on leases since 1973 to effectively prevent damage to the biota of these banks from routine OCS oil- and gas-related activities. Anchoring related to OCS oil- and gas-related activities on the sensitive portions of the topographic features has been prevented. Monitoring studies have demonstrated that the shunting requirements of the stipulations are effective in preventing the muds and cuttings from impacting the biota of the banks. Long-term monitoring studies conducted by NOAA and BOEM at the East and West Flower Garden Banks have shown that no significant long-term changes have been detected in coral cover or coral diversity at the East and West Flower Garden Banks from 1988 to 2023 (Eisenbach et al. 2025; Johnston et al. 2013; 2015; Johnston et al. 2018; Zimmer et al. 2010) and probably not since the first measurements were taken in the mid-1970s (Gittings 1998). The stipulation, which is applied as programmatic mitigation in the 2024-2029 National OCS Oil and Gas Program Programmatic EIS (BOEM 2023a) and Record of Decision (BOEM 2023b) would apply to all leases issued under the 2024-2029 National OCS Oil and Gas Program in designated lease blocks in designated lease blocks, will continue to protect the biota of the banks by substantially mitigating OCS oil- and gas-related activities. This stipulation does not prevent the recovery of oil and gas resources but would serve to protect valuable and sensitive biological resources.

J.7 STIPULATION NO. 6 – UNITED NATIONS CONVENTION ON THE LAW OF THE SEA ROYALTY PAYMENT

J.7.1 Stipulation Overview

Stipulation No. 6 could be included in leases issued as a result of a lease sale in the WPA and CPA in the area beyond the U.S. EEZ, formerly known as the “Western Gap” (**Figure J.7-1**).

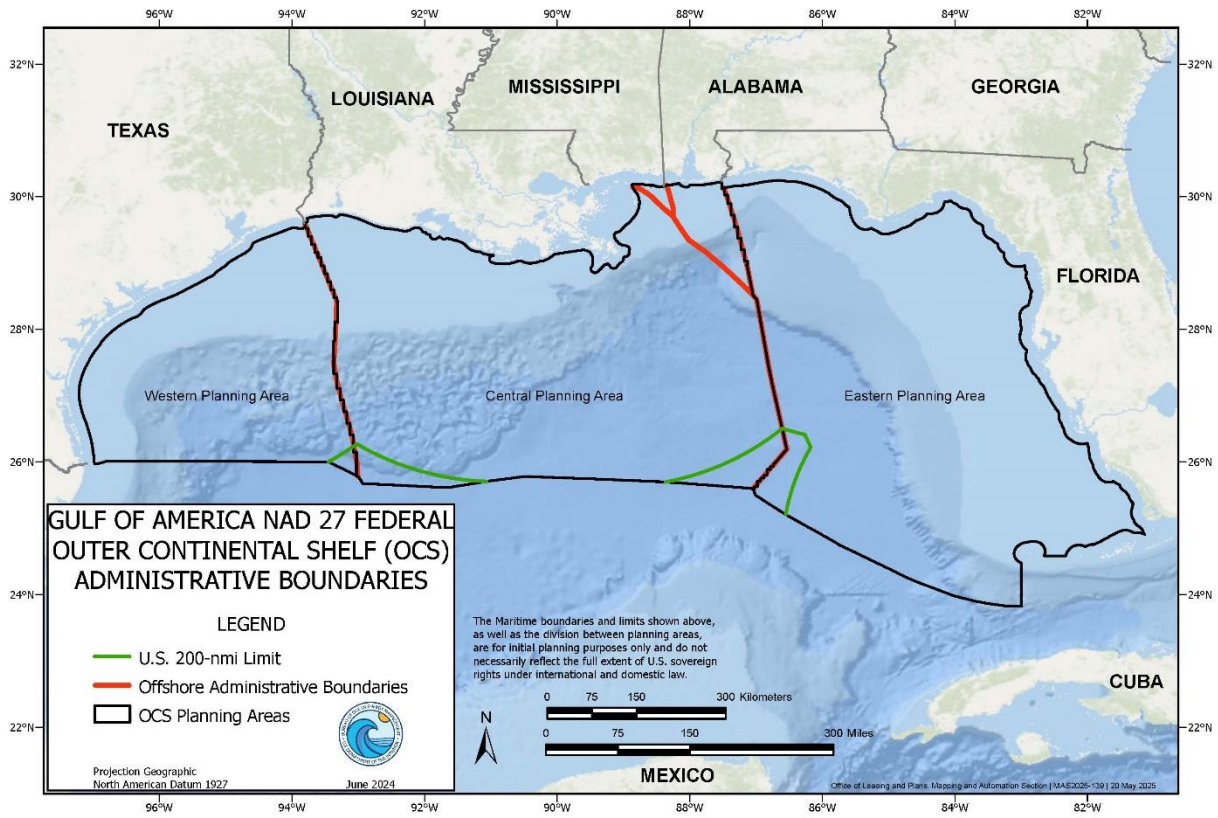

Figure J.7-1. Gulf of America OCS Administrative Boundaries, the "Western Gap" Area, and the "Eastern Gap" Area.

J.7.2 Potential Stipulation Language

If the United States of America becomes a party to the 1982 United Nations Convention on the Law of the Sea (UNCLOS, or Convention) prior to or during the life of a lease issued by the U.S. Government on a block or portion of a block located beyond its Exclusive Economic Zone as defined in UNCLOS, and subject to such conditions that the Senate may impose through its constitutional role of advice and consent, then the following royalty payment lease provisions will apply to the lease so issued, consistent with Article 82 of UNCLOS:

A. UNCLOS requires annual payments by coastal states party to the Convention with respect to all production at a site after the first five years of production at that site. Any such payments will be made by the U.S. Government and not the lessee.

B. For the purpose of this stipulation regarding payments by the lessee to the U.S. Government, each lease constitutes a separate site, whether or not a lease is committed to a unit.

C. For the purpose of this stipulation, the first production year begins on the first day of commercial production (excluding test production). Once a production year begins, it will run for a period of 365 days, whether or not the lease produces continuously in commercial quantities. Subsequent production years will begin on the anniversary date of first production.

D. If total lease production during the first five years following first production exceeds the total royalty suspension volume(s) provided in the lease terms, or through application and approval of relief from royalties, the provisions of this stipulation will not apply. If, after the first five years of production, but prior to termination of this lease, production exceeds the total royalty suspension volume(s) provided in the lease terms, or through application and approval of relief from royalties, the provisions of this stipulation no longer will apply effective the day after the suspension volumes have been produced.

E. If, in any production year after the first five years of lease production, due to lease royalty suspension provisions or through application and approval of relief from royalties, no lease production royalty is due or payable by the lessee to the U.S. Government, then the lessee will be required to pay, as stipulated in paragraph 1 below, UNCLOS-related royalty in the following amount so that the required Convention payments may be made by the U.S. Government as provided under the Convention:

    1. In the sixth year of production, one percent of the value of the sixth year's lease production saved, removed, or sold from the leased area;

    2. After the sixth year of production, the Convention-related royalty payment rate will increase by one percent for each subsequent year until the twelfth year and will remain at seven percent thereafter until lease termination.

F. If the United States becomes a party to UNCLOS after the fifth year of production from the lease, and a lessee is required, as provided herein, to pay UNCLOS-related royalty, the amount of the royalty due will be based on the above payment schedule as determined from first production. For example, the U.S. Government's accession to UNCLOS in the tenth year of lease production would result in an UNCLOS-related royalty payment of five percent of the value of the tenth year's lease production, saved, removed, or sold from the lease. The following year, a payment of six percent would be due and so forth, as stated above, up to a maximum of seven percent per year.

G. If, in any production year after the first five years of lease production, due to lease royalty suspension provisions or through application and approval of relief from royalties, lease production royalty is paid but is less than the payment provided for by the Convention, then the lessee will be required to pay to the U.S. Government the Convention-related royalty in the amount of the shortfall.

H. In determining the value of production from the lease if a payment of Convention-related royalty is to be made, the provisions of the lease and applicable regulations will apply.

I. The UNCLOS-related royalty payment(s) required under paragraphs E through G of this stipulation, if any, will not be paid monthly but will be due and payable to the Office of Natural Resources Revenue on or before 30 days after expiration of the relevant production lease year.

J. The lessee will receive royalty credit in the amount of the UNCLOS-related royalty payment required under paragraphs E through G of this stipulation, which will apply to royalties due under the lease for which the Convention-related royalty accrued in subsequent periods as non-Convention-related royalty payments become due.

K. Any lease production for which the lessee pays no royalty other than a Convention-related requirement, due to lease royalty suspension provisions or through application and approval of relief from royalties, will count against the lease's applicable royalty suspension or relief volume.

L. The lessee will not be allowed to apply or recoup any unused UNCLOS-related royalty credit(s) associated with a lease that has been relinquished or terminated.

J.7.3 Effectiveness of the Lease Stipulation

The purpose of the stipulation is to provide guidance on royalty payment lease provisions, which will apply to the lease so issued, consistent with Article 82 of UNCLOS, should the United States of America become a party to the 1982 United Nations Convention on the Law of the Sea (UNCLOS, or Convention) prior to or during the life of a lease issued by the U.S. Government on a block or portion of a block located beyond its EEZ as defined in UNCLOS.

J.8 Stipulation No. 7 – Agreement between the United States of America and the United Mexican States Concerning Transboundary Hydrocarbon Reservoirs in the Gulf of America

J.8.1 Stipulation Overview

Stipulation No. 7 could be included in leases issued as a result of future OCS oil and gas lease sales that are wholly or partially located within 3 statute mi (2.6 nautical miles [nm]; 3 mi; 4.8 km) of the Maritime and Continental Shelf Boundary with Mexico, commonly referred to as the "Western Gap" (**Figure J.7-1**). The Western Gap area is composed of any and all blocks in the WPA and CPA that are wholly or partially located within 3 statute mi (2.6 nm; 3 mi; 4.8 km) of the Maritime and Continental Shelf Boundary with Mexico, as the Maritime Boundary is delimited in the Treaty to Resolve Pending Boundary Differences and Maintain the Rio Grande and the Colorado River as the International Boundary, signed November 24, 1970; the Treaty on Maritime Boundaries between the United Mexican States and the United States of America, signed on May 4, 1978; and, as the

continental shelf in the western GOA beyond 200 nm (230 mi; 370 km) is delimited in the Treaty between the Government of the United Mexican States and the Government of the United States of America, signed on June 9, 2000.

J.8.2 Potential Stipulation Language

The Agreement between the United States of America and the United Mexican States Concerning Transboundary Hydrocarbon Reservoirs in the Gulf of Mexico (Agreement), signed on February 20, 2012, entered into force on July 18, 2014. All activities carried out under this lease must comply with the Agreement and any law, regulation, or condition of approval of a unitization agreement, plan, or permit adopted by the United States to implement the Agreement before or after issuance of this lease. The lessee is subject to, and must comply with, all terms of the Agreement, including, but not limited to, the following requirements:

A. When the United States is obligated under the Agreement to provide information that may be considered confidential, commercial, or proprietary to a third-party or the Government of the United Mexican States, if the lessee holds such information, the lessee is required to provide it to the lessor as provided for in the Agreement;

B. When the United States is obligated under the Agreement to prohibit commencement of production on a lease, Bureau of Safety and Environmental Enforcement (BSEE) will direct a Suspension of Production with which the lessee must comply;

C. When the United States is obligated under the Agreement to seek development of a transboundary reservoir under a unitization agreement, the lessee is required to cooperate and explore the feasibility of such a development with a licensee of the United Mexican States;

D. When there is a proven transboundary reservoir, as defined by the Agreement, and the relevant parties, including the lessee, fail to conclude a unitization agreement, the lessee's rights to produce the hydrocarbon resources will be limited by the terms of the Agreement;

E. If the lessee seeks to jointly explore or develop a transboundary reservoir with a licensee of the United Mexican States, the lessee is required to submit to BSEE information and documents that comply with and contain terms consistent with the Agreement, including, but not limited to, a Proposed unitization agreement that designates the unit operator for the transboundary unit and provides for the allocation of production and any redetermination of the allocation of production; and

F. The lessee is required to comply with and abide by determinations issued as a result of the Agreement's dispute resolution process on, among other things, the existence of a transboundary reservoir, and the allocation and/or reallocation of production.

The lessee and its operators, personnel, and subcontractors are required to comply with these and any other additional measures necessary to implement the provisions of the Agreement, including, but not limited to, conditions of approval for their plans and permits for activities related to any transboundary reservoir or geologic structure subject to the Agreement.

A copy of the Agreement is attached to this lease. The lessee accepts the risk that a provision of the Agreement or any United States law, regulation, or condition of approval of a unitization agreement, plan, or permit implementing the Agreement may increase or decrease the lessee's obligations and rights under the lease. The summary of provisions of the Agreement set forth above is provided for the lessee's reference. To the extent this summary differs or conflicts with the express language of the Agreement or implementing regulations, the provisions of the Agreement and regulations are incorporated by reference in their entirety and will control and be enforceable as binding provisions of this lease.

J.8.3 Effectiveness of the Lease Stipulation

The Transboundary Agreement removes uncertainties regarding development of transboundary resources in the resource-rich GOA. As a result of the Agreement, nearly 1.5 million acres of the OCS would be made more accessible for exploration and production activities. BOEM's estimates indicate that this area contains as much as 172 million barrels of oil and 304 billion cubic feet of natural gas. The Agreement also opens up resources in the Western Gap that were off limits to both countries under a previous treaty that imposed a moratorium along the boundary. The Transboundary Agreement sets clear guidelines for the development of oil and natural gas reservoirs that cross the maritime boundary. Under the Agreement, U.S. companies and Petróleos Mexicanos (PEMEX) would be able to voluntarily enter into agreements to jointly develop those reservoirs. In the event that consensus cannot be reached, the Transboundary Agreement establishes the process through which U.S. companies and PEMEX can individually develop the resources on each side of the border while protecting each nation's interests and resources.

J.9 STIPULATION NO. 8 – LIVE BOTTOM

J.9.1 Stipulation Overview

BOEM protects live bottoms in the GOA through two stipulations attached to leases, as well as through post-lease conditions of approvals attached to permits. BOEM defines "live bottom areas" as seagrass communities or those areas that contain biological assemblages consisting of such sessile invertebrates as sea fans, sea whips, hydroids, anemones, ascidians, sponges, bryozoans, or corals living upon and attached to naturally occurring hard or rocky formations with rough, broken, or smooth topography; or areas whose lithotope favors the accumulation of turtles, fishes, and other fauna. Live bottom features may include pinnacle trend features, low-relief features, or potentially

sensitive biological features (PSBFs). Protective measures have been developed over time based on the nature and sensitivity of these various live bottom habitats and their associated communities, as understood from decades of BOEM-funded and other environmental studies. These protections were developed into two stipulations, the Live Bottom (Pinnacle Trend) Stipulation and the Live Bottom (Low-Relief) Stipulation, as discussed below. These stipulations have historically been applied to OCS leases in areas with known concentrations of these live bottom features.

The two Live Bottom Stipulations are intended to protect hard bottom habitat and their associated live bottom communities from damage and, at the same time, provide for recovery of potential oil and gas resources nearby. The PSBFs, which are found throughout the GOA, are not protected by lease stipulations but are protected by mitigations that are attached as conditions of approval to permits at the post-lease review stage. BOEM policy as it relates to these lease stipulations and post-lease mitigations is described in NTL No. 2009-G39, "Biologically-Sensitive Underwater Features and Areas," and can be found at https://www.boem.gov/sites/default/files/regulations/Notices-To-Lessees/2009/09-G39.pdf. Specific OCS blocks affected by the Live Bottom Stipulations are listed at https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Gulf-of-Mexico-Region/topoblocks.pdf. A detailed map showing the locations of the affected blocks can be found at https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Gulf-of-Mexico-Region/topomap.pdf.

The Pinnacle Trend is located offshore Mississippi and Alabama in the northeastern CPA. The pinnacles are a series of topographic irregularities with variable biotal coverage, which provide structural habitat for a variety of pelagic fish. The pinnacles would be classified as live bottom under the Live Bottom Stipulation. The Live Bottom (Pinnacle Trend) Stipulation has been routinely applied to appropriate CPA oil and gas lease sales since 1974 to protect the known Pinnacle Trend features in the CPA. The Live Bottom (Pinnacle Trend) Stipulation, which is applied as programmatic mitigation in the 2024-2029 National OCS Oil and Gas Program Programmatic EIS (BOEM 2023a) and Record of Decision (BOEM 2023b), would apply to all leases issued under the 2024-2029 National OCS Oil and Gas Program in designated lease blocks and, therefore, would be included on leases on 74 OCS lease blocks in the northeastern CPA, including the Main Pass Area, South and East Addition Blocks 190, 194, 198, 219-226, 244-266, 276-290; Viosca Knoll Area Blocks 473-476, 521, 522, 564, 565, 566, 609, 610, 654, 692-698, 734, 778; and Destin Dome Area Blocks 577, 617, 618, and 661 (refer to **Figure J.6-1** and **Figure J.9-1**). Within the Live Bottom (Pinnacle Trend) Stipulation blocks, no bottom-disturbing activities may occur within 30 m (100 ft) of any hard bottom/pinnacles that have a vertical relief of 8 ft (2 m) or more. A bottom survey report showing pinnacle location and proposed bottom-disturbing activity will be required as part of any permit application to ensure that sensitive seafloor features are avoided.

Live bottom (low-relief) features are seagrass communities; areas that contain biological assemblages consisting of sessile invertebrates living upon and attached to naturally occurring hard or rocky formations with rough, broken, or smooth topography; and areas where a hard substrate and vertical relief may favor the accumulation of turtles, fishes, or other fauna. The Live Bottom

(Low Relief) Stipulation OCS blocks are located in water depths of 100 m (328 ft) or less in the EPA and 142 OCS blocks in the northeastern CPA, including Pensacola Blocks 751-754, 793-798, 837-842, 881-886, 925-930, and 969-975; and Destin Dome Blocks 1-7, 45-51, 89-96, 133-140, 177-184, 221-228, 265-273, 309-317, 353-361, 397-405, 441-448, 485-491, 529-534, and 573-576 (refer to **Figure J.9-1**). Within the Live Bottom (Low Relief) Stipulation Blocks, no bottom-disturbing activities may occur within 30 m (100 ft) of any live bottom (low-relief) feature. A bottom survey report showing live bottom location and proposed bottom-disturbing activity will be required as part of any permit application to ensure that sensitive seafloor features are avoided. While the Live Bottom (Low Relief) Stipulation blocks described here are located in areas currently under Presidential withdrawal, they could be subject to this stipulation if the Presidential withdrawal expired, and they were leased in the future.

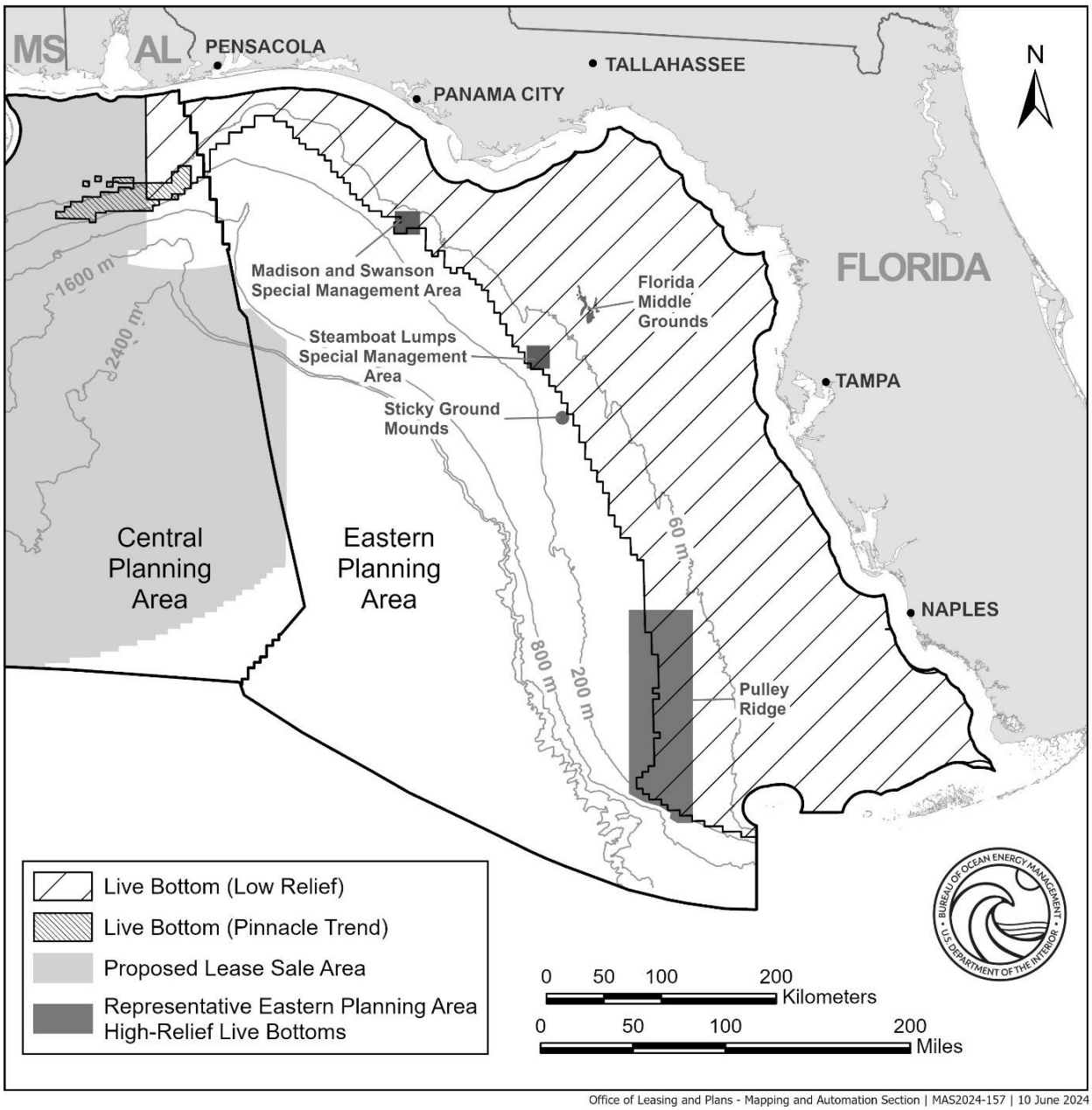

Figure J.9-1. Live Bottom (Low Relief) Stipulation Blocks in the EPA and CPA.

The PSBFs are those features not protected by a biological lease stipulation that are of moderate to high relief (8 ft [2 m] or higher), provide surface area for the growth of sessile invertebrates, and attract large numbers of fish. These features are located outside any No Activity Zone of any of the named topographic features or the 74 live bottom (pinnacle trend) stipulated blocks. Because PSBFs occur throughout the GOA, they are not protected through lease stipulations that apply to specific OCS blocks, but rather are protected by conditions of approval attached to permits following a site-specific review of a permit application. No bottom-disturbing activities may occur within 30 m (100 ft) of any PSBF. A bottom survey report showing PSBF location and

proposed bottom-disturbing activity will be required as part of any permit application to ensure that sensitive seafloor features are avoided.

The potential stipulation language outlined below is only for the Live Bottom (Pinnacle Trend) Stipulation, which is applied as programmatic mitigation in the 2024-2029 National OCS Oil and Gas Program Programmatic EIS (BOEM 2023a) and Record of Decision (BOEM 2023b), and would apply to all leases issued for GOA lease sales under the 2024-2029 National OCS Oil and Gas Program in designated lease blocks. This stipulation is the only Live Bottom Stipulation that has been applied to OCS oil and gas leases recently because the live bottom, low-relief blocks in the EPA and CPA are currently under Presidential withdrawal. Should the Presidential withdrawal end, stipulation language will be included for the live bottom (low relief) OCS blocks. In addition, because there are no lease stipulations for PSBFs, their protection will be handled at the post-lease, site-specific review stage, and conditions of approval will be added to permits to prevent any potential damage to those features.

J.9.2 Potential Stipulation Language

The proposed stipulation reads as follows:

A. For the purpose of this stipulation, “live bottom areas” are defined as seagrass communities or those areas that contain biological assemblages consisting of sessile invertebrates such as sea fans, sea whips, hydroids, anemones, ascidians, sponges, bryozoans, or corals living upon and attached to naturally occurring hard or rocky formations with rough, broken, or smooth topography; or areas whose lithotope favors the accumulation of turtles, fish, and other fauna. Live bottom features may include Pinnacle Trend features, low-relief features, or potentially sensitive biological features.

B. Prior to any drilling activities or the construction or placement of any structure for exploration or development on this lease, including but not limited to, anchoring, well drilling and pipeline and platform placement, the lessee will submit to the Bureau of Ocean Energy Management (BOEM) Gulf of America Regional Director (RD) a live bottom survey report containing a bathymetry map prepared using remote-sensing techniques. The bathymetry map shall be prepared to determine the presence or absence of live bottoms that could be impacted by the proposed activity. This map must encompass the area of the seafloor where surface-disturbing activities, including anchoring, may occur.

C. If it is determined that the live bottoms might be adversely impacted by the proposed activity, the BOEM Gulf of America RD will require the lessee to undertake any measure deemed economically, environmentally, and technically feasible to protect the live bottom areas. These measures may include, but are not limited to, relocation of operations and monitoring to assess the impact of the activity on the live bottom areas.

J.9.3 Effectiveness of the Lease Stipulation

The sessile and pelagic communities associated with the crest and flanks of the live bottom features could be adversely impacted by OCS oil- and gas-related activities if such activities took place on or near these communities without the Live Bottom Stipulation. Impacts from mechanical damage, including anchors, could potentially be long term if the physical integrity of the live bottoms themselves became altered. By identifying the live bottom features present at the activity site, the lessee may be directed to avoid placement of the drilling rig and anchors on the sensitive areas. Through detection and avoidance, this stipulation would minimize the likelihood of mechanical damage from OCS oil- and gas-related activities associated with rig and anchor emplacement to the sessile and pelagic communities associated with the crest and flanks of such features.

For many years, the live bottom stipulations have been made a part of leases on blocks in the CPA and EPA (prior to moratoria and subsequent Presidential withdrawal) to ensure that potential damage to pinnacle trend areas and low-relief features from nearby OCS oil- and gas-related activities are substantially mitigated. The stipulation, which is applied as programmatic mitigation in the 2024-2029 National OCS Oil and Gas Program Programmatic EIS (BOEM 2023a) and Record of Decision (BOEM 2023b), would apply to all leases issued for GOM lease sales under the 2024-2029 National OCS Oil and Gas Program in designated lease blocks and will continue to protect the biota of live bottom areas by substantially mitigating OCS oil- and gas-related activities. This stipulation does not prevent the recovery of oil and gas resources; however, it does serve to protect valuable and sensitive biological resources. Studies at the Pinnacle Trend have shown that the Live Bottom (Pinnacle Trend) Stipulation has successfully prevented mechanical damage to the pinnacle habitats through the survey and distancing requirements, and sediments have not shown elevated barium levels from OCS oil- and gas-related activities within 15 mi (25 km) of the area (Continental Shelf Associates Inc. and Texas A&M University Geochemical and Environmental Research Group 2001).

J.10 STIPULATION NO. 9 – BLOCKS SOUTH OF BALDWIN COUNTY, ALABAMA

J.10.1 Stipulation Overview

This stipulation could be included in leases on blocks south of and within 15 mi (24 km) of Baldwin County, Alabama (**Figure J.6-1**). The stipulation would specify requirements for consultation that lessees must follow when developing plans for fixed structures, with the goal of reducing potential visual impacts.

J.10.2 Potential Stipulation Language

The proposed stipulation reads as follows:

A. To minimize visual impacts from development operations on this block, the lessee will contact lessees and operators of leases in the vicinity prior to submitting a Development Operations Coordination Document (DOCD) to determine if existing or planned surface production structures can be shared. If

feasible, the lessee's DOCD should reflect the results of any resulting sharing agreement, propose the use of subsea technologies, or propose another development scenario that does not involve new surface structures.

B. If the lessee cannot formulate a feasible development scenario that does not call for new surface structure(s), the lessee's DOCD should ensure that they are the minimum distance necessary for the proper development of the block and that they will be constructed and placed using orientation, camouflage, or other design measures in such a manner as to limit their visibility from shore.

C. The Bureau of Ocean Energy Management (BOEM) will review and make decisions on the lessee's DOCD in accordance with applicable Federal regulations and BOEM assessments, and in consultation with the State of Alabama (Geological Survey/Oil and Gas Board).

J.10.3 Effectiveness of the Lease Stipulation

For several years, the then-Governor of Alabama had indicated opposition to new leasing south and within 15 mi (24 km) of Baldwin County but requested that, if the area is offered for lease, a lease stipulation to reduce the potential for visual impacts should be applied to all new leases in this area. Before the decision in 1999 on the Final Notice of Sale for Lease Sale 172, BOEM's Gulf of America OCS Region's Regional Director, in consultation with the Geological Survey of Alabama/State Oil and Gas Board, developed a lease stipulation to be applied to any new leases within the 15-mi (24-km) area to mitigate potential visual impacts. The stipulation specifies requirements for consultation that lessees must follow when developing plans for fixed structures. A lessee's DOCD should reflect the results of any resulting sharing agreement, should propose the use of subsea technologies, or should propose another development scenario that does not involve new surface structures. If the lessee cannot formulate a feasible development scenario that does not call for new surface structure(s), the lessee's DOCD should ensure that the structures are the minimum necessary for the proper development of the block and that they will be constructed and placed, using orientation, camouflage, or other design measures, in such a manner as to limit their visibility from shore. The stipulation has been continually adopted in annual CPA lease sales and regionwide lease sales since 1999 and substantially mitigates visual impacts.

J.11 Stipulation No. 10 – Restrictions due to Rights-of-Use and Easements for Floating Production Facilities

J.11.1 Stipulation Overview

This proposed stipulation is intended to be lease sale-specific language and would incorporate maps for each potentially affected block containing rights-of-use and easements (refer to **Figure J.11-1** for an example map). This stipulation is designed to minimize or avoid potential space-use conflicts with moored and/or floating production facilities that have already been granted rights-of-use and easements in particular OCS blocks.

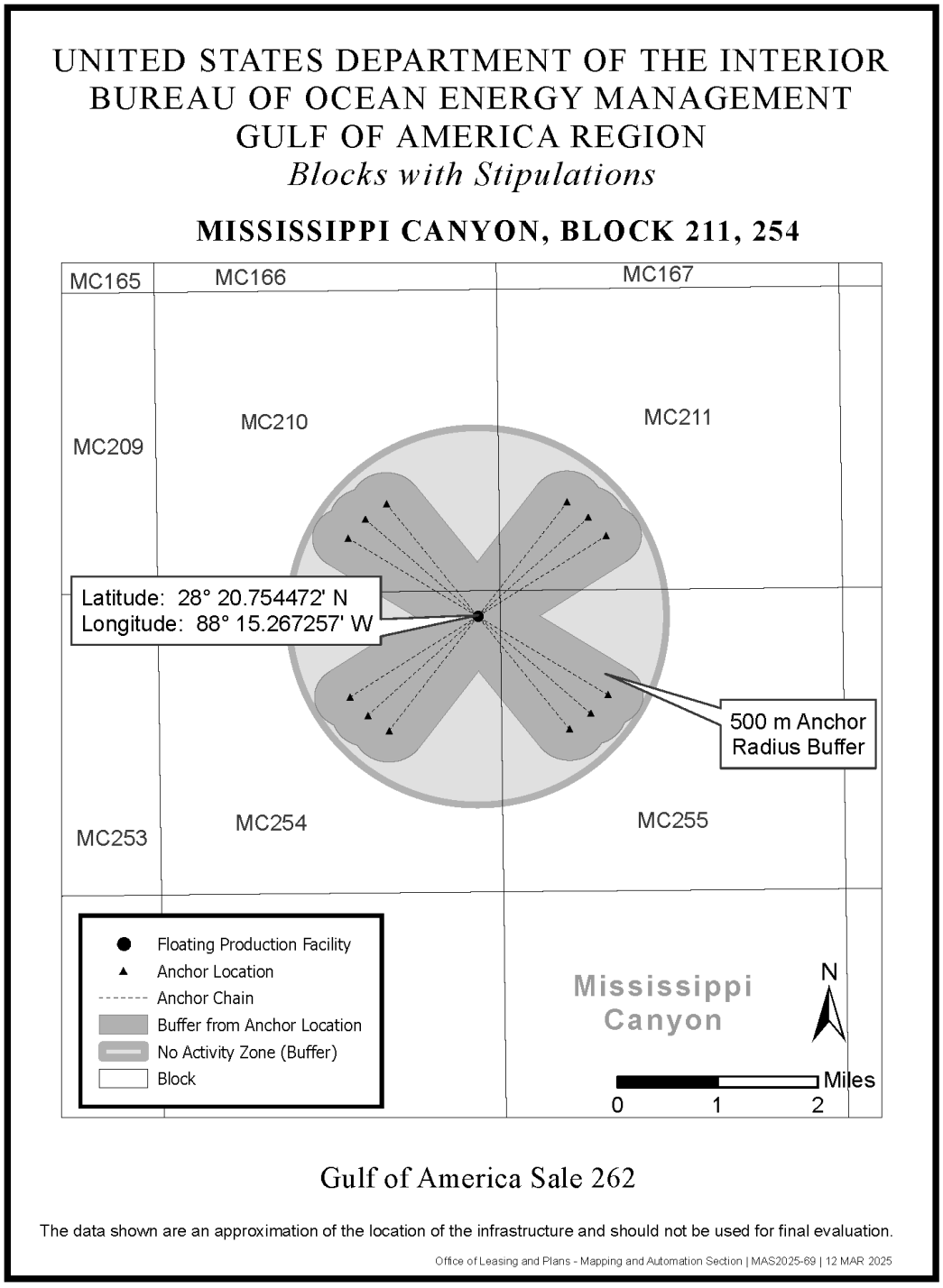

Figure J.11-1. Example Map of a Block Subject to this Stipulation under Gulf of America Lease Sale.

J.11.2 Proposed Stipulation Language

The proposed stipulation reads as follows:

> The lessee may not conduct activities, including, but not limited to, the construction and use of structures, operation of drilling rigs, laying of pipelines, and/or anchoring on the seafloor or in the water column within the areas depicted by the attached map(s). Nevertheless, sub-seabed activities that are part of exploration, development, and production activities from outside the areas depicted on the attached maps may be allowed within the areas depicted by the attached map(s), including the use of directional drilling or other techniques.

J.11.3 Effectiveness of the Lease Stipulation

This stipulation is designed to minimize or avoid potential space-use conflicts with moored and/or floating production facilities that have already been granted rights-of use and easements in particular OCS blocks. BOEM has effectively used this stipulation for over a decade to make bidders aware of other activities with rights-of-use and easements on the blocks offered for OCS oil and gas leasing, and BOEM may require buffers or additional requirements prior to issuing leases on those specific blocks.

J.12 REFERENCES

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APPENDIX K

GULF OF AMERICA OCS OIL AND GAS LEASING GREENHOUSE GAS EMISSIONS

K GULF OF AMERICA OCS OIL AND GAS LEASING GREENHOUSE GAS EMISSIONS

K.1 OVERVIEW

This appendix provides additional discussion on the methodology, results, and uncertainty in BOEM's greenhouse gas (GHG) emissions analysis presented in **Chapter 4**. BOEM estimates GHG emissions for oil and gas leasing on the Gulf of America OCS. This analysis encompasses GHG emissions resulting from the full life cycle of potential oil and gas exploration, development, production, processing, transmission, and consumption. It also estimates offsetting reductions in GHG emissions under the proposed action due to displacement of energy substitutes from the potential oil and gas production.

BOEM's analysis of GHG life cycle emissions resulting from the proposed action indicates that emissions from OCS oil and natural gas are similar to those resulting from displaced energy substitutes when considering domestically produced or consumed fuels. This finding stems from the fact that OCS production would displace other energy sources and their associated emissions. BOEM also considers the changes in foreign oil production and consumption and associated changes in global emissions in response to the proposed action (i.e., a single proposed OCS oil and gas lease sale in the GOA). BOEM's analysis finds that global emissions would likely increase under each scenario's activity level for the proposed action (i.e., low, mid-, or high activity level).

Section K.2.3, provides full life cycle GHG emissions from domestically produced or consumed energy under the proposed action separated into the upstream emissions (**Table K.2-5**) and the mid- and downstream GHG emissions (**Table K.2-7**). The full life cycle GHG emissions are presented in **Table K.2-8**. BOEM's analysis of emissions from oil and gas produced and consumed outside the U.S. is segmented into a quantitative set of GHG emissions estimates (**Section K.2.5**) and a qualitative discussion of foreign GHG emissions (**Section K.4**). The foreign GHG emissions estimates are discussed quantitatively (**Section K.2.5**) and qualitatively (**Section K.4**).

BOEM recognizes the global scope of the impacts of GHG emissions, their effects to climate-related factors, and the potential contributions of the effects of agency actions to global GHG concentrations. As such, this appendix provides a detailed methodology of BOEM's life cycle GHG analysis and provides distinct domestic and foreign estimates of emissions related to shifts in domestic versus foreign energy markets as a result of the proposed action.

K.2 LIFE CYCLE GREENHOUSE GAS EMISSIONS

"Life cycle" refers to emissions from all activities related to the exploration, development, production, processing, transmission, and consumption of a resource. For hydrocarbon resources, the activities are often grouped into three stages: upstream, midstream, and downstream (**Figure K.2-1**). Upstream activities include exploration, development, and production, which are described in the exploration and development scenarios (refer to **Chapter 3**). Midstream activities are associated with refining, processing, storage, and distribution of fuels produced from leases

issued via oil and gas lease sales in the GOA. Finally, downstream activities are associated with the consumption of those fuels.

Figure K.2-1. Life Cycle Stages of Greenhouse Gas Emissions.

The activities associated with each stage would result in GHG emissions, including CO_2, CH_4, and N_2O. These three GHGs are the primary GHGs globally, and the only ones deliberately released as part of the life cycle. Emissions of these GHGs contribute to climate-related factors globally. The analysis below quantifies projected GHG emissions that could occur from new leasing under the proposed action and the subsequent consumption of produced fuels. These projected GHG emissions serve as a proxy for assessing the potential environmental impacts related to changes in atmospheric and oceanic GHG concentrations.

K.2.1 Analysis Framing

To consider the full impact of OCS leasing, BOEM estimates emissions associated with additional OCS oil and natural gas production and emissions reductions associated with potential energy market substitutes displaced by OCS production from new leases. In accordance with the economic theory of the law of supply and demand, additional OCS production would increase supply and lower prices, this production results in an increase in the quantity demanded for oil and natural gas. In turn, and in cooperation with the economic theory of substitution effects, as consumers switch to consuming more OCS oil and natural gas, they reduce their consumption (demand) of substitute energy sources, like coal, biofuel, renewables, and onshore or imported oil and natural gas. Further, due to the reduced demand for energy substitutes, prices for those energy sources would also decline, causing suppliers to reduce their production of these substitute energy sources. BOEM's life cycle analysis considers these substitute sources and the emissions that they would generate if not for OCS production. This displacement of substitute sources does not occur on a 1:1 basis (a concept known as "perfect substitution"). The decline in oil and gas prices leads to an increase in overall energy consumption of roughly 10 percent of the new OCS production modeled by BOEM using the exploration and development scenarios. The remaining 90 percent of the new OCS production represents displacement of substitute energy sources. BOEM's modeling suggests that the displaced energy sources are primarily oil imports and domestic onshore oil and natural gas.

BOEM further discusses the concepts of displacement and substitute energy sources in **Section K.2.2.1** and **Section K.5.1.2**.

Given the global nature of energy, in particular oil, and the GHG emissions resulting from energy production through consumption, the quantitative GHG emissions analysis can be categorized into two components: (1) estimated GHG emissions resulting from domestically produced or consumed fuels; and (2) estimated GHG emissions when considering the shift in foreign oil production and consumption. BOEM can model domestic energy markets with sufficient reliability to estimate the energy substitutes produced or consumed domestically. However, global energy markets cannot be modeled to the same level of detail as the domestic energy sources.

BOEM's GHG analysis considers a No Action Alternative in which there is no new OCS leasing. Because there is no new leasing in the No Action Alternative, there are no associated GHG emissions assigned to the No Action Alternative as they are considered the baseline level of emissions. OCS oil and gas production and associated GHG emissions from existing leases would still occur in the absence of the proposed action, but because these activities and emissions would occur regardless of future leasing decisions, they are not quantified. They are treated as part of the modeling baseline along with all other sources of energy not directly stemming from a new OCS lease sale. To the extent existing leases' production or other energy sources are displaced by the proposed action's production, BOEM accounts for the emissions reductions within its estimate of the total proposed action emissions. Total proposed action emissions are those associated with OCS exploration, development, and production from a lease sale under the proposed action after accounting for those emissions displaced from substitute energy sources which are not produced or consumed under the proposed action.

BOEM frames energy substitutes in this Programmatic EIS as displacements occurring under the proposed action rather than as substitutions under the No Action Alternative as described in BOEM's GHG analyses for previous lease sales. This change was made in response to comments received from stakeholders. Specifically, USEPA provided comments recommending that BOEM present a No Action Alternative with no emissions resulting from the proposed action (Tomiak 2023). As such, this analysis shows GHG emissions associated with the substitute energy sources that are displaced by new OCS oil and gas production as negative values reducing total GHG emissions under the proposed action rather than as positive values increasing GHG emissions under the No Action Alternative. Thus, the total proposed action emissions are the GHG emissions from new OCS production plus the reduction in GHG emissions from displaced energy substitutes. The framing of the analysis here has no impact on the estimated GHG emissions associated with the proposed action. BOEM's previous analysis included an estimate of incremental emissions (i.e., Proposed Action emissions less No Action Alternative emissions), whereas this analysis includes an estimate of total proposed action emissions (i.e., proposed action emissions plus displaced energy emissions). BOEM's analysis using the current methodology remains fundamentally the same as the previous methodology, only the framing and presentation of the proposed action GHG emissions has changed (**Figure K.2-2**).

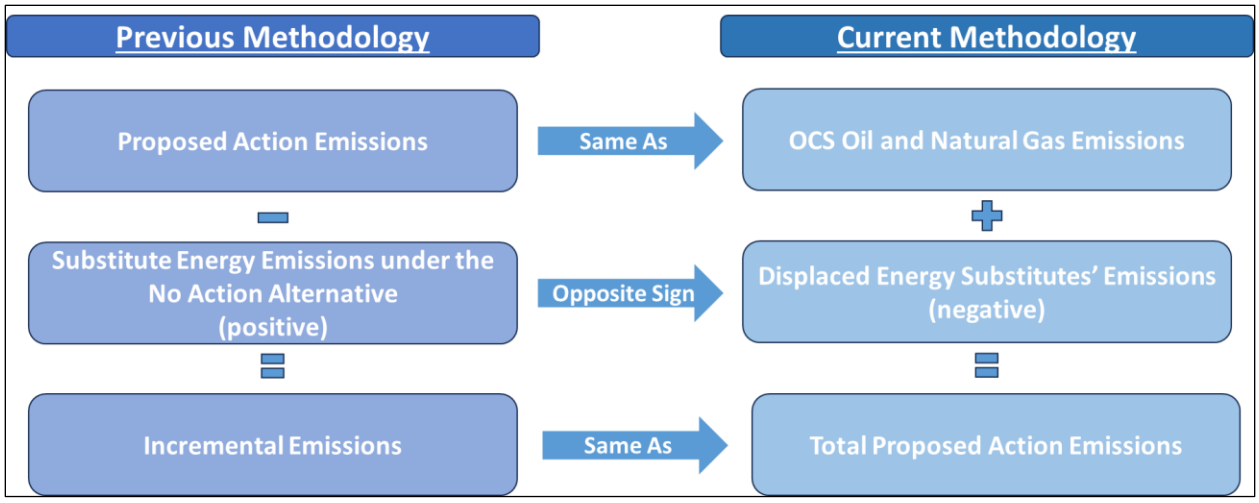

Figure K.2-2. Change to BOEM's Framing of the Proposed Action's Domestically Produced or Consumed GHG Emissions.

Table K.2-1 presents BOEM's overall GHG modeling approach. BOEM quantitatively considers the life cycle GHG emissions associated with domestically produced or consumed energy (**Section K.2.3**). BOEM provides quantitative estimates of GHG emissions from changes in foreign oil production and consumption (**Section K.2.5**). BOEM qualitatively considers other changes in foreign markets, including changes in foreign oil midstream emissions and energy market substitutions, but cannot quantify these at this time (**Section K.4**).

Table K.2-1. BOEM's Proposed Action GHG Emissions Analysis: Modeling Capability in Quantifying GHG Emissions by Life Cycle Components.

Emissions Source	Upstream	Midstream	Downstream
Domestically Produced or Consumed Energy – New OCS oil and natural gas production	Quantified (**Table K.2-5**)	Quantified (**Table K.2-7**)	Quantified (**Table K.2-7**)
Domestically Produced or Consumed Energy – Displaced substitute energy sources	Quantified (**Table K.2-5**)	Quantified (**Table K.2-7**)	Quantified (**Table K.2-7**)
Non-U.S. Consumed Energy – Foreign oil market change	Quantified* (**Table K.2-11**)	Under consideration but unavailable at this time	Quantified* (**Table K.2-13**)
Non-U.S. Consumed Energy – Displaced substitutes for oil in foreign markets (natural gas, coal, biofuels, renewables, reduced demand)	Qualitatively discussed in **Section K.4**	Qualitatively discussed in **Section K.4**	Qualitatively discussed in **Section K.4**

* Foreign oil production and consumption are not modeled as dynamically as domestic oil production and consumption. The Market Simulation Model's estimate of the foreign oil market does not include cross-price effects (refer to Section K.4).

The resulting analysis indicates that, when considering only emissions associated with domestically produced or consumed energy, selection of the proposed action results in total GHG

emissions that are very close to baseline level emissions under the No Action Alternative. However, when the analysis is expanded to also consider emissions from foreign energy markets, BOEM finds the proposed action results in higher global GHG emissions than under the No Action Alternative baseline. BOEM recognizes that many variables are uncertain within its life cycle GHG analysis and considers some of these uncertainties in **Section K.5**. In addition, BOEM places the estimated volumes of the GHG emissions attributable to the proposed action into context with a discussion of potential impacts to the human and natural environment resulting from changes in atmospheric and oceanic GHG concentrations.

K.2.2 Life Cycle GHG Estimation Methodology

BOEM's life cycle GHG estimation methodology was first described in 2016 (Wolvovsky and Anderson 2016). The methodology has been updated in the Gulf of Mexico GHG Analysis Updates for Lease Sale 261 (BOEM 2023a), as well as the Economic Analysis Methodology for the 2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program (BOEM 2023b). The scope of BOEM's quantitative GHG analysis includes entire life cycle (upstream, midstream, and downstream) GHG emissions from domestically produced or consumed energy, as well as the upstream and downstream GHG emissions from a shift in foreign oil production and consumption under the proposed action. BOEM's life cycle GHG analysis relies on three models to estimate results: Market Simulation Model (MarketSim) (Industrial Economics Inc. 2023a); Offshore Environmental Cost Model (OECM) (Industrial Economics Inc. 2018; 2023b); and Greenhouse Gas Life Cycle Energy Emissions Model (GLEEM) (Wolvovsky 2023). For a full description of these models, please refer to their documentation and associated reports.

BOEM acknowledges that these models were developed for analysis at a national level and that there may be limitations on the scalability of the models to this regional analysis. However, the models incorporate a regional framework and specify assumptions for the unique Gulf of America OCS planning area (e.g., Western and Central Planning Areas) when applicable. The models represent the best science and methodology available for estimating energy market impacts, rates of displacement of the substitute energy sources, and emissions rates, which are relevant factors in the larger analysis and comparison of GHG emissions that could occur under the proposed action.

When estimating emissions, BOEM's models quantify the three main GHGs: CO_2, CH_4, and N_2O. To provide a single metric for estimating and comparing an alternative's emissions profiles, BOEM provides combined totals of all three GHG emissions in CO_2e. This approach allows for a direct, aggregate comparison among emissions of CO_2, CH_4, and N_2O, which have varying potentials to trap heat and different atmospheric lifespans, known as Global Warming Potential (GWP). For example, 1 metric ton of CH_4 has an impact similar to 25 metric tons of CO_2. This analysis uses the 100-year GWP conversion factors developed by the USEPA (USEPA 2023) (**Table K.2-2**).

Table K.2-2. Global Warming Potential (in metric tons).

Greenhouse Gas	CO_2	CH_4	N_2O
Global Warming Potential (CO_2e)	1	25	298

Source: USEPA (2021).

BOEM evaluates life cycle GHG emissions assuming annual exploration, development, and production occur as described and estimated in **Chapter 3** under three different activity level scenarios (i.e., low, mid-, and high). To estimate the volume of substitute energy sources displaced by new OCS oil and natural gas under a given proposed action's potential exploration and development production scenarios, BOEM uses MarketSim. The displacement estimates are then used as inputs in the OECM and GLEEM (**Figure K.2-3**).

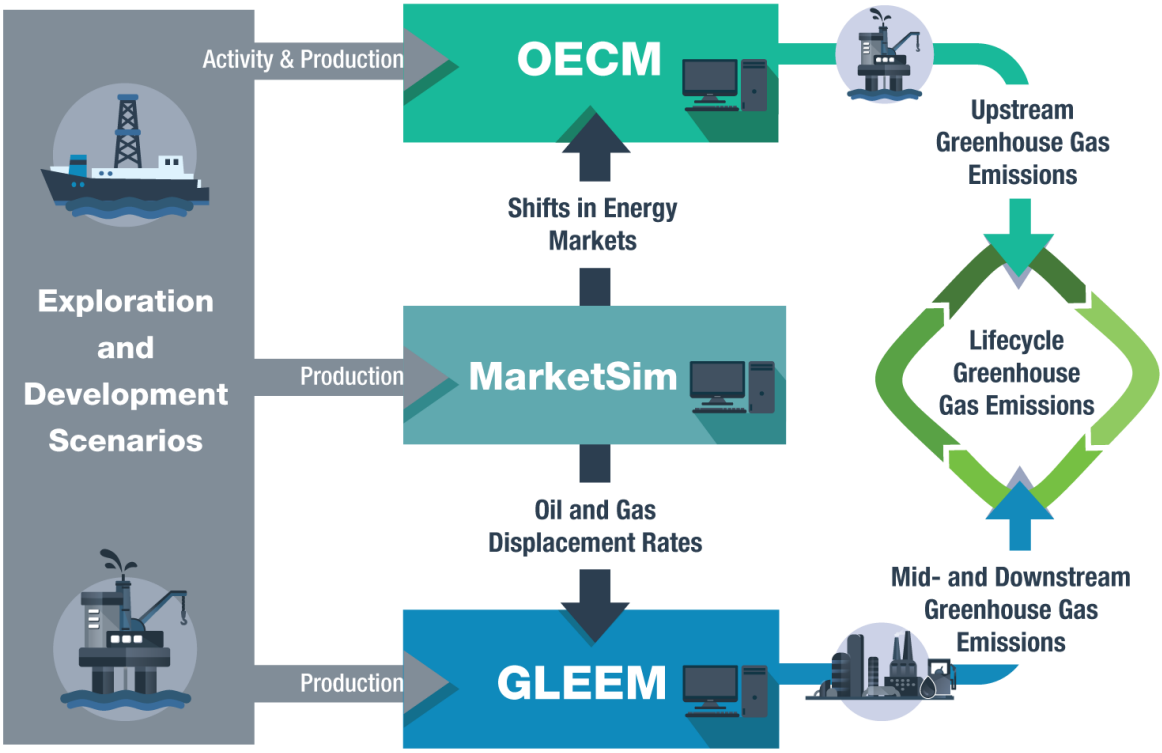

Figure K.2-3. Illustration of BOEM's Models and GHG Estimation Methodology.

K.2.2.1 MarketSim Model

MarketSim is a Microsoft™ Excel™-based model for the oil, gas, coal, and electricity markets. BOEM uses MarketSim to estimate the energy commodity price changes expected to occur with new OCS oil and gas production and then calculate the displacement of energy market substitutes (refer to **Table K.2-4**) that would occur given those price changes (e.g., the volumes of substitute oil and natural gas imports, domestic onshore oil and gas, and renewable energy displaced by new OCS oil and gas production).

MarketSim's baseline is adapted from a special run of the Energy Information Administration's National Energy Modeling System (NEMS). BOEM requested specialized runs from the Energy Information Administration that modified the 2023 AEO Reference Case to remove new OCS oil and gas lease sales and associated production starting in 2023 (Energy Information Administration 2023; Sommer 2023). Removing the expected production from new OCS leasing from Energy Information Administration's projections allows BOEM to use MarketSim to investigate the impact of alternative new OCS leasing scenarios and associated production within the EIA's broad energy market projections.

MarketSim makes no assumptions about future technology or policy changes other than those reflected in the Energy Information Administration's NEMS forecast (Industrial Economics Inc. 2023a). The Energy Information Administration's 2023 AEO Reference Case reflects laws and policies current as-of 2022. As such, the baseline used in MarketSim includes impacts from Inflation Reduction Act (IRA) provisions modeled by the Energy Information Administration. Due to the complexities of the IRA, not all provisions were modeled in the AEO given uncertainty over the structure of implementation details. Details on the IRA provisions excluded from the 2023 AEO Reference Case are included in the 2023 AEO Narrative Appendix (Energy Information Administration 2023).

While U.S. policy affecting energy markets has changed since the 2023 AEO was developed, nonetheless, it is representative of the best available modeling baseline compatible with MarketSim. BOEM acknowledges many substantial changes to national and worldwide economies beyond those projected within the 2023 AEO and MarketSim's baseline. Accordingly, BOEM has conducted a sensitivity analysis to illustrate the impacts these changes could have on the estimates of displacement rates of energy substitutes and their emissions. **Section K.5.2** includes more information on the sensitivity analysis, but for further details on methodology, modeling assumptions and results refer to Chapter 4 of the Final EAM paper, and the appendix to the MarketSim documentation (BOEM 2023b; Industrial Economics Inc. 2023a). This section also outlines the process, timelines and challenges associated with obtaining the specialized runs from the Energy Information Agency.

For each of the scenarios analyzed, BOEM adds the estimate of future production from a proposed lease sale into MarketSim as an addition to the energy market baseline. MarketSim uses price elasticities and adjustment rates to calculate a new energy market equilibrium and the volumes of substitute energy sources displaced by the potential OCS production under the proposed action. Elasticity is a mathematical value that expresses the percent change expected in one economic variable given a 1 percent change in another economic variable (e.g., supply, demand, or price). Adjustment rates are the limits MarketSim sets on how much of the long-term change estimated by the elasticity values can occur in 1 year. Collectively, elasticities and adjustment rates determine the change in supply and demand of alternative energy sources given a change in the anticipated production from the proposed action scenarios. MarketSim evaluates a series of simulated price changes until each fuel market reaches equilibrium where supply equals demand. The differences between the baseline and simulated supply and demand provide BOEM the necessary data to use in

the OECM and GLEEM to estimate GHG emissions from the OCS oil and gas as well as those from the displaced energy substitutes. Additional details about how MarketSim incorporates energy market equilibrium and displacements of energy market substitutes are described in the MarketSim documentation (Industrial Economics Inc. 2023a).

Table K.2-3 shows the potential oil and natural gas production volumes of the proposed action at three different activity levels. **Table K.2-4** shows the amount of displaced energy sources as a percentage of the potential OCS production. For example, 55 percent of the estimated 933.0 million barrels of oil equivalent (MMBOE) production in the proposed action high activity scenario represents a reduction of 501.4 MMBOE in net imports that would be displaced by OCS production. The model estimates that 9 to 11 percent of the OCS production does not displace any energy source and represents additional demand under the proposed action.

Table K.2-3. Proposed Action Potential Production by Activity Level (in MMBOE).

Potential OCS Production (MMBOE)	Low Activity Level	Mid-Activity Level	High Activity
Oil	55.3	326.1	755.8
Natural Gas	13.8	66.6	177.3
Total	69.0	392.7	933.0

Note: Natural gas volumes are typically given in thousand cubic feet (Mcf). For ease of comparing oil to natural gas volumes, BOEM converted from Mcf to MMBOE using the equivalency assumption of 5.620 Mcf/BOE.

Table K.2-4. Displaced Energy Sources as a Percentage of Proposed Action Oil and Natural Gas Production.

Substitute Energy Source	Low Activity Level	Mid-Activity Level	High Activity Level
Onshore Production	26	24	24
Onshore Oil	13	13	13
Onshore Gas	13	10	11
Production from Existing State/Federal Offshore Leases	1	1	*
Imports	54	56	55
Oil Imports	53	55	54
Gas Imports	1	1	1
Coal	*	*	*
Electricity from Sources Other Than Coal, Oil, and Natural Gas**	1	1	1
Other Energy Sources***	8	8	8
Increased Energy Demand (energy not displaced)	9	10	11

Notes: The estimates in this table represent the volume of a specific substitute energy source (as the percent of potential OCS production) that is displaced by potential OCS production (or in the case of the last row, energy not displaced which is an increase in demand) with the selection of the proposed action. For example, the volume of onshore natural gas displaced by new OCS production is estimated at 11% of potential proposed action production at the high activity level. Numbers may not sum due to rounding.

* Value is less than 0.5% and thus rounds to 0%.

** Includes electricity from wind, solar, nuclear, and hydroelectric sources. BOEM does not assign life cycle GHG emissions to these energy sources. For the upstream, BOEM does not currently have the data needed to determine how much renewable energy generation is reduced by either curtailing utilization of existing capacity or

building of new capacity in the GOA. For the midstream, only nuclear would have modeled emissions, which would be de minimis. None of these sources would have any downstream emissions.

*** Includes primarily natural gas liquids (roughly 80%), with the balance from biofuels, refinery processing gain, product stock withdrawal, liquids from coal, and "other" natural gas not captured elsewhere. BOEM does not assign upstream, midstream, or downstream GHG emissions with biofuels, which is a very small portion of "Other Energy Sources" that would be de minimis.

K.2.2.2 OECM and Upstream GHG Emissions Estimates

BOEM uses the OECM to estimate upstream emissions from OCS production and displaced energy sources (Industrial Economics Inc. 2018; 2023b). The OECM uses the level of exploration, development, and production activities associated with the potential production to estimate the OCS upstream GHG emissions. The OECM upstream activity emissions estimates include (1) propulsion and auxiliary engines operated onboard vessels, (2) drilling operations, (3) platform operations including flaring, (4) helicopters and light aircraft, (5) use of above-ground pipelines, (6) construction (onshore and offshore), and (7) accidental oil spills and gas releases. BOEM's upstream emissions factors for OCS oil and natural gas activities and substitutes can be found in Table 5 of the OECM documentation (Industrial Economics Inc. 2023b).

K.2.2.3 GLEEM: Midstream and Downstream GHG Emissions Estimates

GLEEM uses potential production and MarketSim's estimates of energy substitutes' displacement to generate the midstream and downstream GHG emissions estimates. The model calculates the emissions associated with onshore processing (refining and storage), delivery of energy (i.e., oil, natural gas, or other displaced energy substitutes) to the final consumer, and consumption of the oil and gas products. GLEEM relies on the MarketSim estimates of substitute energy displacement to estimate midstream and downstream emissions from displaced energy substitutes under the proposed action scenarios. More details on GLEEM are available in the model documentation (Wolvovsky 2023).

K.2.3 Life Cycle Greenhouse Gas Emission Estimates: Domestically Produced or Consumed Energy

Table K.2-5 shows the GHG emissions estimates for OCS production and displaced energy substitutes. The first row shows the estimate of GHG emissions from upstream activities under the proposed action. These are the emissions specifically associated with the exploration, development, and production of the resources on the OCS resulting from a single proposed OCS oil and gas lease sale. To capture the total GHG emissions associated with the proposed action BOEM uses MarketSim to estimate the resulting changes in energy markets associated with this new OCS production. BOEM models the displacement of other energy sources in response to the potential production from the proposed action. The emissions associated with these displaced energy sources are included in the second row. These emissions are negative as they are emissions reductions from displaced energy substitutes under the proposed action that would have occurred under the No Action Alternative baseline. The sum of these two estimates is the total proposed action emissions, which is shown in the last row.

Table K.2-5. Upstream GHG Emissions from Domestically Produced or Consumed Energy (in thousands of metric tons).

Activity Level	Low	Low	Low	Low	Mid	Mid	Mid	Mid	High	High	High	High
Greenhouse Gas	CO_2e	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O
OCS Oil & Gas Emissions*	124	121	**	**	1,651	1,438	8	**	4,927	4,396	19	**
Displaced Energy Emissions*	-2,880	-1,917	-38	**	-16,580	-11,072	-219	**	-38,603	-25,776	-509	**
Total Proposed Action Emissions***	-2,756	-1,796	-38	**	-14,928	-9,634	-211	**	-33,676	-21,380	-490	**

Note: Values rounded to nearest 1,000 metric tons.

* Upstream OCS Oil & Gas Emissions are those associated directly with potential production from the Proposed Action and include GHG emissions from the transport of the portion of that potential production estimated to be part of U.S. gross oil exports. Upstream Displaced Energy Emissions include the GHG emissions from the change in the production and transport to U.S. shores of U.S. gross oil imports. When added together, this ensures that upstream total proposed action emissions account for the change in U.S. net oil imports.

** Values are between -0.5 and 0.5.

*** The total proposed action emissions are the emissions associated with the potential OCS oil and gas of the Proposed Action plus those of the displaced energy sources. These are the total GHG emissions attributable to the proposed action, i.e., row 1 plus row 2.

As described earlier, BOEM has reframed its analysis regarding how energy substitutes are presented. **Table K.2-6** shows BOEM's previous format, where emissions from energy substitutes are presented as occurring under the No Action Alternative. The No Action Alternative in the current approach is considered to have no emissions and is not shown in **Table K.2-5**. As described, the resulting GHG emissions attributable to the proposed action remain the same, whether they are presented as total proposed action emissions or as the difference between the proposed action and the No Action Alternative emissions.

Table K.2-6. Previous Format: Upstream GHG Emissions from Domestically Produced or Consumed Energy (in thousands of metric tons).

Activity Level	Low	Low	Low	Low	Mid	Mid	Mid	Mid	High	High	High	High
Greenhouse Gas	CO_2e	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O
Proposed Action	124	121	*	*	1,651	1,438	8	*	4,927	4,396	19	*
No Action Alternative	2,880	1,917	38	*	16,580	11,072	219	*	38,603	25,776	509	*
Difference	-2,756	-1,796	-38	*	-14,928	-9,634	-211	*	-33,676	-21,380	-490	*

Note: Values rounded to nearest 1,000 metric tons.

* Values are between -0.5 and 0.5.

For the upstream portion of life cycle emissions, BOEM estimates about 4.9 million metric tons of CO_2e would be emitted from OCS oil and natural gas activity and production at the high activity level. However, because of that production, other energy sources would not be produced (i.e., they would be "displaced"). Those sources would have generated 38.6 million metric tons of CO_2e upstream emissions. The OCS oil and gas emissions are only 13 percent of those that are

displaced, resulting in a reduction in upstream emissions from domestically produced or consumed energy under the proposed action.

Collectively, the displaced substitute energy sources have higher GHG emissions per unit of production (also known as "GHG intensity") compared to OCS oil and natural gas. In general, the highest GHG intensive projects are those that flare or vent substantial amounts of natural gas and those that are late in their life cycle. The GHG intensity is generally lowest when a facility is at peak production and, barring technology improvements, increases as facilities age and the production volumes decrease. As a facility ages and a reservoir becomes increasingly depleted, more effort is required for every barrel as the concentration of the oil in the extracted mix decreases. It takes more energy and resources to extract and separate out that oil from the extracted mix. Deepwater GOA upstream oil and gas production is generally characterized as having some of the lowest GHG intensity of global oil production (ICF International 2023; Kennett et al. 2023; Oberstoetter 2021). The deepwater GOA's low GHG intensity is due to several factors. The deepwater GOA has efficiencies stemming from generally larger projects and the U.S. regulatory environment. Larger projects lead to greater well productivity leading to lower energy use and lower methane emissions per BOE. The GOA regulatory environment also includes restrictions on venting and flaring of OCS natural gas to further lower the carbon intensity of OCS production (ICF International 2023). Further, deepwater projects are earlier in their life cycle, have higher production volumes, and the facilities are designed with technological advancements to reduce GHG emissions (Kennett et al. 2023). Thus, while extraction of crude oil from the GOA OCS would certainly lead to GHG emissions, the production of GOA OCS crude is associated with fewer upstream GHG emissions than the modeled displaced oil substitutes used to meet consumer demands in the absence of the proposed action.

Table K.2-7 shows the midstream and downstream emissions associated with the proposed action. Mid- and downstream emissions from OCS oil and gas are larger than those of the displaced substitutes, resulting in an increase in emissions over the baseline. This increase is due to the slightly higher energy consumption and fuel switching towards OCS oil and natural gas under the proposed action. BOEM calculates that, under the proposed action, the additional OCS production would result in slightly lower oil prices than under the No Action Alternative baseline. The average price reductions under the proposed action relative to baseline over the 34 years of oil and natural gas production at the high activity level are $0.11 per barrel for oil, $2.00 per million cubic feet for natural gas, $0.80 per thousand tons for coal, and $0.02 per megawatt hour for electricity. With the lower energy prices, MarketSim estimates that all domestic energy demand over the 34-year production would be 105.5 MMBOE higher for the high activity level (roughly 11.3 percent of the OCS production). For oil and natural gas specifically, MarketSim estimates U.S. consumption to be higher by 56.9 million barrels of oil and 89.4 billion cubic feet of natural gas under the proposed action at the high activity level. Although oil and natural gas demand are expected to be higher in the proposed action, BOEM anticipates that there would be a reduction in onshore production (mainly natural gas) and imports (mainly oil), in addition to lower coal production and consumption.

At the high activity level, BOEM estimates that OCS oil and gas would emit 300.2 million metric tons of CO_2e from midstream and downstream activities associated with the proposed action.

The potential OCS production displaces substitute energy sources and accounts for 261.7 million metric tons of CO_2e emissions. This results in total proposed action midstream and downstream emissions of 38.5 million metric tons of CO_2e.

Table K.2-7. Midstream and Downstream GHG Emissions from Domestically Produced or Consumed Energy (in thousands of metric tons).

Activity Level	Low	Low	Low	Low	Mid	Mid	Mid	Mid	High	High	High	High
Greenhouse Gas	**CO_2e**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**CO_2**	**CH_4**	**N_2O**
OCS Oil & Gas Emissions	22,192	21,957	7	*	126,439	125,226	37	1	300,173	297,091	97	2
Displaced Energy Emissions	-19,853	-19,666	-6	*	-111,916	-110,979	-27	-1	-261,673	-259,402	-67	-2
Total Proposed Action Emissions**	2,339	2,291	2	*	14,522	14,246	10	*	38,500	37,689	30	*

Note: Values rounded to nearest 1,000 metric tons.

* Values are between -0.5 and 0.5.

** The total proposed action emissions are the emissions associated with the potential OCS oil and gas of the proposed action plus the reductions associated with displaced energy substitutes. These are the total GHG emissions attributable to the proposed action, i.e., row 1 plus row 2.

Table K.2-8 shows the life cycle GHG emissions estimates from domestically produced or consumed energy. At all activity levels, the GHG emissions from OCS oil and gas are close to the volume of displaced GHG emissions from substitute energy sources. The modeling indicates that under the proposed action there are slightly fewer emissions at the low and mid-activity levels (decreases of 1.8 percent and 0.3 percent, respectively) but slightly higher emissions in the high activity level (increase of 1.6 percent).

Table K.2-8. Full Life Cycle GHG Emissions from Domestically Produced or Consumed Energy (in thousands of metric tons).

Activity Level	Low	Low	Low	Low	Mid	Mid	Mid	Mid	High	High	High	High
Greenhouse Gas	**CO_2e**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**CO_2**	**CH_4**	**N_2O**
OCS Oil & Gas Emissions	22,315	22,078	7	*	128,090	126,664	45	1	305,100	301,487	116	2
Displaced Energy Emissions	-22,732	-21,583	-44	*	-128,496	-122,052	-246	-1	-300,276	-285,178	-576	-2
Total Proposed Action Emissions**	-417	495	-36	*	-406	4,612	-201	*	4,824	16,309	-460	*

Note: Values rounded to nearest 1,000 metric tons.

* Values are between -0.5 and 0.5.

** The total proposed action total emissions are the emissions associated with the potential OCS oil and gas of the proposed action plus the reductions associated with displaced energy substitutes. These emissions are the total GHG emissions attributable to the proposed action, i.e., row 1 plus row 2.

Table K.2-9 provides context for the domestic life cycle GHG emissions analysis by comparing high activity emissions presented in **Table K.2-8**, to annual state emissions. As shown in the table, the 36-years of OCS oil and gas activity life cycle are estimated to generate a similar volume of GHG emissions as the total emissions generated in Louisiana and Mississippi in 2022. After accounting for displaced energy GHG emissions, Total Proposed Action Emissions are about half of the total emissions generated in Vermont during 2022. When comparing the average annual total emissions from the proposed action, these are less than half of the total emissions generated in the District of Columbia during an average month in 2022. Meanwhile, peak year OCS oil & gas activity will likely generate about the same volume of emissions as the total generated in Hawaii during 2022, and the total proposed action peak year emissions would generate about the same volume of GHG emissions as those generated in the District of Columbia on average in two months during 2022.

Table K.2-9. Comparison of GHG Emissions and State Level Emissions (in millions of metric tons).

Proposed Action Emissions (High Activity)	CO_2e	Comparable State Emissions (2022)	CO_2e
OCS Oil & Gas*	305.1	Louisiana and Mississippi	310.8
Total Proposed Action*	4.8	Vermont	8.5
Average Annual Total Proposed Action	0.13	District of Columbia (average month)	0.27
Peak Year (2039) OCS Oil & Gas	17.2	Hawaii	17.76
Peak Year (2031) Total Proposed Action	0.55	District of Columbia (average 2 months)	0.54

Note: State level emissions from (USEPA 2025)

* These first two rows of emissions under the Proposed Action are the emissions from the entire 36 years of potential OCS activity and production under high activity scenario. For illustrative purposes, these emissions are compared to emissions from selected states in the year 2022 (most recent data available).

Small changes in the exploration and development activity, the volumes of oil to natural gas production within the proposed action scenarios, and underlying assumptions within the models could lead to different results. The primary modeling assumptions affecting the results are elasticities, adjustment rates, differences in emission factors, and regional energy market differences. The interplay of all these variables, along with projected activity levels and the ratio of oil versus natural gas production within the exploration and development scenario, drive differences in GHG emissions estimates between new OCS production and displaced energy substitutes. The factors contributing to uncertainty are discussed in **Section K.5**.

In the GOA Draft Programmatic EIS, BOEM compared the GHG emissions from domestically produced or consumed energy to climate targets and carbon budgets. However, given the change in administration and policy, the U.S. is no longer party to the Paris Agreement. Due to the fact that the U.S. does not have GHG emission reduction goals these comparisons have been removed from the Final GOA Oil and Gas Programmatic EIS. See **Section K.3** for a discussion of the impacts to human and natural environment associated with changes to atmospheric or oceanic concentrations of GHGs.

K.2.4 Foreign GHG Emissions Methodology and Estimates

BOEM's foreign GHG emissions analysis estimates the change in global emissions not captured in the domestic life cycle GHG emissions analysis. The goal of the foreign GHG analysis is to consider the impact of the proposed action's potential production on global GHG emissions while accounting for emissions not already captured within the domestic GHG emissions analysis. As a global commodity, any oil price changes resulting from OCS production would impact global production and consumption. Further, GHG emissions are a global pollutant, meaning emissions do not remain localized only to the source of the emissions. Rather, they disperse throughout the global atmosphere. Thus, just like the emissions associated with foreign activities impact the U.S., similarly domestic emissions impact U.S. citizens and their interests globally.

BOEM first uses MarketSim to estimate changes in foreign oil production and consumption. Then, using the best available information, BOEM converts the changes in global oil production and consumption into an estimate of the change in related GHG emissions. **Section K.2.5.1** explains BOEM's calculation of foreign upstream emissions, and **Section K.2.5.2** explains BOEM's calculations for foreign downstream emissions.

As described in **Section K.4**, foreign energy market simulations using MarketSim are necessarily more simplistic given limited information available for foreign markets when compared to that available for the U.S. domestic energy markets. BOEM uses MarketSim's current assumptions to estimate shifts in foreign oil markets in response to OCS leasing decisions but acknowledges that the foreign analysis is less detailed than the domestic analysis. BOEM expects to continue to make refinements to its foreign GHG analysis as data and methodologies develop for future analyses.

K.2.4.1 Foreign Oil Upstream Methodology and Estimates

Since BOEM's recent GHG analyses for GOA Lease Sale 259 and 261 (BOEM 2023a; 2023c), BOEM has expanded its foreign GHG emissions methodology to include estimates of the change in foreign oil's upstream GHG emissions. BOEM uses MarketSim's estimate of the change in foreign oil production caused by the proposed action but adjusts that result to account for emissions already considered in the domestic analysis. BOEM first considers the overall change in foreign oil production and subtracts the change in foreign oil exports to the U.S. (U.S. gross oil imports) as they are already accounted for in BOEM's domestic GHG analysis. Life cycle GHG emissions from U.S. gross oil imports are included in the displaced energy substitutes emissions within the domestic GHG analysis.

As shown in **Table K.2-10**, at the high activity level, BOEM's modeling suggests that the proposed action results in a decrease of 334 million barrels of foreign oil production. However, BOEM's domestic analysis already accounts for the displaced emissions associated with a decrease of 479 million barrels in U.S. gross oil imports (foreign gross oil exports) under the proposed action. The difference (479-334) represents foreign oil production available for foreign consumption under the proposed action instead of as exports to the U.S. Because BOEM already accounted for the reduction in life cycle emissions associated with the displaced U.S. gross oil imports, the foreign

analysis accounts for the upstream emissions associated with the 145 million barrels available for foreign consumption.

Table K.2-10. Increase in Foreign Oil Supply under the Proposed Action (in millions of barrels).

Foreign Oil Supply Category	Low Activity Level	Mid-Activity Level	High Activity Level
Change in Foreign Oil Production under the Proposed Action	-25	-146	-334
Change in Foreign Oil Exports to U.S.	-35	-206	-479
Adjusted Change in Foreign Oil Supply (row 1 minus row 2)	10	61	145

Note: Change in foreign oil exports to the U.S. is equivalent to the change in U.S. oil imports. The adjusted change in foreign oil supply shown here is the decrease in foreign oil production minus the decrease in foreign oil exports to the U.S. It does not add U.S. oil exports since these were not subtracted from the domestic analysis and are already accounted for when taking a global view.

The difference of 145 million barrels shown in **Table K.2-10** plus an increase in U.S. oil exports is the supply necessary for the increase in foreign consumption of 164 million barrels under the proposed action shown in **Table K.2-12**. In other words, the increase in foreign consumption, due to lower oil prices resulting from increased OCS production under the proposed action, is fulfilled by an increase in U.S. oil exports and a decrease in foreign oil exports to the U.S (i.e., U.S. oil imports).

BOEM then applies the same OECM emissions factor used for overseas oil production that is exported to the U.S. to the estimate of the annual change in foreign oil supply shown in **Table K.2-10**. BOEM assumes the change in foreign oil production would have the same GHG emissions factor as the foreign oil that is produced and exported to the U.S. This simplifying assumption is necessary and appropriate given the lack of information on the specifics of where foreign oil production could change in response to OCS production. **Table K.2-11** shows the increase in foreign upstream GHG emissions associated with the increase in foreign oil supply shown in **Table K.2-10**. To put the foreign oil upstream increase in emissions in context, the 8.30 million metric tons of CO_2e resulting from the 36 years of estimated OCS oil and gas activity associated with the proposed action in the high activity case, is similar to the 8.5 million metric tons of CO_2e released in Vermont in 2022 (USEPA 2025).

Table K.2-11. Foreign Upstream: Increase in Oil Supply GHG Emissions under the Proposed Action (in CO_2e, thousands of metric tons).

Activity Level	Low	Low	Low	Low	Mid	Mid	Mid	Mid	High	High	High	High
Greenhouse Gas	**CO_2e**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**CO_2**	**CH_4**	**N_2O**
Foreign Oil Upstream Emissions	562	389	7	*	3,487	2,413	43	*	8,295	5,741	102	*

Note: CO_2e conversions are made using the USEPA's 100-Year GWP values of 25 for CH_4 and 298 for N_2O.
* Values are between -0.5 and 0.5.

K.2.4.2 Foreign Oil Downstream Methodology and Estimates

BOEM's MarketSim model estimates the increase in foreign oil consumption that occurs under the proposed action. However, some of that increase in oil consumed in foreign markets is already included in BOEM's GHG emissions analysis of domestically produced or consumed energy. This is because BOEM's domestic downstream analysis treats the full value of the proposed action's exploration and development scenarios' potential OCS oil and gas production as being consumed domestically. However, a small amount of that OCS oil is exported and consumed in foreign markets. Thus, when extending the analysis to include foreign consumption, an adjustment is necessary. BOEM adjusts MarketSim's foreign oil consumption estimate to account for the amount that is already included within the domestic downstream analysis. The adjusted increase in foreign oil consumption is presented in **Table K.2-12**. BOEM continues to review and refine its foreign emissions methodology and could further refine this change for future analyses.

Table K.2-12. Increase in Foreign Oil Consumption (adjusted) Resulting from the Proposed Action (in millions of barrels).

Step of Adjustment (description)	Low Activity Level	Mid-Activity Level	High Activity Level
A. Global (domestic plus foreign) shift in oil consumption estimated by MarketSim	15.0	94.6	224.5
B. Shift in U.S. domestic oil consumption used in GLEEM	3.9	25.7	60.6
C. (A minus B) Adjusted shift in foreign oil consumption*	11.1	68.9	163.9

GLEEM takes the adjusted annual change in foreign consumption and applies an emissions factor attributable to combusted oil. For this analysis, BOEM uses a single set of USEPA emissions factors called "Other Oil <401°F" (USEPA 2023). This emissions factor set is a miscellaneous factor set used when the end petroleum product consumed is unknown. Typically, rather than using a single emissions factor, it would be preferable to use a range of emissions factors that correspond to the different end uses of petroleum products after oil refining. However, for this analysis, BOEM applies this emissions factor to all combusted oil due to a lack of information about the end petroleum products consumed in foreign markets, as the consumption of oil and its end uses vary from country to country. GLEEM's calculations for non-combustion uses of oil is based on the U.S. market as an approximation (Wolvovsky 2023). This approach is unlikely to change the results substantially, as the amount of oil used in domestic and foreign markets in non-combustion products is small.

Although the U.S. non-combusted oil products are used as a proxy for global non-combusted oil, taking a similar approach for emissions factors would likely produce less accurate results. For instance, in 2019, the most recent year for which data are available, about 20 percent of European Union oil was consumed as motor gasoline (Eurostat 2022), while in the U.S. that portion was more than double, i.e., approximately 45 percent of all oil was consumed as motor gasoline (Energy Information Administration 2022). The different emissions factors for each type of fuel (USEPA 2023)

would likely result in substantial changes in multiple ways. This variability applies to all countries around the world, including variability in oil product consumption within the European Union. Therefore, a U.S. consumption model would not apply to most other countries and, though these figures are available for the European Union, and some other countries, they are not available globally. As a result, BOEM has decided to use a generic emissions factor that does not correlate with specific oil products but gives a reasonable approximation of emissions from oil consumed in other countries without introducing other uncertainties into the results.

Table K.2-13 presents the increase in GHG emissions attributable to the higher foreign consumption of oil under the proposed action. Another way to view this is that the foreign oil consumption estimated under the No Action Alternative is lower than under the proposed action. At the high activity level, the selection of the No Action Alternative results in an estimated 63.6 million metric tons of CO_2e fewer GHG emissions than if the proposed action is selected. To put these emissions into context the 63.4 million metric tons of CO_2e in the high activity case is similar to the 61.4 million metric tons CO_2e released in Maryland in 2022 (USEPA 2025).

Table K.2-13. Foreign Downstream: Change in Oil Consumption GHG Emissions under the Proposed Action (in CO_2e, thousands of metric tons).

Activity Level	Low	Low	Low	Low	Mid	Mid	Mid	Mid	High	High	High	High
Greenhouse Gas	CO_2e	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O
Foreign oil downstream emissions	4,310	4,296	*	*	26,739	26,653	1	*	63,587	63,382	3	*

Note: CO_2e conversions are made using the USEPA's 100-Year GWP values of 25 for CH_4 and 298 for N_2O.
* Values are between -0.5 and 0.5.

When considering the increase in emissions associated with foreign oil production in **Table K.2-11** and the increase in emissions associated with the increase in foreign oil consumption in **Table K.2-13**, BOEM finds that foreign emissions would increase under the proposed action.

K.3 IMPACTS FROM GHG EMISSIONS

In the GOM Draft Programmatic EIS, BOEM provided additional context for the effects of the estimated GHG emissions under the proposed action by applying estimates of the per-metric-ton social cost of GHG to those estimates. As a result of recent policy changes, the use of the SC-GHG has been removed in this Final PEIS.

NEPA does not require an agency to quantify project impacts through a specific methodology, such as estimating the "social cost of carbon," "social cost of methane," or "social cost of greenhouse gases." A protocol to estimate what is referenced as the "social cost of carbon" (SCC) associated with GHG emissions was developed by a federal Interagency Working Group on the Social Cost of Greenhouse Gases (IWG).

E.O. 14154 disbanded the IWG and withdrew any guidance, instruction, recommendation, or document issued by the IWG. Section 6(c) states:

The calculation of the "social cost of carbon" is marked by logical deficiencies, a poor basis in empirical science, politicization, and the absence of a foundation in legislation. Its abuse arbitrarily slows regulatory decisions and, by rendering the United States economy internationally uncompetitive, encourages a greater human impact on the environment by affording less efficient foreign energy producers a greater share of the global energy and natural resource market. Consequently, within 60 days of the date of this order, the Administrator of the USEPA shall issue guidance to address these harmful and detrimental inadequacies, including consideration of eliminating the "social cost of carbon" calculation from any Federal permitting or regulatory decision.

E.O. 14154 further directs agencies to ensure consistency with the guidance in OMB Circular A-4 of September 17, 2003, when estimating the value of changes in GHG emissions from agency actions.

BOEM has not included any estimates for the SCC for this Programmatic EIS for multiple reasons. First, this action is not a rulemaking. Rulemakings are the administrative actions for which the IWG originally developed the SCC protocol. Second, E.O. 14154 clarifies that the IWG has been disbanded and its guidance has been withdrawn.

Further, NEPA does not require agencies to conduct a cost-benefit analysis. Including an SCC analysis without a complete cost-benefit analysis, which would include the social benefits of the proposed action to society as a whole and other potential positive benefits, would be unbalanced, potentially inaccurate, and not useful to foster informed decision-making. Any increased economic activity—in terms of revenue, employment, labor income, total value added, and output—that is expected to occur as a result of the proposed action is simply an economic impact, not an economic benefit, inasmuch as any such impacts might be viewed by another person as a negative or undesirable impact due to a potential increase in the local population, competition for jobs, and concerns that changes in population will change the quality of the local community. "Economic impact" is distinct from "economic benefit," as understood in economic theory and methodology, and the socioeconomic impact analysis required under NEPA is distinct from a cost-benefit analysis, which NEPA does not require. In addition, many benefits and costs from agency actions cannot be monetized and, even if monetizable, cannot meaningfully be compared directly to SCC calculations for a number of reasons, including because of differences in scale (local impacts vs global impacts).

Finally, purported estimates of SCC would not measure the actual environmental impacts of a proposed action and may not accurately reflect the effects of GHG emissions. Estimates of SCC attempt to identify economic damages associated with an increase in carbon dioxide emissions—typically expressed as a one metric ton increase in a single year—and typically includes, but is not limited to, potential changes in net agricultural productivity, human health, and property damages from increased flood risk over hundreds of years. The estimate is developed by aggregating results across models, over time, across regions and impact categories, and across multiple scenarios. The

dollar cost figure arrived at based on consideration of SCC represents the value of damages avoided if, ultimately, there is no increase in carbon emissions. But SCC estimates are often expressed in an extremely wide range of dollar figures, depending on the particular discount rates used for each estimate, and would provide little benefit in informing the Secretary's decision. For these reasons, DOI has also rescinded its October 16, 2024 memorandum, "Updated Estimates of the Social Cost of Greenhouse Gases," which had directed DOI bureaus to calculate SCC using the methodology contained in the Environmental Protection Agency's Final Rule of March 8, 2024, 89 Fed. Reg. 16,820.

To summarize, BOEM, is not evaluating SCC for this Final Programmatic EIS because: (1) BOEM is not engaged in a rulemaking for which the now-rescinded SCC protocol was originally developed; (2) the IWG has been disbanded and all technical supporting documents and associated guidance have been withdrawn; (3) NEPA does not require agencies to prepare SCC estimates or cost-benefit analyses; (4) costs attributed to GHGs are often so variable and uncertain that they are unhelpful for BOEM's analysis; and (5) the full social benefits of carbon-based energy production have not been monetized, and quantifying only the costs of GHG emissions, but not the benefits, would yield information that is both potentially inaccurate and not useful.

With removal of the estimates of the social cost of GHG, BOEM provides context for the volumes of GHG emissions in terms of how those volumes compare to those of state level emissions. Additionally, BOEM recognizes that changes in GHG emissions lead to changes in the atmospheric and oceanic concentrations of those GHG emissions. These changes in turn may lead to changes in global mean temperatures, precipitation, ocean acidity, and seal levels. Finally, those changes might result in the impacts to the human and natural environment affecting health, mortality, habitat and species decline, biodiversity, coastal erosion, crop failure, property life and value. The contribution of the proposed action to effects on the human and natural environment are discussed in their relevant chapters within **Chapter 4** of the Final Programmatic EIS.

K.4 FOREIGN QUALITATIVE LIFE CYCLE GREENHOUSE GAS ANALYSIS

As shown in **Table K.2-11** and **Table K.2-13**, BOEM estimates emissions associated with the potential changes in foreign oil production and consumption resulting from the proposed action. However, BOEM recognizes that these changes are not a complete accounting of all potential changes in foreign markets and are not as comprehensive as the estimates of life cycle emissions from domestic production or consumption (**Table K.2-8**). BOEM recognizes that there are additional foreign energy market responses and impacts that cannot be quantified at this time (**Table K.2-1**); however, these are considered qualitatively in this section.

In developing the global life cycle GHG analysis, BOEM consulted with the contracted developer of MarketSim, Industrial Economics, Inc., to assist in refining and expanding its analysis. Through this expert review, Industrial Economics, Inc. extensively evaluated BOEM's approach to estimating the change in emissions associated with the shift in foreign energy consumption. However, given the model's current capabilities and limitations, Industrial Economics, Inc.

acknowledged that MarketSim would not allow a complete estimation of foreign life cycle GHG emissions at that time. Since that initial consultation, BOEM has implemented Industrial Economics, Inc.'s intermediate solution to use the overseas oil production emissions factors that the OECM uses for oil imports to the U.S. and apply those emission factors to the shift in foreign oil production estimated by MarketSim. While BOEM has made some progress in the estimation of the proposed action's impact on foreign life cycle GHG emissions, there are still many life cycle stage components that BOEM is unable to quantify as explained below.

According to Industrial Economics, Inc., to provide a complete and quantitative estimate of the impact of OCS leasing on the global energy market and resulting GHG emissions, the model would need demand-driven and competition-driven substitution effects for all global major energy forms as well as upstream, midstream, and downstream emissions profiles for OCS oil and gas and domestic and foreign substitutes (Price 2021). To derive these substitution effects, the model requires a detailed global baseline energy forecast that includes multiple categories of supply, demand, and prices at a regional level. Industrial Economics, Inc. indicated it was unaware of any such existing forecasts with the required level of detail that have been published by a major organization. Industrial Economics, Inc. suggested that, in theory, BOEM could develop its own projections of foreign supply, demand, and prices based on less detailed forecasts, but doing so would "require a number of assumptions that would introduce significant uncertainty into MarketSim's results" (Price 2021).

Currently, MarketSim estimates total non-U.S. supply and demand for oil. However, its specification of foreign oil demand does not include cross-price elasticities that would capture how foreign demand for oil changes in response to other energy prices. Similarly, the model does not capture how foreign demand for oil substitutes changes in response to oil prices. MarketSim also does not capture foreign production of gas and coal consumed outside the U.S. or foreign consumption of gas or coal produced outside the U.S. A comprehensive accounting of all these effects would require a substantial expansion of MarketSim in scope and complexity, as well as the development of baseline supply and demand projections beyond what is included in the Energy Information Administration's Annual Energy Outlook.

Despite the extensive data requirements and limitations needed to estimate the proposed actions influence on foreign GHG emissions, BOEM determined that, for this analysis, BOEM could reasonably quantify the GHG emissions from foreign production and consumption of oil as presented in **Section K.2.5**. Meanwhile, BOEM continues to evaluate options to improve methodologies to estimate midstream emissions from foreign oil production, as well as those relating to the adjustment of foreign oil consumption, for use in future analyses.

Evaluating the foreign energy market qualitatively, the price decreases for oil under the proposed action would be felt beyond U.S. borders given that oil is a globally traded commodity. The displacements of substitute energy sources discussed earlier for the domestic energy market also occur in the foreign markets in response to the decrease in the price of oil. In this case, as the price of oil declines, increased consumption of oil would displace substitute energy sources such as coal,

natural gas, biofuels, and others, but at different rates than within the U.S. depending on each country's or region's energy infrastructure and market.

K.4.1 Foreign Oil Life Cycle Change: Midstream Emissions

According to Industrial Economics, Inc., BOEM lacks the ability to estimate foreign oil midstream GHG emissions. First, BOEM does not have information on the volume of foreign midstream oil, and, even if that were available, BOEM would be unable to estimate where changes in foreign oil midstream emissions would occur. BOEM needs this information to derive foreign midstream oil GHG emission factors. For the domestic markets and analysis, BOEM uses the USEPA's midstream emissions inventory data to derive midstream emission factors for domestic oil. The GHG emissions associated with activities, such as refining, differ based on the quality of crude oil and the technological capabilities of different refining sectors within the foreign oil midstream, as the GHG emissions intensity of petroleum refining varies across countries. Thus, to be able to estimate foreign midstream emissions, BOEM requires projections of where oil is being refined. This requires knowledge and understanding of the total midstream GHG emissions and the volume of oil passing through the midstream. BOEM does not have a comparable data set for foreign markets.

Given these data limitations, BOEM considers these impacts qualitatively. If BOEM were to quantify foreign oil's midstream GHG emission by applying the same domestic refining GHG emissions data to the portion of global oil midstream not estimated in BOEM's domestic midstream analysis, it would represent an increase in global GHG emissions under the proposed action relative to the No Action Alternative. BOEM will continue to investigate potential updates to its methodology for future analyses.

K.4.2 Substitutes for Oil in Foreign Markets

To understand the complexities and limitations of estimating foreign energy market oil substitutes and their emissions, it is useful to provide context from BOEM's domestic analysis. The inputs for BOEM's domestic GHG model are based on the best available and most credible information. They are illustrative of the range and depth of data necessary to credibly conduct a full quantitative analysis of changes in foreign GHG emissions. BOEM's MarketSim model adopts assumptions from the Energy Information Administration (the primary Federal Government entity on energy statistics and analysis) and from economics literature cited in the model documentation. These assumptions help BOEM estimate where the likely substitute sources of oil and gas would come from (e.g., oil and gas production from State submerged lands, onshore domestic production, and international imports) and the other types of energy sources that would be used to balance demand and supply (i.e., coal, biofuels, nuclear, and renewable energy). Accurately estimating this mix of substitute energy sources is important because each substitute energy source has a different life cycle GHG emissions profile over the course of its production, transportation, refining, and/or consumption.

BOEM does not have complete data, like that of the Energy Information Administration for the U.S., for the rest of the world. As such, BOEM cannot evaluate the full set of substitutions that

occur globally. To fully consider the substitution impact of the change in foreign oil consumption, BOEM would need information on the suite of energy sources that are displaced by the increased oil consumption and the supply and demand elasticities (including cross-price demand elasticities) associated with them. These displacement patterns vary throughout the world. BOEM and Industrial Economics, Inc. are currently unaware of data sets and model parameter estimates that would allow for modeling foreign energy market substitutions between oil, gas, coal, electricity, and reduced demand. And, if BOEM were able to develop the data set, development of a model capable of the required calculations of both domestic and foreign substitution effects would represent a substantial challenge.

In the proposed action, the increase in oil consumption leads to an increase in total downstream GHG emissions because oil has a higher GHG intensity than most other energy sources. Accordingly, BOEM models the increase in foreign oil downstream emissions in **Table K.2-13**. However, were BOEM able to quantify energy substitution for oil in foreign markets, the total change in foreign downstream emissions would not be as large as that estimated in **Table K.2-13** given the unquantified emissions reductions associated with displaced substitute energy sources in foreign energy markets. In some areas, the additional oil consumption could replace coal, leading to a net reduction. While BOEM does not quantify displacement of substitute energy sources by oil in foreign energy markets under the proposed action, BOEM acknowledges that displacement of substitutes would certainly occur and that a portion of the increased emissions currently quantified would be mitigated by displaced GHG emissions from energy substitutes.

The same uncertainty exists in regard to estimating the displacement of GHG emissions from energy substitutes in the upstream and midstream. Industrial Economics, Inc. highlighted the complexities and wide range of data required to consider these substitutions. Industrial Economics, Inc. found that the change in GHG emissions associated with the full life cycle for all energy sources other than oil produced and consumed in foreign markets under the proposed action cannot be quantified without making significant assumptions and concluded that these effects are more appropriately addressed qualitatively.

Though oil is a global commodity, the regional nature of gas, coal, and electricity would require MarketSim to consider regional price differences and calculate regional equilibriums for these other fuels. Industrial Economics, Inc. characterized the necessary updates to create this global regional analysis as “a major challenge” (Price 2021). Furthermore, regarding the necessary underlying data that would be required to support a model if built, Industrial Economics, Inc. stated the following:

We are unaware of any existing forecasts published by EIA, the International Energy Agency, or other organizations that include this level of detail. In the absence of such a forecast, BOEM could develop its own based on less detailed forecasts that may be available, but this would likely require a number of assumptions that would introduce significant uncertainty into MarketSim’s results (Price 2021).

In summary, BOEM's domestic analysis estimates the GHG emissions associated with the full life cycle of energy substitutes displaced under the proposed action, but BOEM's foreign analysis is limited to quantifying the GHG emissions from changes in the foreign upstream and downstream of only oil under the proposed action. Missing from the foreign analysis are changes in foreign oil's midstream emissions and estimates of foreign energy market substitutes displaced in response to changes in oil prices. Because the quantifiable foreign analysis is not comprehensive, domestic production and consumption GHG emissions are not directly comparable to the foreign estimates. Therefore, BOEM is not providing a combined quantitative estimate of domestic and foreign emissions because it would be potentially misleading to simply add them together.

BOEM is investigating methods to incorporate the foreign oil midstream GHG emissions and estimate the full life cycle GHG emissions of foreign energy substitutes displaced by oil. However, even with those additions, BOEM expects global GHG emissions would likely still be higher for the proposed action than the No Action Alternative baseline level. In the domestic analysis, emissions associated with the downstream consumption of oil far outweigh upstream and midstream emissions, the currently unquantified reductions (foreign oil substitutes) and additions (foreign oil midstream) would not be high enough to offset the increase in GHG emissions currently estimated from foreign oil's upstream and downstream. Moreover, downstream emissions account for the majority of the life cycle emissions, meaning most of the foreign GHG emissions have already been quantified in this analysis.

K.5 AREAS OF UNCERTAINTY IN MODELING INPUTS

BOEM's GHG analysis is subject to much uncertainty in several key variables. As described earlier, BOEM uses several models to estimate these impacts. Each of these models have different components, assumptions, or baseline data that, while based on the best available information, are uncertain. Differences in these variables can impact the analysis results. The key areas of uncertainty include the following:

- anticipated levels of activity and production, i.e.,
  - exploration and development activity per barrel of oil equivalent (BOE) of potential production and
  - the ratio of potential oil versus gas;
- model inputs including levels of elasticities and adjustment rates used;
- emission factors used for OCS production and substitute energy sources; and
- baseline energy projections.

The uncertainty related to elasticities and adjustment rates used and their impact on results is covered extensively in Appendix A of the MarketSim documentation (Industrial Economics Inc. 2023a).

K.5.1 Activity and Production

The basis of BOEM's GHG analyses is the estimate of potential OCS production and associated activity. BOEM assumes that, if the proposed action is approved, industry would develop oil and gas resources in the GOA.

In addition to estimating the potential production that could result from a proposed action, BOEM estimates the associated activities and facilities required for the exploration and development of the potential production (i.e., number of wells drilled and operated; miles of pipelines laid; and platforms and other infrastructure installed, operated, and removed).

BOEM models potential OCS oil and natural gas activity and production under the proposed action at three different activity levels—low, mid-, and high—to account for uncertainties in market conditions, price volatility, consumer demand, and variable cost conditions. Potential production for the three activity levels is shown in **Table K.2-3**. Considerable uncertainty surrounds any future OCS production as this production is contingent on, in some cases, billions of dollars of investment risk. Additionally, the levels of exploration and development activity required to meet production within the exploration and development scenarios are uncertain. Both the activity and production projections within exploration and development are key contributors to the results of the GHG analyses given that each type of activity has a specific GHG emissions profile.

K.5.1.1 OCS Activity Per BOE of Production

Table 3.3-2 shows the range of activity levels (low to high). At the low activity level proposed action scenario (i.e., single lease sale), BOEM does not forecast new platforms would be installed and any new production would be exclusively using subsea tiebacks to existing platforms. This allows for substantial efficiency in terms of per-barrel GHG emissions as platforms have a higher total GHG emissions profile than subsea tiebacks. While the mid-activity and high activity scenarios include both platforms and subsea tiebacks, the mid-activity level has fewer platforms installed per barrel of production compared to the high activity level. The low and mid activity levels also have fewer wells drilled per barrel of production than the high activity level. This variation in potential activity impacts upstream emissions and is a contributing factor to the total proposed action emissions differences between activity levels.

K.5.1.2 Relative Oil and Natural Gas Production

As described throughout BOEM's analyses, BOEM calculates the energy market substitutions that would be displaced by OCS production under the proposed action. The substitution rates are different for oil and natural gas because consumers and producers respond differently to changes in the price of oil and petroleum products (like gasoline) than they do to changes in the price of natural gas (primarily heating and electricity). For example, from the perspective of consumers, these differences in substitution patterns for oil versus gas may reflect differences in the availability of substitutes or differences in the extent to which different uses are discretionary (e.g., consuming energy for home heating is less discretionary than consuming gasoline for vacation

transportation). BOEM's analyses generally involve scenarios that include both oil and natural gas. BOEM presents displacement rates as percentages representing the combined displacement rates of substitute energy sources by OCS oil and natural gas. The displacement rates for a given scenario depend on both the size of the scenario in terms of BOE produced and the ratio of oil to gas production in that scenario. As such, the ratio of oil to natural gas production is a large driver in the resulting displacement rates of energy market substitutes by OCS oil and natural gas. A different ratio of oil to natural gas production can impact the rates of displacement of energy market substitutes by OCS oil and natural gas, which in turn impact the GHG analysis.

Table K.5-1 shows the displacement rates of energy substitutes for the three activity levels. For OCS oil production, a large percentage of the displacement impacts imports. For natural gas production, the largest displaced substitute energy source is onshore natural gas production. Natural gas production also has a much larger increased consumption as a result of the proposed action than oil (i.e., larger percentage not displaced). If actual production stemming from the proposed action resulted in higher levels of oil production and lower levels of natural gas production, the combined displacement rates would show higher levels of imports and lower levels of onshore production displaced. Such a scenario would also have a lower rate of increased energy demand (energy not displaced). Thus, a higher ratio of oil to natural gas would lead to greater reduction in GHG emissions from displaced energy substitutes and result in lower total proposed action emissions.

The difference in displacement rates of energy substitutes by OCS oil and natural gas is important to the analysis results given that OCS natural gas displacement favors substitute energy sources with lower or no GHG emissions when compared to energy sources displaced by OCS oil. BOEM's modeling is not able to consider whether any new electricity generation from wind, solar, nuclear, and hydroelectric sources require construction of new capacity as it may simply reflect increased generation of existing capacity. Therefore, BOEM does not associate any upstream, midstream, or downstream emissions with additional electricity from wind, solar, nuclear, and hydroelectric sources. Similarly, a portion of OCS oil and natural gas production does not displace any substitute energy sources at all. Rather, it represents the portion of potential OCS oil and natural gas production that would enable additional demand relative to the No Action Alternative baseline. A proposed action that assumes higher levels of potential OCS natural gas production would generally displace fewer GHG emitting substitute energy sources and result in higher total GHG emissions when compared to one with a lower ratio of natural gas to oil production. However, because OCS oil production largely displaces substitute oil imports, a proposed action with a high proportion of OCS oil production would have relatively fewer total GHG emissions attributed to it because the displaced oil imports have higher GHG emissions from upstream operations and transportation than OCS production. **Table K.5-2** shows the relative volume of oil versus natural gas production as a percent of total potential OCS production under the proposed action. The production percentages differ slightly due to the variation in the historical oil and gas volumes and producing gas to oil ratios. This activity forecast relies on different annual historical data for each scenario activity level.

Table K.5-1. OCS Oil versus OCS Natural Gas Production Displacement Rates of Substitute Energy Sources under the Proposed Action.

Substitute Energy Source	OCS Oil Low Activity Level	OCS Gas Low Activity Level	Combined Low Activity Level	OCS Oil Mid-Activity Level	OCS Gas Mid-Activity Level	Combined Mid-Activity Level	OCS Oil High Activity Level	OCS Gas High Activity Level	Combined High Activity Level
Onshore Production	16.8%	63.8%	26.2%	16.7%	57.8%	23.6%	16.7%	54.5%	23.7%
Onshore Oil	15.8%	0.1%	12.8%	15.6%	0.7%	13.1%	15.4%	0.9%	12.7%
Onshore Gas	1.0%	63.7%	13.4%	1.2%	57.1%	10.5%	1.3%	53.6%	11.0%
Production from Existing State/Federal Offshore Leases	0.6%	0.2%	0.6%	0.6%	0.3%	0.5%	0.5%	0.2%	0.5%
Imports	65.9%	9.1%	54.4%	65.6%	8.9%	56.1%	65.5%	8.7%	54.9%
Oil Imports	65.8%	4.2%	53.4%	65.5%	3.9%	55.2%	65.4%	3.9%	53.9%
Gas Imports	0.1%	4.9%	1.0%	0.1%	4.9%	0.9%	0.1%	4.8%	1.0%
Coal	0.1%	0.2%	0.1%	0.1%	0.3%	0.1%	0.1%	0.3%	0.2%
Electricity from Sources Other than Coal, Oil, and Natural Gas*	0.9%	1.8%	1.1%	1.0%	2.4%	1.2%	1.0%	2.4%	1.3%
Other Energy Sources**	10.2%	0.1%	8.3%	10.0%	0.5%	8.4%	9.8%	0.6%	8.1%
Increased Energy Demand (energy not displaced)	5.4%	24.8%	9.3%	6.0%	29.9%	10.0%	6.3%	33.2%	11.4%

* Includes electricity from wind, solar, nuclear, and hydroelectric sources. BOEM does not associate any upstream, midstream, or downstream GHG emissions with these energy sources.

** Includes primarily natural gas liquids, with the balance from biofuels, refinery processing gain, product stock withdrawal, liquids from coal, and “other” natural gas not captured elsewhere. BOEM does not associate any upstream, midstream, or downstream GHG emissions with biofuels, which is a very small portion of “other energy sources.”

Table K.5-2. OCS Oil versus OCS Natural Gas Percent of Potential Production.

OCS Fuel Produced	Low Activity Level	Mid-Activity Level	High Activity Level
Oil	80.1%	83.0%	81.0%
Natural Gas	19.9%	17.0%	19.0%

Note: The OCS natural gas is generally associated gas, meaning it is a by-product of targeted OCS oil extraction.

K.5.1.3 Impact on GHG Intensity and Results

The impact of the areas of uncertainty described above in **Section K.5.1.1** and **Section K.5.1.2** can be illustrated by looking at the GHG intensity of different components of the life cycle GHG emissions. The GHG intensity measures the amount of GHG emissions per unit of energy. **Table K.5-3** compares the GHG intensity values of the potential OCS oil and natural gas production to those of the energy sources it displaces. The GHG intensities in **Table K.5-3** are calculated by dividing the estimates of CO_2e emissions (**Table K.2-5** and **Table K.2-7**) by the potential OCS production (**Table K.2-3**). The GHG intensities of the displaced energy sources found in the second and fourth rows of **Table K.5-3** are not truly the GHG intensities of those displaced energy sources, but rather their intensities relative to the volume of OCS production they are displaced by under the proposed action. This allows for direct comparison of the relative efficiency of the OCS oil and natural gas versus the energy it is displacing while also accounting for the increase in demand.

The first two rows of **Table K.5-3** show the upstream GHG intensities for OCS oil and gas production and those for the energy sources displaced respectively. These differences in GHG intensity values between the low, mid-, and high activity levels for the OCS oil and natural gas illustrate the impact different projections of exploration, development, and production activity within exploration and development scenario can have on results. The upstream GHG intensity values for OCS oil and natural gas of 1.8, 4.2, and 5.3 metric tons CO_2e ($mtCO_2e$) for the low, mid-, and high activity levels, respectively, are commensurate with the levels of activity per BOE within their exploration and development scenarios. In the upstream, displaced energy sources have fairly uniform GHG intensities, which allows the low and mid-activity levels to achieve slightly more negative total upstream emissions per barrel than the high activity level.

For the midstream and downstream, rows 4 and 5 of **Table K.5-3**, show the GHG intensity of the displaced energy sources between activity levels. As discussed in **Section K.5.1.2**, the displacement rates vary between the different activity levels. For example, the low activity level has a higher level of displacement for onshore natural gas than the mid-activity and high activity levels (shown in **Table K.5-1**). In previous analyses, OCS natural gas displacement rates have generally been within 1 percent of each other across activity levels (e.g., imports are 9.1, 8.9., and 8.7 between the low, mid-, and high activity levels, respectively). That holds true in this analysis for the energy sources displaced by OCS oil and most energy sources displaced by natural gas. However, there is a 10 percent spread for the rate at which OCS natural gas displaces onshore natural gas between the low and high activity levels, with the onshore gas displacement rate falling from 63.7 percent under the low activity scenario to 53.6 percent under the high activity scenario. This is likely due to the large differences between activity levels' volumes of natural gas, the years over

which those volumes occur, and how those volumes interact with the elasticities and adjustment rates for natural gas in MarketSim. This leads to a lower displacement of onshore production and higher rate of increased demand (less displaced energy) in the high activity level relative to the low activity level. This narrows the margin of mid- and downstream GHG emissions at the high activity level between OCS oil and gas versus those of displaced energy substitutes relative the margin at the low activity level. Overall, the high activity level displaces GHG emitting substitute energy sources such as onshore oil and gas at a lower rate than the other two scenarios, meaning lower GHG intensity for substitutes relative to the low and mid-activity levels. This means that the midstream and downstream GHG emissions per BOE of potential OCS production under the proposed action are higher for the high activity level than for the low and mid-activity levels (**Table K.5-3**, row 6).

Thus, when viewed together, the upstream GHG intensities and the midstream and downstream GHG intensities illustrate how the domestic life cycle total GHG emissions at the high activity level could be positive while those at the low and mid-activity levels could be negative.

Table K.5-3. GHG Intensity Based on Domestic Life Cycle Activity under the Proposed Action (metric tons CO_2e per thousand BOE of potential OCS production).

Life Cycle Stage and Source of CO_2e	Low Activity Level	Mid-Activity Level	High Activity Level
(1) Upstream: OCS Oil & Gas	1.8	4.2	5.3
(2) Upstream: Displaced Energy Sources	-41.7	-42.2	-41.4
(3) Subtotal: Upstream	**-39.9**	**-38.0**	**-36.1**
(4) Mid- and Downstream: OCS Oil & Gas	321.6	322.0	321.7
(5) Mid- and Downstream: Displaced Energy Sources	-287.7	-285.0	-280.5
(6) Subtotal: Mid- and Downstream: Displaced Energy Sources	**33.9**	**37.0**	**41.3**
(7) Total: Life Cycle Domestically Produced or Consumed Energy	**-6.0**	**-1.0**	**5.2**

As described in **Section K.2.3**, BOEM's analysis shows that, when limited to domestically produced or consumed energy, the life cycle GHG emissions attributable to OCS oil and gas is within 2 percent, plus or minus, of the GHG emissions from the energy sources displaced by that OCS oil and gas. E&D scenarios with different amounts of activity (e.g. more or fewer platforms installed) or different production assumptions (e.g., more or less natural gas relative to oil) would have different results, with some resulting in OCS oil and gas having higher GHG emissions and others showing displaced energy substitutes having higher GHG emissions.

K.5.2 Baseline Energy Projections: Supply, Demand, and Prices

A fundamental source of uncertainty within BOEM's modeling is the composition of future energy needs and markets. As described in **Section K.2.2,** BOEM's models rely on a baseline energy market projection and assumptions of elasticity (how prices respond to changes in supply

and demand and vice versa). As noted in **Section K.2.2.1,** the MarketSim baseline is derived from specialized NEMS runs from the AEO. For this analysis, BOEM used the specialized runs developed by EIA from the 2023 AEO which relies on laws and policies in effect late-2022. There is a potential that this baseline will differ from future projections as those laws and policies have changed. The EIA did not publish an AEO in 2024, but did publish their 2025 AEO on April 15, 2025. Given the process outlined below, BOEM was not able to update the modeling to include the 2025 AEO as baseline. However, BOEM has also outlined in this section its consideration of how the baseline could have affected the analysis results.

K.5.2.1 Energy Information Administration NEMS MarketSim Process

The EIA is considered the U.S. Government's official and formal forecast for energy projections and is widely used across industry and government entities. Typically, EIA publishes the AEO annually each spring. The standard NEMS runs used in the AEO include OCS oil and gas production from both existing leases and future leases. Thus, BOEM is not able to use the published reference case to estimate the impact of new leasing as it requires a "no new leasing" baseline for comparison. For the MarketSim baseline, BOEM requests a specialized version of the NEMS runs which only include production from existing OCS leases and assumes no future leasing. This is often referred to as the "constrained" case. BOEM collaborates with the EIA on the timing of its request and the availability of EIA staff and leadership to conduct and review the constrained runs. The entire process is lengthy and requires completion of several sequential tasks. First, BOEM provides the EIA with estimates of the portion of the resource base that are leased or unleased. EIA uses this information to complete the NEMS runs. The EIA must provide domestic data which is included in the AEO as well as international data which are published separately on a different publication schedule. The constrained case is then thoroughly reviewed within the EIA. While BOEM is not fully aware of the EIA's methodology, BOEM's understanding is that this is a complex and time-consuming task.

Once BOEM receives the AEO data from the constrained NEMS runs, it must convert the data into the MarketSim model. This includes converting certain data and model parameters and locating alternate data sources for variables not included in the AEO. Because the EIA updates data categories between AEO's, BOEM must verify the validity of all data elements. Any items that are missing or altered must be accounted for and resolved. When BOEM initially designed MarketSim, all the baseline update data were available from the EIA. However, in recent years, BOEM and the EIA have needed to engage in additional communications to finalize the MarketSim baseline update. The total timeframe to update the model based on the AEO constrained case is entirely dependent on what stage EIA is in the process of developing the AEO. If BOEM's request is made the same time the AEO is under development, the EIA is not able to provide the specialized runs until after the AEO reference case is finished. The changes in AEO categories, publishing schedule, personnel shortages and changes, and model enhancement, has increased the time to develop the constrained case and implement it into the MarketSim.

EIA published their 2025 AEO on April 15, 2025. The 2025 AEO "only considers laws and regulations implemented as of December 2024" and thus does not incorporate or reflect policy changes announced by the Trump administration since January 2025. Based on the schedule for preparing and publishing this PEIS, and the time required for runs of MarketSim and subsequent consolidation of modeling results, BOEM would have needed the constrained NEMS run baseline by mid-March, which was prior to release of the non-constrained AEO 2025. Thus, BOEM relies on this "EIA NEMS MarketSim Process" section to explain the use of a baseline derived from the AEO 2023. The referenced "Implications of Changes to MarketSim Baseline" document, provides a supplemental analysis that speaks to how results might be different given potential influences on the baseline since publication of the AEO 2023. Even if BOEM had had enough time to request constrained model runs and incorporate them into the MarketSim, they would still not be reflective of current policies.

Further, there is still great uncertainty in the laws and policies that will be implemented throughout the AEO forecast period. Thus, regardless of whether BOEM is able integrate the most recent AEO baseline in the MarketSim model, policy gaps will exist. Any forecast, including the EIA's annual forecasts are simply projections over a certain period and include an element of uncertainty that are difficult to account for. Any change in assumptions, laws and policies will result in changes to the forecasts and ultimately the baseline used by BOEM for its analyses.

K.5.2.2 Impact on GHG Analysis

Given the challenges above, as well as BOEM's expedited timeframe for publishing this analysis, using a baseline from AEO 2025 was not feasible. However, BOEM provides an analysis demonstrating the impacts of changing its baseline. This analysis is presented in a paper "Implications of Changes to MarketSim Baseline" (Changing Baseline) available at https://www.boem.gov/oil-gas-energy/energy-economics/oil-and-gas-economic-modeling.

Using previously conducted sensitivity analyses, the paper highlights how changes in the baseline would affect BOEM's projected displacement rates of energy substitutes as well as associated GHG emissions. In addition, the paper also discusses differences between baseline used for this Programmatic EIS, and projections used in AEO 2025. Last, the document provides a qualitative analysis of changes not included in AEO 2025 (announced since January 2025) that could potentially affect BOEM's results.

Overall, the differences between AEO 2025 and the constrained AEO 2023 data, coupled with the sensitivity results performed suggest that updating MarketSim to use the AEO 2025 baseline would not have a significant impact on the projected displacement patterns and associated GHG emissions. Several key metrics of U.S. energy markets (oil, natural gas, coal and electricity) show little change between the two baselines, and the sensitivity cases performed demonstrate that given the magnitude of baseline changes, it is unlikely to have a substantial impact on MarketSim's results.

BOEM contracted a study that demonstrates the effect of different modeling assumptions, including modifying the baseline, on the displacement rates of energy substitutes and subsequent estimates of potential OCS leasing on GHG emissions. The sensitivity tests highlight the importance of varying modeling assumptions and uncertainty in the parameters that likely affect the analyses. The testing shows that, small changes to the modeling baseline have minimal impact on results. However, larger changes to both baseline and demand and supply response patterns have a significant impact on the results. The results of this sensitivity analysis are presented and discussed in Appendix A.5 of the MarketSim documentation (Industrial Economics Inc. 2023a). The results are also summarized in Chapter 4 of the Final Economic Analysis Methodology for the 2024-2029 National OCS Oil and Gas Leasing Program) (BOEM 2023b).

K.6 CONCLUSION

BOEM's analysis of GHG life cycle emissions resulting from the proposed action indicates that domestic emissions from OCS oil and natural gas are similar to those resulting from displaced energy substitutes given that OCS production would replace large portions of domestic energy market substitutes. However, when considering the impact of changes in foreign oil production and consumption (**Table K.2-11** and **Table K.2-13**), global emissions increase in each activity level in the proposed action. Although BOEM's analysis includes quantification of GHG emissions from foreign oil production and consumption, lack of needed information currently precludes quantification of foreign oil's midstream GHG emissions and foreign substitutes' full life cycle GHG emissions. However, as discussed in **Section K.4**, such estimates would not be expected to change BOEM's conclusion that more global GHG emissions would occur under the proposed action.

Nonetheless, BOEM acknowledges the limitations and continues to explore ways to improve its methodology. BOEM will continue to review and consider whether to refine the entire life cycle analysis as new data and methodologies become available. As demonstrated in **Section K.4**, BOEM developed the global component of this analysis using the most complete, recent information currently available with a sufficient level of detail for assessing these effects. This includes baseline projections of non-US energy consumption and production and non-U.S. GHG emissions factors.

As shown in **Section H.5**, changes to underlying modeling assumptions and uncertainty in the parameters may impact BOEM's analyses. As demonstrated by the sensitivity tests, summarized in Chapter 4 of the Final Economic Analysis Methodology for the 2024-2029 National OCS Oil and Gas Leasing Program, major changes in energy demand and supply trends would likely change the substitutions and lead to estimates of total GHG emissions under the proposed action that are different than BOEM's current analyses, which is based on the 2023 Annual Energy Outlook reference case projections (BOEM 2023b). BOEM provides this information to underscore the uncertainty and importance of key variables in its analyses. Subject to available resources, BOEM continually seeks ways to improve its analysis, including the underlying areas of uncertainty within its analysis.

BOEM's quantitative and qualitative GHG analyses together represent the best available approach for comparison of GHG emissions from the proposed action and serve as a proxy for evaluating and comparing impacts to climate change relative to the No Action Alternative.

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APPENDIX L

RESPONSES TO PUBLIC COMMENTS ON THE DRAFT GOA PROGRAMMATIC EIS

L RESPONSES TO PUBLIC COMMENTS ON THE DRAFT GOA PROGRAMMATIC EIS

Through January 27, 2025, BOEM received a total of 5,251 comments. Of the 5,251 submissions, 33 were identified as unique and containing substantive content (including 13 submissions submitted to the docket and 20 comments from public meetings). There were 5,197 form letter copies of a single campaign. Copies of form letters were counted as a single submission.

The comments came from a variety of stakeholders including other Federal agencies, industry, non-governmental associations, and individual commenters. Commenters are labeled by the Comment ID Number in the second column of **Table L-1**. The first column of **Table L-1** includes the names of individuals and/or organizations that submitted the comment.

All comments (i.e., letters, public meeting testimony transcripts, electronic submissions, etc.) were analyzed to identify all substantive issues raised by the public. Comments were grouped by similar issues into 12 major categories, and responses are provided for each issue. The comments were reproduced as they were received, although many were shortened or summarized to provide the heart of the comment. The comments and responses are presented in a matrix (**Table L-1**) and are organized by the following 12 topics: Topic 1–NEPA Process and Public Involvement; Topic 2–NEPA Analysis; Topic 3–Alternatives; Topic 4–Environmental Issues and Concerns; Topic 5–Cumulative Analysis; Topic 6–Consultations; Topic 7–Mitigation; Topic 8–Oil Spills; Topic 9–General Feedback on the Draft GOA Oil and Gas Programmatic EIS and Associated Leasing; Topic 10–Decommissioning; Topic 11-Out of Scope, and Topic 12- EPA Comments on the Draft GOA Oil and Gas Programmatic EIS. Some topics include subtopics to further group similar comments. Topic 1 has a subtopic for comment period extension requests. Topic 2 has subtopics on different aspects of the purpose and need as well as other general comments. Topic 3 includes a subtopic on stated preference for those commenters who stated a preference for a particular alternative. Topic 4 has 19 subtopics (i.e., Climate Change, Greenhouse Gases, Well Stimulation, General Physical, Biological, and Social Resource Analysis, Air Quality, Water Quality, Coastal Communities and Habitats, Benthic Communities and Habitats, Fish and Invertebrates, Birds, Marine Mammals, Sea Turtles, Commercial Fisheries, Recreational Fishing, Recreational Resources, Economic Factors, and Social Factors) to separate the various environmental issues and concerns raised by commenters. Topic 6 has subtopics for different consultations. Topic 9 includes subtopics for supporting or opposing the GOA Oil and Gas Programmatic EIS and offshore oil and gas leasing in general.

An index of comments, which is organized by topic and commenter, can be found below. An individual or group can search by name or Comment ID Number to more quickly find BOEM's response. Comments that were received as a form letter were labeled (i.e., Form Letter 1), and the number of individuals who sent or signed the form letter has been tallied and is shown in **Table L-2**. Comment letters with several signatory organizations are labeled in the matrix with the first signatory organization, but all signatory organizations on each letter are listed in **Table L-3**.

Please note that some comment letter excerpts have been shortened or truncated due to space constraints. However, staff has addressed the major substantive issues contained within the full comment letters. Further, BOEM acknowledges that within many of the form letters, personalized statements were also included. Each form letter was reviewed to identify unique substantive comments. So, although not all of the personal statements, opinions, and general preferences are individually addressed in the matrix below, the spirit of these comments has been considered and addressed through other similar comments in the matrix below. BOEM has considered the personal comments, and these comments are part of the administrative record for this Final Programmatic EIS.

As shown in the comment matrix, BOEM received two formal requests for an extension to the comment period from Earthjustice et al. and from a private citizen. These extension requests were not granted. In addition, BOEM received an informal request for an informal extension from USEPA. As with the formal requests, BOEM responded to USEPA indicating that an extension would not be granted. The USEPA submitted comments to BOEM on the Draft Programmatic EIS 3 days after the comment period closed and published the comments in the *Federal Register* in accordance with their responsibilities under Section 309 of the Clean Air Act. Since USEPA also conducts reviews of final EISs to ensure that the lead agency has taken USEPA's comments into account, and because their comments were submitted soon after the comment period closed, BOEM was able to include those comments and responses without impacting the project schedule. The comments and responses can be found under Topic 12, USEPA Comments on the Draft GOA Oil and Gas Programmatic EIS in **Table L-1**. Please note that because the comments were submitted directly to BOEM, and not to *Regulations.gov*, the comments do not have a unique ID number.

Topic 1 – NEPA Process and Public Involvement

NEPA Process and Public Involvement – General

- API et al. (BOEM-2023-0046-3145)
- Chevron (BOEM-2023-0046-3140)

NEPA Process and Public Involvement – Requests to Extend the Comment Period

- Earthjustice et al. (BOEM-2023-0046- 0027)
- Ruth Morlas (BOEM-2023-0046-2927)

Topic 2 – NEPA Analysis

Purpose and Need – General

- Earthjustice et al. (BOEM-2023-0046-5236)

Purpose and Need – Climate Change/Emissions

- Earthjustice et al. (BOEM-2023-0046-5236)

NEPA Analysis – General

- Earthjustice et al. (BOEM-2023-0046-5236)

Topic 3 – Alternatives

Alternatives - General

- NMFS, SERO (BOEM-2023-0046- 3146)
- API et al. (BOEM-2023-0046-3145)
- National Ocean Policy Coalition (BOEM-2023-0046-3144)
- Earthjustice et al. (BOEM-2023-0046-5236)
- Andy Radford (1/14/25 Public Meeting)
- CBD (BOEM-2023-0046-3142)
- Chevron (BOEM-2023-0046-3140)

Stated Preference for Alternative A

- Tom Fitzgerald (BOEM-2023-0046-5219)
- CBD (BOEM-2023-0046-3142)
- Christopher Lish (BOEM-2023-0046-5194)
- Ruth Morlas (BOEM-2023-0046-2927)
- Earthjustice et al. (BOEM-2023-0046-5236)
- Sean Tran (1/16/25 Public Meeting)
- Zanagee Artis (1/16/25 Public Meeting)

Stated Preference for Alternatives B-D

- Form Letter 1 (BOEM-2023-0046- 0028)
- API et al. (BOEM-2023-0046-3145)
- National Ocean Policy Coalition (BOEM-2023-0046-3144)
- Chevron (BOEM-2023-0046-3140)
- Andy Radford (1/14/25 Public Meeting)
- David Duke (1/14/25 Public Meeting)
- Lori LeBlanc (1/16/25 Public Meeting)
- NMFS, SERO (BOEM-2023-0046- 3146)

- Ruth Morlas (BOEM-2023-0046-2927)
- Zanagee Artis (1/16/25 Public Meeting)
- Earthjustice et al. (BOEM-2023-0046-5236)

Topic 4 – Environmental Issues and Concerns

Climate Change

- Earthjustice et al. (BOEM-2023-0046-5236)
- Sean Tran (1/16/25 Public Meeting)

Greenhouse Gases

Greenhouse Gases – General

- Tom Fitzgerald (BOEM-2023-0046-5219)
- Earthjustice et al. (BOEM-2023-0046-5236)

Greenhouse Gases –SC-GHG Analysis

- Institute for Policy Integrity (BOEM-2023-0046-3141)
- Earthjustice et al. (BOEM-2023-0046-5236)
- API et al. (BOEM-2023-0046-3145)

Greenhouse Gases – MarketSim Modeling

- Earthjustice et al. (BOEM-2023-0046-5236)
- API et al. (BOEM-2023-0046-3145)

Well Stimulation

- Earthjustice et al. (BOEM-2023-0046-5236)

General Physical, Biological, and Social Resource Analysis

- NMFS, SERO (BOEM-2023-0046-3146)
- Earthjustice et al. (BOEM-2023-0046-5236)

Air Quality

- API et al. (BOEM-2023-0046-3145)
- Earthjustice et al. (BOEM-2023-0046-5236)

Water Quality

- Earthjustice et al. (BOEM-2023-0046-5236)

Coastal Communities and Habitats

- Earthjustice et al. (BOEM-2023-0046-5236)

Benthic Communities and Habitats

- NMFS, SERO (BOEM-2023-0046-3146)

Fishes and Invertebrates

- NMFS, SERO (BOEM-2023-0046-3146)

Birds

- Earthjustice et al. (BOEM-2023-0046-5236)

Marine Mammals

- NMFS, SERO (BOEM-2023-0046-3146)
- Earthjustice et al. (BOEM-2023-0046-5236)

Sea Turtles

- NMFS, SERO (BOEM-2023-0046-3146)
- Earthjustice et al. (BOEM-2023-0046-5236)

Commercial Fisheries

- NMFS, SERO (BOEM-2023-0046-3146)
- Earthjustice et al. (BOEM-2023-0046-5236)

Recreational Fishing

- NMFS, SERO (BOEM-2023-0046-3146)

Recreational Resources

- Earthjustice et al. (BOEM-2023-0046-5236)

Economic Factors

- NMFS, SERO (BOEM-2023-0046-3146)
- Earthjustice et al. (BOEM-2023-0046-5236)
- Zanagee Artis (1/16/25 Public Meeting)
- API et al. (BOEM-2023-0046-3145)

Social Factors

- Earthjustice et al. (BOEM-2023-0046-5236)
- Zanagee Artis (1/16/25 Public Meeting)

Topic 5 – Cumulative Analysis

- Ruth Morlas (BOEM-2023-0046-2927)
- Earthjustice et al. (BOEM-2023-0046-5236)

Topic 6 – Consultations

Endangered Species Act

- Earthjustice et al. (BOEM-2023-0046-5236)

Magnuson-Stevens Fishery Conservation Management Act

- NMFS, SERO (BOEM-2023-0046-3146)

Other Consultations

- NMFS, SERO (BOEM-2023-0046-3146)

Topic 7 – Mitigation

- NMFS, SERO (BOEM-2023-0046-3146)
- Earthjustice et al. (BOEM-2023-0046-5236)
- API et al. (BOEM-2023-0046-3145)

Topic 8 – Oil Spills

- API et al. (BOEM-2023-0046-3145)
- Earthjustice et al. (BOEM-2023-0046-5236)
- Zanagee Artis (1/16/25 Public Meeting)

Topic 9 – General Feedback on the Draft GOM Oil and Gas Programmatic EIS and Associated Leasing

Support

- Form Letter 1 (BOEM-2023-0046- 0028)
- API et al. (BOEM-2023-0046-3145)
- Andy Radford (1/14/25 Public Meeting)
- Karen Palmertree (1/15/25 Public Meeting)
- Barbara Houk (1/15/25 Public Meeting)
- Mark Corson (1/15/25 Public Meeting)
- Darrel Tanner (1/15/25 Public Meeting)

- Jim Dill (1/16/25 Public Meeting)
- Steve Epstein (1/16/25 Public Meeting)
- Annie Cook (1/16/25 Public Meeting)
- Vivian Funkhouser (1/16/25 Public Meeting)
- Roger Sutton (1/16/25 Public Meeting)
- Willian Aucoin (1/16/25 Public Meeting)
- Peggy Lough (1/16/25 Public Meeting)
- John Lough (1/16/25 Public Meeting)
- Dianne James (1/16/25 Public Meeting)
- Jerry Laye (1/16/25 Public Meeting)
- Mike DeMetz (1/16/25 Public Meeting)

Oppose

- Sean Tran (1/16/25 Public Meeting)

Topic 10 – Decommissioning

- CBD (BOEM-2023-0046-3142)
- Earthjustice et al. (BOEM-2023-0046-5236)

Topic 11 – Out of Scope

General

- Ruth Morlas (BOEM-2023-0046-2927)

Topic 12 – EPA Comments on the Draft Programmatic GOA Programmatic EIS

- EPA

Table L-1

TOPIC 1 – NEPA PROCESS AND PUBLIC INVOLVEMENT

NEPA Process and Public Involvement – General

Commenter	ID Number	Comment	Response
API et al.-1	BOEM-2023-0046-3145	"BOEM has undertaken multiple NEPA reviews encompassing oil and gas leasing in the GOM, comprising thousands of pages over several years—all of which support the safe and responsible leasing and development of OCS oil and gas subject to existing robust environmental safeguards…. The Associations are aware of no new information that would change these conclusions for this DPEIS, nor does the DPEIS identify any such new information. Consistent with the Regional Director's note at page iii of the DPEIS, the Final PEIS should make clear that it supports the decision for the first GOM oil and gas lease sale, as well as future leasing and post-lease site- and activity-specific OCS oil-and gas-related activity analyses and approvals, pursuant to the 2024-2029 GOM OCS Oil and Gas Leasing Program."	Thank you for your comment. BOEM is committed to using the best available scientific information in all of its EISs, consistent with the information requirements under NEPA. This includes identifying any new information that has become available between the publication of the Draft and Final PEIS and determining if that information changes the conclusion in the PEIS. BOEM is currently identifying any new information and verifying the conclusions of the Draft PEIS before the publication of the Final PEIS. The Secretary retains the discretion at the lease sale stage to determine whether, when, and under what terms, a lease sale should be held and the precise acreage to be offered. BOEM's PEIS was prepared under our legal obligations under NEPA to inform decisions pursuant to OCSLA. By analyzing the lease sales proposed in the National OCS Oil and Gas Program at a regional level, BOEM provides the Secretary of the Interior with a robust analysis as the background for the decisionmaker to decide which OCS areas to offer for sale and under which conditions, which will be documented in the Record of Decision at a later time. In response to the final comment of the last paragraph, this PEIS is expected to be used to inform the decision for the first GOA oil and gas lease sale proposed in the 2024-2029 National OCS Oil and Gas Program (Lease Sale 262), to be used and supplemented as appropriate for decisions on future proposed Gulf of America OCS oil and gas lease sales, to be used for tiering purposes for associated site- and activity-specific OCS oil- and gas-related activity approvals, and/or to help inform extraordinary circumstance reviews to ensure that categorical exclusions are used appropriately.
Chevron-1	BOEM-2023-0046-3140	Chevron requests that these comments and any materials either accompanying or referenced in these comments be made part of the administrative record for the PEIS.	Thank you. All comments received on this Draft PEIS will be part of the administrative record for this PEIS.
Chevron-2	BOEM-2023-0046-3140	In addition to these comments, Chevron supports and has participated in the development of comments being submitted by the American Petroleum Institute (API), of which Chevron is a member, and, to the extent not inconsistent, incorporates them by reference herein.	Thank you for your comments. BOEM has addressed the comments submitted from API in this matrix and in the PEIS where appropriate.

NEPA Process and Public Involvement – Requests to Extend the Comment Period

Commenter	ID Number	Comment	Response
Earthjustice et al.-A	BOEM-2023-0046- 0027	The undersigned groups respectfully request that the Bureau of Ocean Energy Management ("BOEM") extend the public comment period on the above referenced draft Programmatic Environmental Impact Statement ("PEIS") by forty-five (45) days beyond the currently scheduled public comment deadline of January 27, 2025. Reasons for requesting the extension include: • The length of the document • Timing of the public meetings within the comment period • Comparison to comment periods for PEIS on offshore wind projects	Thank you for your letter dated December 23, 2024. BOEM recognizes that there are 3 business days in the comment period that are affected by federal holidays. While the scope of this EIS includes a larger array of decision points, it is largely the same activities already considered in prior NEPA documents in the Gulf of America that had 45-day comment periods. BOEM included robust information during public scoping promoting early public involvement. Furthermore, the materials to be presented at the public meetings were made available on the website on December 13, 2024. These materials do not present any new information that is not already included in the Draft EIS. In addition, there are more than 11 days after the last public meeting until the comment period closes. BOEM has thoughtfully considered your request and has decided not to extend the comment period.

Commenter	ID Number	Comment	Response
Ruth Morlas-1	BOEM-2023-0046-2927	First, it is to request an extension of the comment period. You are effectively providing only two weeks for someone to read and understand a 752-page document…. Please extend the deadline for comments to something more reasonable, responsible, and fair. Please extend the comment deadline for at least another 45-90 days from now.	Thank you for your request. Please note that there was a 45-day comment period for the PEIS, not two weeks. The Notice of Availability for the PEIS was published in the *Federal Register* on December 13, 2024, and the comment period closed on January 27, 2025. In addition, the materials presented at the public meetings were made available on the website on December 13, 2024. These materials summarize the information presented in the PEIS. BOEM also included robust information during public scoping promoting earlier public involvement in the NEPA process. BOEM has thoughtfully considered your request and has decided not to extend the comment period.

TOPIC 2 – NEPA ANALYSIS

Purpose and Need – General

Commenter	ID Number	Comment	Response
Earthjustice et al.-1	BOEM-2023-0046-5236	**II. The statement of purpose and need is inaccurate and defines the project objectives in unreasonably narrow terms.** Here, the Draft PEIS defines the purpose of the Proposed Action as "to facilitate the potential development of those areas that may contain economically recoverable oil and gas."[29] The Draft PEIS further states that the Proposed Action "is needed to address the ongoing domestic demand for oil and gas resources and, per current law, to facilitate the development of offshore wind as a source of renewable electricity."[30] There are several problems with this purpose and need statement that should be addressed in the final PEIS. First, nowhere does the purpose and need statement reflect the broader statutory requirements of OCSLA, instead focusing solely on increasing energy production from the OCS. In fact, OCSLA recognizes that "the outer Continental Shelf is a vital national resource reserve held by the Federal Government for the public, which should be made available for expeditious and orderly development, subject to environmental safeguards," and BOEM must "balance orderly energy resource development with protection of the human, marine, and coastal environments."[31] Furthermore, this management of the OCS "shall be conducted in a manner which considers economic, social, and environmental values of the renewable and nonrenewable resources contained in the [OCS]," and "the potential impact of oil and gas exploration on other resource values of the [OCS] and the marine, coastal, and human environments."[32] Second, the Draft PEIS makes new leasing a foregone conclusion when in fact there is no need for new leasing in the Gulf. There are already more than 2,200 oil and gas leases in the Gulf across almost 12 million acres,[33] generating 97% of OCS oil and gas production and 14% of total U.S. oil production.[34] U.S. crude oil production established a new record in August 2024 by averaging more than 13.4 million barrels per day, and is now more than twice as high as when President Barack Obama took office in January 2009.[35] In fact, the U.S. is now producing more oil each year than any other country has ever done.[36] These record figures do not appear to factor into the alleged need to address the "domestic demand for oil and gas resources."[37]	Thank you for your comment. In accordance with OCSLA, BOEM considers the national energy needs during the development of the National OCS Oil and Gas Program as well as ensures that development of the OCS is subject to environmental safeguards. In addition, BOEM ensures the protection of the environment when it manages activities on the OCS. Per Section 18 of the OCSLA, BOEM is required to prepare a schedule of oil and gas lease sales on the OCS for 5-year periods, which is accomplished through the preparation of the National OCS Oil and Gas Program. In addition, environmental safeguards are considered when analyzing national energy needs. As stated in OCSLA, the OCS "should be made available for expeditious and orderly development, subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs" (43 U.S.C. 1332(3)). As specified by Section 18 of OCSLA, the analysis in the National Program considered national energy needs and balanced energy development with protection of the human, marine, and coastal environments while simultaneously ensuring receipt of fair market value for the lands leased and the rights conveyed by the Federal Government. For more detail, please refer to **Chapter 1** of the PEIS. The Secretary approved the *2024-2029 National Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program* on December 14, 2023. With the approval of the 2024-2029 National OCS Oil and Gas Leasing Program, the Secretary determined that continued leasing in the GOA is in the national interest and decided to schedule three regionwide lease sales in the GOA Program Area to meet national energy needs. The Secretary retains the discretion at the lease sale stage to determine whether, when, and under what terms, a lease sale should be held and the precise acreage to be offered. When oil and gas lease sales are scheduled, BOEM then conducts regional reviews for individual oil and gas lease sales. The Proposed Action evaluated in this regional PEIS is to hold an oil and gas lease sale on the Federal OCS in the GOA. The purpose and need in the PEIS reflect the statutory requirements of OCSLA. The purpose of this Proposed Action is to facilitate the potential development of those areas in the GOA that may contain economically recoverable oil and gas. This purpose is consistent with BOEM's mandate to further the orderly development of OCS oil and gas resources under OCSLA (43 U.S.C. 1331 et seq.). The need for the PEIS has been revised and now reads "the need for the Proposed Action is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C.1331 et seq.)." The PEIS is expected to be used to inform the decision on whether and how to proceed for the first proposed GOA oil and gas lease sale scheduled in the 2024-2029 National OCS Oil and Gas Program. BOEM may also rely on the PEIS or supplement it as appropriate for decisions on future proposed GOA oil and gas lease sales that will be made in the normal course. BOEM may also tier from the PEIS in future NEPA reviews for associated site- and activity-specific OCS oil- and gas-related activity approvals (typically environmental assessments for plan approvals), and to help inform extraordinary circumstance reviews to ensure categorical exclusions are used appropriately. Thus, for each lease sale decision, the decisionmaker has the ability to choose one of the alternatives, or a combination of alternatives, after weighing possible benefits and adverse environmental impacts.

Commenter	ID Number	Comment	Response
		Third, despite the Draft PEIS's focus on this domestic demand, the United States is not even consuming a significant portion of the oil and gas that it is producing. In fact, since 2023, the U.S. has been a net exporter of petroleum products.[38] In 2023, the U.S. exported about 10.15 million barrels per day of petroleum to 173 countries and 3 U.S. territories (American Samoa, Puerto Rico, and U.S. Virgin Islands), with crude oil exports of about 4.06 million barrels per day accounting for 40% of total U.S. gross petroleum exports.[39]	The Secretary also has the discretion to include several environmental safeguards at the leasing stage through lease stipulations (described in **Appendix J** of the PEIS, and Chapter 7 of the SID, which is incorporated by reference). Additionally, post-lease environmental safeguards (mitigating measures) are an integral part of BOEM's program to ensure that post-lease operations are conducted in an environmentally sound manner (with an emphasis on minimizing any adverse impact of routine activities on the environment). BOEM assigns site-specific mitigations by imposing conditions of approval on a plan, permit, or authorization (described in Chapter 6 of the SID, which is incorporated by reference into this PEIS). With respect to no new leasing, as discussed in the *2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program Final Programmatic Environmental Impact Statement*, if no new lease sales were to occur, market forces dictate that most of this foregone energy would likely be procured from other sources to meet energy demand. In response to the comment concerning petroleum exports, BOEM's mission is the economically and environmentally responsible development of offshore energy and mineral resources. In addition to crude oil, the U. S. also exported approximately 2.68 million barrels per day of hydrocarbon gas liquids (propane, butane, ethane, etc.) and 2.98 million barrels per day of finished petroleum products (motor gasoline, fuel oils, etc.) during 2023. BOEM does not have jurisdiction over policies related to the export or import of oil and gas resources.
Earthjustice et al.-2	BOEM-2023-0046-5236	Finally, the Draft PEIS's statement that the Proposed Action is needed "per current law, to facilitate the development of offshore wind as a source of renewable electricity" is based on a provision of the Inflation Reduction Act ("IRA") which ties offshore wind development to offshore oil and gas leasing.[48] ….Yet nowhere does the statement of purpose and need grapple with the fact that the Proposed Action itself will lock in significant new fossil fuel production for decades, resulting in massive amounts of GHG emissions and making it more difficult for the U.S. to meet these targets.[51]	Thank you for your comment. The recent Presidential Memorandum, "Temporary Withdrawal of All Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects" (January 20, 2025) withdrew all areas within the OCS as defined in section 2 of the Outer Continental Shelf Lands Act, 43 U.S.C. 1331 from disposition for wind energy leasing as of January 21, 2025, and shall remain in effect until the Presidential Memorandum is revoked. This withdrawal temporarily prevents consideration of any area in the OCS for any new or renewed wind energy leasing for the purposes of generation of electricity or any other such use derived from the use of wind. Based on this Presidential Memorandum, the need for the PEIS has been revised to remove the statement "per current law, to facilitate the development of offshore wind as a source of renewable electricity." The need for the PEIS has been revised and now reads "the need for the Proposed Action is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. §§ 1331 *et seq.*)." With respect to the proposed action and its link to fossil fuel production, E.O. 14154 *"*Unleashing American Energy*"* (January 20, 2025), states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future. With respect to the Biden Administration's climate goals, increasing renewable energy production, and reducing reliance on oil and gas, recent changes in federal policy through recent E.O.s provide revised guidance on BOEM policy. E.O. 14154, revoked several Biden era policies, including E.O. 14008, "Tackling the Climate Crisis at Home and Abroad.*"* In addition, E.O. 14148, "Initial Recissions of Harmful Executive Orders and Actions" (January 28, 2025) rescinded Biden era E.O.s related to climate change, including: E.O. 14008, "Tackling the Climate Crisis Home and Abroad" (January 27, 2021), E.O. 14013, "Rebuilding and Enhancing Programs to Resettle Refugees and Planning for the Impact of Climate Change on Migration" (February 4, 2021), E.O. 14027, "Establishment of the Climate Change Support Office" (May 7, 2021), and E.O. 14030, "Climate-Related Financial Risk" (May 14, 2021). Therefore, the goals outlined in those E.O.s are no longer BOEM policy. E.O. 14162, "Putting America First in International Environmental Agreements" (January 20, 2025), states that "The United States Ambassador to the United Nations shall immediately submit formal written notification of the United States' withdrawal from the Paris Agreement under the United Nations Framework Convention on Climate Change." On January 27, 2025, the Secretary-General was notified of the United States' withdrawal from the Paris Agreement. Furthermore, the E.O. ordered the withdrawal of the United States from any agreement, pact, accord, or similar commitment made under the United Nations Framework Convention on Climate Change.

Purpose and Need – Climate Change/Emissions

Commenter	ID Number	Comment	Response
Earthjustice et al.-3	BOEM-2023-0046-5236	Fourth, and most significantly, the Proposed Action arises at a time of rapid change in federal policy addressing fossil fuels, greenhouse gases ("GHG"), and the climate crisis. In 2009, the federal government declared that elevated concentrations of GHGs were likely to "endanger the public health and welfare of current and future generations."[40] In the 2023 Fifth National Climate Assessment, the federal government concluded that "[w]ithout rapid and deep reductions in global greenhouse gas emissions from human activities, the risks of accelerating sea level rise, intensifying extreme weather, and other harmful climate impacts will continue to grow…." [41] The U.S. has enacted policies that seek to address this crisis. In 2021, President Biden issued Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, formally declaring the nation to be in a "climate crisis" that called for an all-of-government response.[42] ….Internationally, as a signatory to the Paris climate agreement, the U.S. has committed to cutting U.S. GHG emissions by over half by 2030 in order to hold global average temperature increases to 2.0 degrees Celsius and to pursuing efforts to hold them to 1.5 degrees.[45] Meeting these policy commitments will require an aggressive, immediate phase-out of the production and consumption of fossil fuels. There are already more than enough fossil fuels in development to overshoot the nation's climate policy goals and international commitments to limit emissions, even without any new development.[46] A U.N.-authored report found that plans to continue production of fossil fuels were "dangerously out of sync" with international commitments to reduce GHGs.[47] Yet nowhere does the Draft PEIS's statement of purpose and need consider these legal obligations and the immediate need to cut fossil fuel production.	Thank you for your comment. BOEM provided a discussion of potential net-zero pathways and associated impacts to energy demand on the incremental emissions from a decision for the proposed action in **Appendix H,** and summarized in **Chapter 4.0.2.1,** of the Draft PEIS. However, this analysis (**Appendix K** in the Final PEIS) has been modified given the recent E.O.s from January 2025 and change in administration priorities, policies and regulations including a CEQ interim final rule to remove the existing implementing regulations for NEPA and disbanding of the IWG and withdrawal of any guidance, instruction, recommendation, or document issued by the IWG. The Proposed Action in the PEIS is to hold an oil and gas lease sale on the Federal OCS in the GOA. BOEM acknowledges that this is a time of rapid change in federal policy and recent Executive Orders provide guidance on BOEM policy. Please see previous comment response stated in Earthjustice et al.-2 regarding the proposed action moving away from fossil fuel production, the Biden Administration's climate goals, and the Paris Climate Agreement.

NEPA Analysis – General

Commenter	ID Number	Comment	Response
Earthjustice et al.-4	BOEM-2023-0046-5236	BOEM estimates that a single OCS oil and gas lease sale will result in up to nearly 1 billion barrels of oil and nearly 1 trillion cubic feet of gas.[3] BOEM's proposal fails to comply with clear requirements of the Outer Continental Shelf Lands Act ("OCSLA") and the National Environmental Policy Act ("NEPA") to conduct environmental analyses on a finer geographic scale. The Draft PEIS provides little to no meaningful analysis of the site-specific environmental impacts of the proposed lease sale. The NEPA process provides guidance for BOEM's decision-making. Indeed, NEPA requires BOEM to take a hard look at the impacts that continued oil and gas development would bring to communities, species, and the environment, and give them appropriate consideration when exercising its discretion in deciding whether to hold and how to hold a new lease sale in the Gulf of Mexico. BOEM must conduct an accurate environmental analysis and consider a reasonable range of alternatives that includes leasing options that minimize environmental impacts.	Thank you for your comment. BOEM's OCS Oil and Gas Program Planning and Decision Process is described in Chapter 1.3 of the SID, which is incorporated by reference into the PEIS. Due to the staged decision-making process in OCSLA, BOEM does a staged or tiered process in which NEPA documents that cover potential impacts associated with the various stages of the OCSLA process are prepared. This includes analyses at the National OCS Oil and Gas Program stage, proposed lease sale stage, exploration or development and production plan stage, and various permitting stages, including, but not limited to, drilling and decommissioning. BOEM has chosen at its discretion to prepare a Programmatic EIS at this stage to analyze the potential environmental impacts that could result if exploration, development, production, and decommissioning activities eventually occur, in order to provide the context and setting of future Proposed Actions and to better understand the potential impacts associated with these types of activities as well as the ongoing and reasonably foreseeable impacts on GOA resources. This allows more time to include public involvement and to evaluate the potential environmental impacts of the proposed activities. The PEIS is informed by and incorporates by reference the GOM Oil and Gas SID which: (1) identifies the resulting activities associated with OCS oil and gas leasing, (2) describes IPFs, and (3) describes cause and effect relationships of the IPFs to the physical, biological, and social resources in the GOA. The PEIS analysis focuses on the context and intensity of the actions described in the SID by considering the scenario of these activities described in **Chapter 3.3.2** and listed in **Table**

Commenter	ID Number	Comment	Response
			3.3-2 of the PEIS to determine those potential effects at a regional level. Following the regional NEPA analysis, BOEM will conduct additional NEPA analysis at the site-specific stage for each exploration or development and production plan, and various permitting stages, including, but not limited to, drilling and decommissioning. This staged analysis also provides for a more informed lease sale decision, which, in turn, allows for future site-specific reviews that can be tiered to in additional NEPA documents, thereby streamlining the NEPA process for the region. BOEM considers a reasonable range of alternatives in the PEIS in addition to the No Action Alternative. The alternatives analyzed in this PEIS identify potential space use conflicts between different uses in the GOA and sensitive habitats in the GOA and propose different solutions to these conflicts through the use of mitigating measures that will protect sensitive species or limit activities in certain areas, should they be leased (Alternative B), or by eliminating conflict by excluding certain areas from leasing through exclusions (Alternatives C and D). To minimize the environmental harm potentially caused by OCS oil- and gas-related activities authorized by BOEM, BOEM has developed a suite of commonly applied mitigating measures described in Chapter 6 of the SID, which is incorporated by reference into this PEIS and Pre-Lease Stipulations described in **Appendix J** of the PEIS, and Chapter 7 of the SID, which is incorporated by reference. BOEM's subject-matter experts analyzed each alternative for the Proposed Action, with and without these mitigating measures in the PEIS. Furthermore, BOEM consults with Federal, tribal, and State agencies responsible for regulatory environmental compliance to assure appropriate environmental mitigating measures are relevant and up to date.
Earthjustice et al.-5	BOEM-2023-0046-5236	NEPA and OCSLA, as well as their implementing regulations, guide the environmental review process of the national OCS oil and gas leasing program. BOEM must comply with mandates under those statutes and their implementing regulations for the proposed action contemplated under this Draft PEIS. **National Environmental Policy Act** BOEM must take a hard look at the effects of the proposed action—a lease sale on the GOM OCS—and evaluate reasonable alternatives to the action. The EIS must also consider the cumulative impacts of the proposed lease sale in conjunction with past, present, and reasonably foreseeable future impacts, including impacts from oil and gas activities, other commercial and recreational activities in the GOM, as well as the impacts of climate change and other environmental degradation. **Outer Continental Shelf Lands Act** On December 14, 2023, the Secretary signed a Decision Memorandum and Record of Decision for the Programmatic Environmental Impact Statement for the 2024-2029 National OCS Oil and Gas Program ("Program"). The Program sets a framework for leasing during the respective term, and leases may only be sold and issued pursuant to the terms of the Program.[20] However, the Secretary retains discretion under OCSLA to determine whether, when, and how to hold individual lease sales listed in the Program[21].	Thank you for your comment. The Secretary is charged with developing the National OCS Oil and Gas Program and is required to balance development with protection of the human, marine, and coastal environments while simultaneously ensuring receipt of fair market value for the lands leased and the rights conveyed by the Federal Government. Under Section 18 of OCSLA, the Secretary is responsible for approving a schedule of lease sales for a 5-year period in a National OCS Oil and Gas Leasing Program. BOEM follows all requirements set forth by OCSLA and is responsible for developing the National OCS Program, advising the Secretary, and administering the National OCS Program. CEQ issued an interim final rule to remove the existing implementing regulations for NEPA, in response to E.O. 14154, "Unleashing American Energy" (January 20, 2025). BOEM's PEIS was prepared according to the NEPA statute (42 U.S.C. 4321 et seq.) and the DOI implementation of NEPA regulations (43 CFR 46) to inform decisions pursuant to OCSLA with the PEIS provides a robust analysis as the background for the decisionmaker to decide which OCS areas to offer for sale and under which conditions. The Secretary retains the discretion at the lease sale stage to determine whether, when, and under what terms, a lease sale should be held and the precise acreage to be offered. Please refer to the comment response Earthjustice et al.-4 for details on how potential space use conflicts could be reduced for each alternative. For more details on the alternatives considered in the PEIS, please refer to **Chapter 2** of the PEIS. For more detail on the alternatives analysis and the impacts of each alternative to the resources in the GOA, please refer to **Chapter 4** and **Appendix M**. BOEM's cumulative impact analysis was conducted in accordance with DOI's implementing regulations (43 CFR 46). This considers the contribution of the potential impacts of the Proposed Action to the past, present, and reasonably foreseeable future activities in the action area. New information and associated analysis have also been added to each resource section in **Chapter 4** and **Appendix M** of the PEIS for ongoing activities and reasonably foreseeable affects in accordance with the DOI Implementing regulations (43 CFR 46) and NEPA statute (42 U.S.C. 4321 et seq). Please refer to each resource section in **Chapter 4** and **Appendix M** of the PEIS for the cumulative impacts analysis and **Chapter 4.17** of the PEIS for a cumulative impacts summary.

TOPIC 3 – ALTERNATIVES

Alternatives – General

Commenter	ID Number	Comment	Response
NMFS, SERO-1	BOEM-2023-0046-3146	The PEIS has four alternative actions, each of which focus on tiered, additional 'exclusions' for leasing. This tiered set of exclusions would presumably be informed by environmental, industrial, military and other factors. However, offshore oil and gas is highly location dependent, as economically viable resources only exist in discrete areas. Rather than focusing on 'exclusions,' the marine spatial planning (MSP) process focuses instead on opportunities, (e.g., finding areas that best support an offshore activity) while minimizing conflicts with other ocean uses. Hence, we would recommend that comprehensive MSP be conducted so the alternatives and ultimately, decisions can be informed by the best available science…. When the offshore wind industry was introduced to the GOM in 2022, BOEM partnered with NOAA's National Centers for Coastal Ocean Science (NCCOS) to develop a collaborative marine spatial planning (MSP) process to ensure that offshore wind energy development would be sited appropriately for living marine resources and other ocean co-uses…. BOEM could extend their partnership with NOAA NCCOS on MSP for oil and gas development during the implementation of the 5-year program. The partial deconfliction of ocean uses with respect to oil and gas development could be achieved through a comprehensive MSP process. Such an approach will maximize public benefits of oil and gas leasing in the GOM, while minimizing conflicts with sensitive environmental resources and supporting other ocean uses, such as fishing, navigation, renewable energy, sediment sources for coastal protection, and military readiness…. The PEIS highlights potential impacts to several species of marine mammals, including Rice's whales, sperm whales, and bottlenose dolphins. However, there are additional offshore marine mammal species that should be considered in the recommended MSP efforts that were not previously addressed in comments provided to BOEM. New information has become available since the publication of the PEIS that details impacts observed over 10 years to toothed whaled species following the 2010 Deepwater Horizon oil spill event.[8] …. Given this new information, it is important for these groups of toothed cetacean species – in particular beaked whales that experienced the greatest long-term declines – to be considered in the recommended MSP process and given consideration when developing mitigation measures to reduce impacts to these already affected species.	Thank you for your suggestion. BOEM uses the best available science to inform decisions and the use of a spatial planning model to determine areas that best support offshore oil and gas activities is not necessary. The areas available for OCS oil and gas leasing are identified through the Area ID process. In the Area ID process, BOEM uses information and comments received in response to a Call for Information and Nominations to develop a recommendation for the areas to be carried forward for consideration for leasing and environmental analysis. BOEM's alternatives are then formed using the areas available for lease in the Area ID. BOEM's mission is to responsibly manage the energy and mineral resources of the U.S. OCS. There are multiple uses of the OCS, and one form of energy development does not take precedence over another. In fact, BOEM's regulations allow for multiple uses of an area. If a lease is issued for a specific use (e.g., offshore wind development, sand and gravel, or oil and gas development), BOEM may consider a request for other uses, as long as those uses do not unreasonably interfere with the original lease holder's use of its lease and BOEM's lease instruments allow for such. The process to establish Wind Energy Areas (WEAs) for Renewable Energy Leasing is different than the process BOEM used to determine alternatives to analyze for this Programmatic EIS. In addition, in reference to the marine spatial planning modelling that BOEM performed with NOAA (Randall et al. 2022) for WEA identification, this model included oil and gas infrastructure distancing when determining the appropriate locations of the WEAs (Celata 2022; Kendall 2023). Under Alternatives C and D, GOA oil and gas leasing is excluded from the WEAs and Call Area, respectively. These exclusions would minimize the space-use conflicts between OCS wind energy and oil and gas development. However, conflicts with vessel traffic may still occur. On July 30, 2025 Secretary Burgum signed S.O. 3437, *Ending Preferential Treatment for Unreliable, Foreign Controlled Energy Sources in Department Decision-Making,* which rescinded all designated GOA Wind Energy Areas. BOEM considered space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind activities, and OCS significant sediment resources. Refer to **Chapter 4.0.2.2** of the PEIS for details how each potential space use conflict was addressed. As part of BOEM's robust environmental analysis, BOEM considered the impacts to marine mammals in **Chapter 4.8**. This analysis included pertinent new information on marine mammals available following the *Deepwater Horizon* event as well as the impacts from unintended releases into the environment on marine mammals, including oil spills. Any new pertinent information on marine mammals made available between the publication of the Draft PEIS and the Final PEIS was also included in this analysis. In reference to new information published since the publication of the Draft PEIS, (Frasier et al. 2024) has been incorporated into the analysis in **Chapter 4.8.2** of the PEIS. As mentioned above, BOEM uses the best available science to inform our decisions (including this new information on marine mammals) and the use of a spatial planning model to determine areas that best support offshore activities or to assess the potential impacts to species is not necessary. Rather, impacts in the PEIS are assessed through the best available science and through the use of the Area ID process, which is described above, and a scenario, consideration of impact producing factors, and cause and effect analysis as detailed in **Chapter 4.8** of the PEIS.

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API et al.-2	BOEM-2023-0046-3145	**2. Alternative A Contravenes Statutory Requirements to Maintain an OCS Leasing Program.** Though inclusion of a No Action Alternative (Alternative A) is appropriate for NEPA review purposes, BOEM should reject that alternative as unreasonable and not meeting either BOEM's stated objectives or Congress' mandates. The DPEIS (at 1-5) recognizes "BOEM's mandate to further the orderly development of OCS oil and gas resources under the OCSLA." Particularly given the unprecedentedly few lease sales already contained in BOEM's 2024-2029 Program, and with the most recent lease sale held back in December 2023, cancelling any scheduled lease sale would impermissibly render the Program a mere paper exercise, thereby flouting Congressional mandates for OCS oil and gas leasing under the Outer Continental Shelf Lands Act of 1953 (OCSLA, 43 U.S.C. § 1331 et seq.)), the 1978 amendments to OCSLA (Public Law 95-372, 92 Stat. 629), and the 2022 IRA, Pub. L. 117-169 §§ 50264 and 50265 (Aug. 16, 2022). Alternative A also cannot be reconciled with the President's recent executive orders directing increased domestic energy production and the removal of obstacles to leasing of energy resources on public lands. The IRA makes clear that BOEM must pursue a truly all-of-the-above energy strategy on the OCS in lieu of its repeated cancellations or extreme truncations of OCS oil and gas lease sales since early 2021. Multiple courts have held that Congress requires DOI to establish and implement an oil and gas leasing program and continue to conduct lease sales. E.g., Louisiana v. Biden, No. 2:21-CV-00778, 2022 WL 3570933 (W.D. La. Aug. 18, 2022) (final merits ruling on summary judgment) (OCSLA "requires [BOEM] to sell oil and gas leases"). Selecting Alternative A would render the Program illusory and statutorily deficient. The DPEIS (at 2-4) discusses the uncertainties that cancelling future lease sales would create for operators, noting that such cancellations "may present economic circumstances that increase the risk of smaller operators going bankrupt and larger operators focusing their activities elsewhere in the world." "When OCS oil and gas lease sales occur on a regular basis, as they generally have for many decades, operators maintain maximum flexibility in how they choose to invest in their discoveries." Id. The DPEIS states that it is "challenging" to predict how operators would respond to Alternative A, but that the lack of new leasing opportunities could lead to fewer capital investments in the GOM region, with associated adverse economic effects. The DPEIS (at 4-217) treats the extent of these economic impacts as uncertain, ranging from "minor adverse" to "moderate adverse" impacts. The DPEIS (at 4- 235) also discusses potential social impacts on communities that depend on the oil and gas industry, but summarily concludes those impacts will be "negligible." This greatly understates the potential economic and social effects of Alternative A. There have already been interruptions in the GOM leasing program and a significant reduction in lease sales from past years. Selecting Alternative A would affect the industry's willingness to invest in the GOM OCS, with foreseeable severe effects on operators and associated industries and communities.	Thank you for your comment. The No Action Alternative is provided for analysis purposes and to comply with the NEPA statute (42 U.S.C. 4321 et seq.) and the DOI regulations implementing NEPA (43 CFR 46). All alternatives are under consideration as part of BOEM's robust environmental review process. The preferred alternative will be selected by the Assistant Secretary of Lands and Minerals Management (as the delegated authority). They will also sign the Record of Decision and decide whether to hold a lease sale. With respect to recent E.O.s for increased domestic energy production as well as the Nation's energy strategy, E.O. 14154 "Unleashing American Energy" (January 20, 2025), states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS, in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future. This policy fits the revised need for the Proposed Action, which is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. 1331 et seq.). As noted above, the Secretary will weigh the alternatives presented in the PEIS, including the No Action Alternative, as well as consider the recent E.O.s, before selecting an alternative. With respect to the impacts on economics and social factors under Alternative A, the impacts of a proposed OCS oil and gas lease sale on economics and social factors are discussed in **Chapter 4.15** and **Chapter 4.16** of the PEIS. As part of the analysis, BOEM considers the impacts of choosing the No Action Alternative (Alternative A), which is the cancellation of a single OCS oil and gas lease sale. For the economics analysis, indirect impacts from socioeconomic changes and drivers from ongoing OCS oil- and gas-related activities and non-OCS oil and gas sectors would still contribute to the existing environmental baseline and ongoing activities stemming from previous OCS oil and gas lease sales that may potentially have direct impacts on economic factors through socioeconomic changes and drivers. A discussion of Alternative A in **Chapter 4.15.2.3** of the PEIS details the potential economic impacts of the cancellation of a single OCS oil and gas lease sale and explains the difference in potential short-term impacts (negligible) and the potential longer-term impacts (minor to moderate adverse), depending on stages of exploration and development and development strategies. In **Chapter 2.2.1** of the PEIS BOEM acknowledges that cancelling a proposed OCS oil and gas lease sale, resulting in a multi-year period (up to 4 years) of no new oil and gas leasing, creates areas of uncertainty for oil and gas developers. Please note that although the cumulative scenario in the Draft PEIS did consider the fewer lease sales proposed under the 2024-2029 National Program than have been included in previous National Programs, revisions have been made to the cumulative scenario in **Chapter 3.3.2** of the Final PEIS to acknowledge for the reasonably foreseeable future National OCS Oil and Gas Programs that could schedule up to 10 proposed OCS oil and gas lease sales in the GOA in response to recently issued E.O. 14156, "Declaring a National Energy Emergency" (January 20, 2025), E.O. 14154 "Unleashing American Energy" (January 20, 2025), Secretary's Order (S.O.) 3417, "Addressing the National Energy Emergency" (February 3, 2025), and S.O. 3418 Unleashing American Energy" (February 3, 2025). These changes have also been addressed in **Chapter 2.2.1** and the impact analyses in the Final PEIS. As noted in the PEIS, the cumulative scenario also includes the fact that the GOA region is currently experiencing continuous OCS oil- and gas-related operations resulting from a long history of regularly occurring OCS oil and gas lease sales (typically annually with a few exceptions) which are currently contributing to regional economics and employment and will continue for years to come. For the social factors analysis of Alternative A, the social impacts on communities of a single cancelled sale as compared to the large amount of ongoing and future activities related to already leased portions of the OCS would be difficult to predict or capture due to their negligibility and diffusiveness, though these could compound with successively missed sales. A wider downturn in the industry activity could have profound social impacts, most notably demonstrated by the downturn in the 1980s, although that is outside of the scope of this analysis as a single cancelled lease sale is not expected to have such far reaching impacts across GOA region communities.

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API et al.-3	BOEM-2023-0046-3145	The DPEIS is also inconsistent in its treatment of Alternative A, and avoids analyzing some predictable impacts of selecting this alternative. For example, the DPEIS analyzes vessel traffic as a factor under alternatives B, C, and D, but not under Alternative A. The DPEIS's charts at page 4-93 and pages 4-121- 122 compare impacts on fish and marine mammals of alternatives B, C, and D associated with vessel traffic and other factors, but omit alternative A, stating that the impacts of that alternative are "none." But BOEM acknowledged in its programmatic analysis of the national OCS leasing program that cessation of leasing would lead to substitution with imported oil to meet energy needs, giving rise to increased tanker traffic with associated impacts. National OCS Final PEIS at 7, 240-43. In that earlier PEIS, BOEM stated that "tanker noise and vessel strikes are particular concerns for marine mammals." (National OCS PEIS at 242). The DPEIS's failure to address these effects of additional vessel traffic renders its analysis of Alternative A deficient.	Thank you for your comment. As discussed in the *2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program Final Programmatic Environmental Impact Statement*, if no new lease sales were to occur, market forces dictate that most of this foregone energy would likely be procured from other sources to meet energy demand. This could include increased tankering of imported oil. However, the No Action Alternative in the *2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program Final Programmatic Environmental Impact Statement* is different from the No Action Alternative in the PEIS. The No Action Alternative in the PEIS is the cancellation of a single proposed GOA oil and gas lease sale, not no new leasing. Under Alternative A in the PEIS the opportunity for development of the estimated oil and gas from the proposed action would be precluded or postponed to a future proposed OCS oil and gas lease sale. BOEM would not expect tankering of imported oil to occur with the cancellation of a single proposed GOAR oil and gas lease sale. Therefore, an analysis of vessel traffic from oil tankering would not be appropriate under Alternative A of the PEIS. BOEM does, however, analyze the baseline conditions, ongoing activities related to previously issued leases and permits, and activities that may occur in the future under existing leases or a separate proposed OCS oil and gas lease sale decision related to the Gulf of America OCS Oil and Gas Program under Alternative A. BOEM has clarified and added detail to the analysis of the ongoing OCS oil and gas activities associated with past and present OCS oil and gas lease sales and the Non-OCS oil- and gas-related activities under Alternative A in addition to the analysis of the cancellation of a single proposed OCS oil and gas lease sale. Ongoing OCS oil- and gas-related activities and other non-OCS oil- and gas-related activities that contribute to the baseline environment are detailed in each resource section of **Chapter 4** and **Appendix M** of the PEIS. The impact analysis framework is described in **Chapter 4.0.3** of this Programmatic EIS with more detail in Chapter 3 of the SID. The incremental impact of the cancellation of a single lease sale would be none for fish and invertebrates (**Chapter 4.6**) and marine mammals (**Chapter 4.8**) under Alternative A because there would be no new routine activities or accidental events resulting from the proposed action. And, as discussed above, an analysis of additional vessel traffic from tankering would not be appropriate because tankering would not be expected with the cancellation of a single lease sale.
API et al.-4	BOEM-2023-0046-3145	Similarly, the DPEIS (at 2-4) states that Alternative A would lead to fewer local impacts "but these activities and associated impacts could shift to other regions," but it does not provide details on these potential effects. This inconsistent presentation of impacts could preclude DOI and the public from making an informed comparison of the alternatives. The Associations urge DOI to carefully evaluate its presentation of the no-action alternative to ensure that the final PEIS gives the public and the decision-maker appropriate and accurate information to make this informed comparison.	Thank you for your comment. **Chapter 2.2.1** of the Final PEIS has been updated with additional information for Alternative A, which provides details on potential impacts of the cancellation of a single proposed OCS oil and gas lease sale.
API et al.-5	BOEM-2023-0046-3145	**4. Alternative C Excludes Vast Areas From Leasing Without Adequate Justification.** Alternative C would exclude significant areas from leasing when compared to Alternative B. As discussed below, BOEM has not provided a reasonable basis for these proposed exclusions. **a. Rice's Whale Exclusions** Alternative C would exclude blocks within the Rice's whale currently proposed critical habitat area and the Rice's whale proposed core distribution area. No such critical habitat has even been finalized to date. Moreover, that proposal is baseless and overbroad, as reflected in separate comments thereon, which are attached to this comment letter. The Associations recognize the importance of conserving marine mammals, including the Rice's whale, but maintain that this goal can be achieved through BOEM's existing approach, under which a lease stipulation provides operating conditions on vessels operating in the De Soto Canyon area, the only area where Rice's whales are regularly and predictably found. Moreover, the exclusion of the proposed critical habitat area does not provide additional protections to Rice's whales over Alternative B. Even supposing that whales are present in the proposed	Thank you for your comment. BOEM's action alternatives were designed to analyze the potential effects of excluding certain sensitive areas from leasing to determine their necessity. To ensure a reasonable range of Alternatives and at the request of the Secretary, BOEM analyzed alternatives that looked at targeted leasing opportunities. When the alternatives were designed, BOEM had adopted a stance of avoidance of potential impacts over mitigation of potential impacts. Therefore, Alternatives C and D provided options for the removal of whole or partial blocks from additional sensitive areas and potential areas of space use conflicts that have been emphasized by public commenters in scoping for previous NEPA analyses, can be geographically defined, and have adequate existing information regarding their importance and/or ecological sensitivity to OCS oil- and gas-related activities. With respect to the Rice's whale exclusion areas, the exclusion of the Rice's whale proposed core distribution area and proposed critical habitat area under Alternatives C and D were included in the alternatives to analyze and determine if there is a need for the exclusion areas. As mentioned in the comment, when considering impacts to marine mammals, under Alternative B, BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notice to Lessees, and Information to Lessees that will protect sensitive species and limit activities in certain areas, should they be leased. Please see previous the comment response Earthjustice et al.-4 discussing BOEM commonly applied mitigating measures.

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		critical habitat area (which has not been established, as discussed below), vessels must still cross the 100-400m isobath for either alternative, and the large oil spill risk analysis for both alternatives is nearly identical. The additional restrictions proposed under Alternative C do not have a sound basis in science or available data. In particular, there is limited evidence that the Rice's whale is consistently present in the proposed critical habitat area.... NMFS proposed designation of critical habitat under the Endangered Species Act (ESA) for the Rice's whale in July 2023, but as of the date of these comments, it has not taken action to finalize that designation. A proposed critical habitat designation has limited legal status as an agency action, and the mere existence of a proposal to designate critical habitat should not be given weight in BOEM's environmental impact analysis.[12] Otherwise, NMFS would be improperly predetermining its ESA decision. Alternative C merely repeats DOI's prior errors. BOEM instead should adhere to its longstanding practice of addressing conservation of Rice's whales through lease-based restrictions applicable only to operations in the demonstrated Biologically Important Area for the Rice's whale. The Associations object to BOEM's unsupported proposal to replace this approach with broad exclusions from leasing. **b. Wind Exclusions** The DPEIS proposes to exclude entirely from oil and gas leasing a set of areas that have been identified for potential wind leasing: the Wind Energy Options, the Wind Energy Areas, and Wind Energy Lease(s).... To the extent that wind energy facilities are eventually constructed in the areas in question, any use conflicts can be managed with lease stipulations without the need for the broad proposed exclusions from leasing altogether. The DPEIS acknowledges (at 4-14), in discussing potential space-use conflicts with wind and other uses, that "in the event that incompatibilities would arise, BOEM could utilize lease stipulations to help mitigate the potential conflicts." Wind facilities require energy transmission lines, but those lines are limited in scope and any conflicts with other uses of the GOM, such as rights of way for oil and gas pipelines, can be addressed with lease conditions that address the routing of this infrastructure to prevent conflicts. The DPEIS (at 4-16) explains that BOEM's own analysis envisions use of distancing as a tool to manage potential conflicts: "The marine spatial planning that BOEM performed with NOAA included oil and gas infrastructure distancing when determining the appropriate locations of the WEAs." The DPEIS cites the study on which BOEM relied in identifying the wind energy areas for potential leasing; that study likewise assumed that distancing would be a tool to manage conflicts between wind energy and other uses such as oil and gas development. Randall et al, "A Wind Energy Siting Analysis for the Gulf of Mexico call area" (BOEM 2022). Overall, BOEM should liberally consider maximum use of the GOM OCS on a lease-by-lease basis to achieve OCSLA's energy generation purposes critical to the prosperity of the nation.	BOEM's subject-matter experts analyzed each alternative for the Proposed Action, with and without these mitigating measures in the PEIS. Furthermore, BOEM consults with Federal, tribal, and State agencies responsible for regulatory environmental compliance to assure appropriate environmental mitigating measures are relevant and up to date. Indeed, BOEM's lease stipulations and mitigations are highly effective, which is why they could be applied in areas that are available for leasing. BOEM's comparison of alternatives details the differences in impacts to marine mammals, including the Rice's whale in **Table 2.5-1** and **Chapter 4.8** of the PEIS. The PEIS details that impacts from most routine activities would primarily occur in the areas not excluded from leasing. Although impact levels for the alternatives may appear the same, the areas of impact are smaller with each alternative as the exclusion areas increase. As noted in the PEIS, the impact levels remain the same between alternatives because of marine mammals' wide distribution across the GOA, transitory use of the excluded areas, and because impacts from some IPFs (e.g., vessel strikes and oil spills) could still occur in the excluded areas. With respect to wind exclusions, the exclusion of the Wind Energy Options, the WEAs, and Wind Energy Lease(s) under Alternative C and the Call Area under Alternative D were included in the alternatives to analyze and determine if there is a need for the exclusion areas. Both conventional energy leases and renewable energy leases give BOEM the right to lease within an already leased area provided the activity does not unreasonably interfere. Section 19 of the conventional energy lease form states that the lessor reserves the right to, "grant leases for any minerals other than oil and gas, and to issue leases or grants for renewable energy or alternative uses within the leased area … as long as such leases or grants shall not unreasonably interfere with or endanger operations under this lease." Likewise, the renewable energy lease form states that, "the Lessor reserves the right to authorize other uses within the leased area and project easement(s) that will not unreasonably interfere with activities described in an approved SAP and/or COP, pursuant to this lease." However, the lease also states that the "the lease does not authorize the Lessee to conduct activities on the Outer Continental Shelf (OCS) relating to or associated with the exploration for, or development or production of, oil, gas, other seabed minerals, or renewable energy resources other than those renewable energy resources identified in Addendum "A" of that form. As noted in the PEIS, if space use incompatibilities with renewables arise on an oil and gas lease, BOEM could utilize lease stipulations to help mitigate the potential conflicts. In addition, when WEAs were identified, the locations of the WEAs included distancing for OCS oil and gas infrastructure, which could help reduce conflict near WEAs. With respect to other exclusions, the exclusion of the SSRAs, Topographic Features Stipulation Blocks, Live Bottom (Pinnacle Trend) Stipulation Blocks, and Blocks South of Baldwin County, Alabama Stipulation Blocks under Alternatives C and D were included in the alternatives to analyze and determine if there is a need for the exclusion areas. Under Alternative B, the SSRAs, Topographic Features Stipulation Blocks, Live Bottom (Pinnacle Trend) Stipulation Blocks, and Blocks South of Baldwin County, Alabama Stipulation Blocks are all available for lease and BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notice to Lessees, and Information to Lessees that will protect sensitive habitats and areas and limit activities in certain areas. As noted in the PEIS, if space use incompatibilities arise, BOEM could use lease stipulations to help mitigate the potential conflicts. Similar to what was discussed above for the Rice's whale exclusions, to minimize the environmental harm potentially caused by OCS oil- and gas-related activities authorized by BOEM, pre-lease stipulations and post-lease mitigations may be applied. Each alternative for the Proposed Action, was analyzed with and without these mitigating measures in the PEIS.

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		c. Other Exclusions BOEM (at 2-6) also proposes to exclude from leasing "whole and partial blocks that contain Significant Sediment Resource Areas (SSRAs)" and areas subject to three existing lease stipulations: the Topographic Features Stipulation, Live Bottom (Pinnacle Trend) Stipulation, and Blocks South of Baldwin County, Alabama Stipulation. In the past BOEM has managed all of these issues with lease stipulations, and the DPEIS provides virtually no discussion of why it proposes to change that longstanding approach. On the contrary, the DPEIS (at 4-14) says that "in the event incompatibilities would arise, BOEM could use lease stipulations is to help mitigate the potential conflicts." BOEM's proposal to replace lease stipulations with exclusions will not avoid impacts to the resources in question. The existing lease stipulations limit resource impacts very effectively, and there is no evidence that exclusions will produce better outcomes. As to SSRAs, the DPEIS (at 4-14, 4-15) says "[a]s storms increase in frequency and strength, there has been and would continue to be, an increased need for sediment dredging for coastal resiliency." But the DPEIS (at 4-15) goes on to explain that BOEM uses Information to Lessees and Notices to Lessees to inform lessees of SSRAs and areas of active dredging and cites a Notice to Lessees requiring that bottom-disturbing activities "must avoid, to the maximum extent practicable, significant OCS sediment resources." Appendix F discusses the existing stipulations in detail and analyzes their effectiveness. It finds them to be effective in protecting the identified features and does not describe any concerns that have arisen in their implementation…. The Associations' members apply the most stringent safety and environmental regulations in the world, and follow comprehensive and dedicated industry safeguards to avoid, minimize, and mitigate any environmental impacts from OCS oil and gas activities. For many years, applicable safeguards have allowed coexistence of OCS uses with these various protected features and uses. It follows that these areas are suitable for oil and gas leasing, and BOEM has not provided an evidence-based demonstration to the contrary.	
API et al.-6	BOEM-2023-0046-3145	**5. Alternative D Is Not Justified in the DPEIS and Is Not a Viable Alternative.** Alternative D contains the same flawed exclusions as Alternative C, plus even more unfounded exclusions. In addition to failing to meet the IRA's requirements for wind leasing, Alternative D fails on its own terms. Many of Alternative D's additional proposed exclusions receive little or no discussion in the DPEIS[13]. The lack of any explanation for these proposed exclusions makes it difficult to provide helpful comments on whether these exclusions have any sound basis. The DPEIS (at 2-8) says only that these areas "have been emphasized by public commenters in scoping for previous NEPA analyses" and suggests that selecting this option would "preserve flexibility for marine spatial planning for potential different ocean uses." The following is an overview of the additional exclusions, as well as the Associations'	Thank you for your comment. Please see the previous comment response portion of API et al.-5 that discusses BOEM's action alternatives, how they were developed, and analyzed while looking for targeted leasing opportunities. With respect to the Eastern Planning Area, the exclusion of the whole or partial blocks in the EPA under Alternative D was included in the alternatives to analyze and determine if there is a need for the exclusion areas. With respect to the Wind Leasing Call Area, the exclusion of the whole or partial blocks in the Call Area under Alternative D was included in the alternatives to analyze and determine if there is a need for the exclusion areas. In addition, at the time the alternative was created, it provided greater flexibility for future identification of WEAs within the Call Area. With respect to bottlenose dolphins, Alternative D would remove from leasing whole and partial blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath. These waters were identified in a complaint against BOEM concerning lasting effects of the *Deepwater Horizon* event on dolphin stocks, a reduction in successful breeding, and unusual mortality events (UMEs); analyzed in the *Gulf of Mexico OCS Proposed Geological and Geophysical Activities Western, Central, and Eastern Planning Areas – Final Programmatic Environmental Impact Statement*; and identified in the GOM Geological and Geophysical Record

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		analysis, to the extent it is possible to analyze exclusions with little or no justification in the DPEIS. **Eastern Planning Area.** Alternative D (at 2-8) proposes excluding "whole and partial blocks in the EPA of the GOM." There is a portion of the Eastern Planning Area that has not been withdrawn from leasing and has been included in previous lease sales. The Associations reviewed the DPEIS but were not able to identify any discussion of BOEM's proposed rationale for changing past agency practice of including this area in lease sales. This area is located along the western edge of the planning area in close proximity to existing oil and gas activities in the Central Planning Area. As such, oil and gas development of these westwardly available areas in the Eastern GOM Planning Area would likely be supported from existing infrastructure (port areas, waste disposal, etc.) and will not require infrastructure to be built in Florida to support OCS oil and gas activities. **Additional Portions of the Wind Leasing Call Area.** BOEM proposes excluding additional areas of the GOM Wind Leasing Call Area. Notably, the wind energy areas proposed for exclusion in Alternative C are the areas that BOEM has itself determined to have potential for wind energy development and has therefore prioritized for potential leasing. It follows that the areas identified in Alternative D are those that BOEM has found to have less potential for wind energy development and for which such use is accordingly more speculative and uncertain. The discussion above of the need to apply an "all of the above" approach to managing oil and gas development together with other uses applies with even greater force in these areas, in which BOEM itself concedes wind energy development is less likely to occur. **Bottlenose Dolphins.** The DPEIS (at 2-8) proposes excluding "whole and partial blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath to avoid additional impacts to coastal stocks of bottlenose dolphin." The DPEIS contains no substantive discussion of this proposal; it mentions bottlenose dolphin only twice in its analysis of potential effects, once in referring generally to cetacean stranding (at 4-112) and once in a general discussion of marine mammals that can be affected by nearshore discharges and wastes (at 4-260). The DPEIS does not otherwise discuss the status of bottlenose dolphin populations in the area, or the nature or scale of any potential benefits to those populations associated with the proposed exclusion. The bottlenose dolphin's status is listed by IUCN as "least concern." The DPEIS provides no rationale or analysis supporting this proposal, and the Associations are not able to discern any need for this exclusion. **Marine Sanctuary.** BOEM proposes excluding additional areas in the vicinity of the Flower Garden Banks National Marine Sanctuary beyond those already excluded under Alternative B. As discussed in the previous section, any concerns	of Decision as areas where G&G activities are limited to certain times of the year. The intent of a proposal excluding whole and partial blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath would be to consider potential protection to coastal stocks of common bottlenose dolphins that are known to occur in these waters, should those blocks not be leased. Under this Alternative, this area would be removed from leasing rather than permitting OCS oil and gas activity on these blocks. Not leasing whole or partial blocks in coastal OCS waters with depths less than 20 m (66 ft) would eliminate new OCS oil and gas leasing activities in the dolphin exclusion area. With respect to marine sanctuaries, the exclusion of the whole and partial blocks around the expanded Flower Garden Banks National Marine Sanctuary as of March 22, 2021 under Alternative D was included in the alternatives to analyze and determine if there is a need for the exclusion areas. Under Alternative B, whole and partial blocks around the expanded Flower Garden Banks National Marine Sanctuary as of March 22, 2021 are all available for lease and BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notice to Lessees, and Information to Lessees that will protect sensitive habitats and areas and limit activities in certain areas. Please see the previous comment response Earthjustice et al.-4 discussing BOEM commonly applied mitigating measures and BOEM's analysis of alternatives with and without these measures. With respect to the Department of Defense Mission Incompatibility, the exclusion of the whole and partial blocks identified by the DoD as mission incompatibility areas under Alternative D was included in the alternatives to analyze and determine if there is a need for the exclusion areas. Although BOEM does have the Military Areas Stipulation, as pointed out in the comment, these specific areas were identified by DoD during the development of the 2024-2029 National Program and BOEM is currently coordinating with DoD on their specific needs to determine if appropriate mitigation can be developed for these areas. Please note that DOI and the DoD are currently discussing current and future military readiness needs across the GOA. Therefore, bidders should be advised that the Military Stipulation may be applied to leases issued on additional lease blocks, as will be identified in the Final Notice of Sale package.

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		involving potential impacts to the marine sanctuary can be managed with lease stipulations and do not need to be addressed through a broad exclusion. **Department of Defense Mission Incompatibility.** BOEM proposes excluding "whole and partial blocks identified by the Department of Defense as mission incompatibility areas." Once again, the DPEIS contains no discussion of the basis for this proposed exclusion or of what concerns, if any, the Department of Defense has raised about compatibility of leasing with military operations. BOEM has a longstanding lease stipulation that is designed to reconcile development of the OCS with the needs of the military. Appendix F (at F-8) discusses BOEM's lease stipulations, including the military stipulation, and concludes that the military stipulation "makes multiple-use conflicts between military operations and OCS oil- and gas-related activities unlikely…." The Associations strongly support the nation's military readiness needs, and the Associations' members have a decades-long track record of conducting their operations in a way that avoids conflict with military activities. BOEM has provided no information suggesting that existing lease stipulations are insufficiently protective so as to possibly warrant such an exclusion from leasing.	
National Ocean Policy Coalition-1	BOEM-2023-0046-3144	In justifying its preference for removing nearly 15 million acres from future Gulf of Mexico oil and gas leasing availability, BOEM cites the avoidance of areas "with the most vulnerable environmental resources" and reduction of "potential marine spatial planning conflicts" with other uses such as offshore wind, marine minerals, and carbon sequestration, while complying with Inflation Reduction Act minimum oil and gas acreage requirements necessary for future offshore wind leasing. The preferred alternative includes the removal of significant acreage associated with the Rice's whale proposed, purported critical habitat and core distribution areas throughout the Gulf of Mexico[2] - a region that generates 14% of the United States' crude oil production[3] - even though there is no justifiable scientific basis for designating the area as critical habitat…. Underscoring the paucity of data, when announcing its proposed Rice's whale critical habitat designation, NMFS cited only one genetically confirmed sighting of a Rice's whale in the western Gulf of Mexico, and cited a 2022 study which found that "sparse" acoustic monitoring technologies makes it "difficult" to quantify the number of Rice's whales in the western Gulf of Mexico." Additionally, NMFS noted the limited information available on the Rice's whale life history, and reliance on information specific to Rice's whales "where possible" and "pertinent information on the closely related Bryde's-like whales in general."[6]	Thank you for your comment. BOEM's action alternatives were designed to analyze the potential effects of excluding certain sensitive areas from leasing to determine their necessity. Please see previous comment responses found in API et al. 5, which discuss alternatives and avoidance areas.

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Earthjustice et al.-6	BOEM-2023-0046-5236	The Draft PEIS also fails to consider reasonable alternatives that could significantly reduce the harmful effects of a Gulf-wide lease sale on affected resources, while still being consistent with BOEM's legal mandates. For example, in their scoping comments, the above-signed groups recommended that BOEM consider an alternative that excludes not only Rice's whale proposed critical habitat, but also includes a 10-kilometer or greater buffer for this critically-endangered species. As discussed in detail below, the best available scientific evidence demonstrates that Rice's whale habitat extends across the entire Gulf of Mexico in waters between the 100m and 400m isobaths. Both the National Marine Fisheries Service ("NMFS") and BOEM have recognized the importance of this habitat to the recovery and survival of the whale. NMFS recently proposed the area as designated critical habitat for Rice's whale.[62] Following a recommendation from NMFS,[63] BOEM excluded the same area from offshore wind leasing in 2022, deeming it "unsuitable" for offshore wind development.[64] Compared to wind, oil and gas activities pose a far greater risk to Rice's whale given that the primary threats to this species include vessel traffic, noise from seismic surveys, and oil spills. NMFS has repeatedly concluded that oil and gas activities in the Gulf of Mexico jeopardize the very survival of the species.[65] Although alternatives C and D exclude whole and partial blocks within proposed Rice's whale habitat, BOEM should also consider excluding from leasing a 10 kilometer (km) (or greater) buffer around the habitat area to account for whale movement and because the above-recognized threats to the species do not stop at the habitat boundary. Based on internal calculations by NRDC using GIS software, a 10km buffer around Rice's whale habitat would be approximately 5.7 million acres in size.	Thank you for your comment. BOEM's action alternatives were designed to analyze the potential effects of excluding certain sensitive areas from leasing to determine their necessity. The alternatives in this PEIS balance the consideration of potential environmental effects with regional and national policy considerations, and include practicable and reasonable means to avoid or minimize environmental harm at this programmatic stage. Please see the comment response API et al.-5 for rationale on the removal on certain areas from leasing. The exclusion of the Rice's whale proposed core distribution area and proposed critical habitat area under Alternatives C and D were included in the alternatives to analyze and determine if there is a need for the exclusion areas. At this point, adding an additional 10-kilometer buffer to the proposed exclusion areas in the alternatives is not appropriate, because NMFS has yet to finalize these areas as critical habitat. However, BOEM is analyzing the difference in alternatives based on current proposed rules with specific delineations for the designation of critical habitat and core distribution areas. In reference to the impacts to Rice's whale from vessel traffic, noise, and oil spills, please see **Chapter 4.8** of the PEIS, which discusses impacts to marine mammals, including the Rice's whale. In reference to exclusions from offshore wind leasing, please note that the process to establish WEAs for Renewable Energy Leasing is different than the process BOEM used to determine alternatives to analyze for this Programmatic EIS. Rather than using modeling to select very specific areas for leasing, as is done when choosing WEAs for renewables, BOEM conducted a robust environmental review which analyzed a larger area in the Gulf in the Programmatic EIS.
Earthjustice et al.-7	BOEM-2023-0046-5236	To fulfill the goals of the Proposed Action and OCSLA, the final PEIS must include a reasonable alternative that safeguards the Rice's whale by excluding the species' full habitat from leasing. As discussed in section IV.G, oil and gas activities in the Gulf of Mexico threaten the survival and recovery of this critically endangered species. Noise, vessel strikes, and spills from oil and gas exploration and development pose a serious threat of harm to Rice's whales.[73] Oil and gas operations also curtail the whale's habitat. NMFS' most recent Status Review concluded that Rice's whales "are at high risk of extinction as a result of their small population size and the suite of anthropogenic threats posed primarily by energy exploration, development and production, and vessel collisions. Small-scale incremental impacts over time or a single catastrophic event could result in extinction."[74] BOEM properly included two alternatives excluding this habitat from oil and gas leasing—Alternatives C and D—in the Draft PEIS.[75] We strongly support BOEM's selection of an alternative that excludes Rice's whale habitat from leasing as the Preferred Alternative.[76]	Thank you for your comment. BOEM's three action alternatives all propose protections for marine mammals, including the Rice's whale. As noted in the comment, Alternatives C and D exclude the proposed core distribution areas and proposed critical habitat of the Rice's whale. The exclusion of the Rice's whale proposed core distribution area and proposed critical habitat area under Alternatives C and D were included in the alternatives to analyze and determine if there is a need for the exclusion areas. Under Alternative B, BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notice to Lessees, and Information to Lessees to protect sensitive species and limit activities in certain areas, which would serve as protections for sensitive species, including the Rice's whale. Furthermore, compliance with existing and future consultation requirements under the ESA, MMPA, and other statutes may result in additional mitigation measures or changes to the measures described in this PEIS and any subsequent Record of Decision. Through adaptive management, BOEM would incorporate new or updated measures resulting from ongoing or future consultations into post-lease plan reviews and authorizations, using a tiered NEPA approach and the best available information at that time. Please see the previous comment response API et al.-5 discussing BOEM commonly applied mitigating measures and BOEM's analysis of alternatives with and without these measures. In addition, impacts to marine mammals, including the Rice's whale, are discussed in detail in **Chapter 4.8**. Impacts from vessel traffic, noise, and oil spills are included in this analysis. The reduction of impacts to marine mammals using the implementation of mitigating measures and exclusions are also discussed in this chapter.
Andy Radford-1	1/14/25 Public Meeting	BOEM continues to point to minimal non conclusive evidence to support the Rice's whale presence in the central western Gulf of Mexico as one justification for removing acreage available for leasing. These reports do not prove that Rice's whale occupies the central western Gulf and attempts to limit acreage for lease or application of mitigation measures in these regions is unjustified.	Thank you for your comment. BOEM's action alternatives were designed to analyze the potential effects of excluding certain sensitive areas from leasing to determine their necessity. Please see the comment response API et al.-5 for rationale on the removal on certain areas from leasing. The exclusion of the Rice's whale proposed core distribution area and proposed critical habitat area under Alternatives C and D were included in the alternatives to analyze and determine if there is a need for the exclusion areas.

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CBD-1	BOEM-2023-0046-3142	Moreover, as discussed above, BOEM failed to consider an alternative—other than the no-action alternative—that would limit the government's exposure to liability by prohibiting the issuance of leases to any company with extant overdue decommissioning obligations.	Thank you for your comment. The limitation to the government's exposure to liability and prohibition of lease issuances would fall under BOEM policy, and therefore, an alternative to address this would be out of scope for this PEIS. This PEIS analyzes the potential impacts of a proposed OCS oil and gas lease sale as well as providing programmatic coverage for ongoing activities and future OCS oil and gas lease sales, including decommissioning. As part of BOEM's policy to mitigate the risk of unaddressed decommissioning and the negative impacts to the environment it may cause, companies must submit proper financial assurance in securing decommissioning performance. BOEM enforces its right to secure financial assurance pursuant to regulations found in 30 CFR §§ 556.900 *et seq.* (see **Appendix C.3.2**). Most notably, BOEM can require that lessees provide additional financial assurance when certain regulatory factors are met. Given these regulatory and financial safeguards, the risk of non-decommissioned oil and gas infrastructure causing environmental impacts is minimized and not expected to increase.
Chevron-3	BOEM-2023-0046-3140	The proposed action and the alternatives considered in the Draft PEIS include a "No Action" alternative (A), which would result in cancellation of the "single proposed lease sale", and three "action alternatives" (B, C, and D). Section 18 of the Outer Continental Shelf Lands Act (OCSLA), 43 U.S.C. 1344 requires the development of an OCS oil and gas leasing program, setting forth a five-year schedule designed to best meet the Nation's energy needs. While Chevron recognizes the need for the agency to assess a "no action alternative," we highlight from the outset that selection of this alternative would not meet the requirements of OCSLA and would not address the Nation's energy needs.	The Secretary is charged with developing the National OCS Oil and Gas Program and is required to balance development with protection of the human, marine, and coastal environments while simultaneously ensuring receipt of fair market value for the lands leased and the rights conveyed by the Federal Government. BOEM follows all requirements set forth by OCSLA and is responsible for developing the National OCS Program, advising the Secretary, and administering the National OCS Program. See the comment response API et al.-2 for details on the No Action Alternative's compliance with the NEPA statute and DOI implementing regulations as well as information on the selection of the preferred alternative. The revised need for the Proposed Action is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. 1331 et seq.).
Chevron-4	BOEM-2023-0046-3140	Alternatives C and D would exclude several areas for environmental protection purposes and to avoid conflicts with other ocean uses. Chevron recognizes that the OCS is actively being accessed for a multitude of ocean uses, including commercial fishing, state oil and gas operations, military activities, tourism, commercial shipping and transport, coastal recreation (including recreational fishing and diving), subsistence use, renewable energy leasing and non-energy marine minerals activities. Industry has a long history demonstrating that oil and gas activities can coexist along with other users. In consideration of special environmentally sensitive marine protected areas and historical archeological sites that must be preserved, industry has a proven track record of collaborating effectively with other ocean users and the appropriate regulatory agencies overseeing those marine activities to address potential concerns. Chevron therefore does not believe it is necessary to limit access or remove portions of acreage from the GOM Program Area as continuing with the federal oil and gas leasing program would not present a conflict from a shared ocean use standpoint. Indeed, it is inconsistent with OCSLA to limit access or exclude oil and gas operations from portions of the GOM. In adopting OCSLA, Congress considered shared ocean use and declared it is the "policy of the United States" to authorize "operations in the outer Continental Shelf" subject only to an obligation "to prevent or minimize … physical obstruction to other users of the waters or subsoil and seabed[.]" 43 U.S.C. § 1332(6).	Thank you for your comment. BOEM disagrees with the statement "it is inconsistent with OCSLA to limit access or exclude oil and gas operations from portions of the GOM." Under OCSLA, BOEM is responsible for managing "offshore mineral resources and energy resources", not just OCS oil and gas. BOEM's mission is to responsibly manage the energy and mineral resources of the U.S. Outer Continental Shelf. There are multiple uses of the OCS, and one form of energy development does not take precedence over another. In fact, BOEM's regulations allow for multiple uses of an area. If a lease is issued for a specific use (e.g., offshore wind development, sand and gravel, or oil and gas development), BOEM may consider a request for other uses, as long as those uses do not unreasonably interfere with the original lease holder's use of its lease. See the comment responses to API et al.-5 and API et al.-6 for a detailed reasoning on BOEM's action alternatives, how they were developed and analyzed, while looking for targeted leasing opportunities. BOEM considered space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind activities, and OCS significant sediment resources. Refer to **Chapter 4.0.2.2** of the PEIS for details how each potential space use conflict was addressed. Please see the comment response Earthjustice et al.-5 for details on how potential space use conflicts could be reduced for each alternative. BOEM understands the long history of OCS oil and gas coexisting with other activities in the GOA. As a matter of fact, Alternative B would encompass BOEM's historical approach to handling multiple uses in the GOA as it is a regionwide lease sale that relies on mitigations to eliminate or reduce impacts. Under Alternative B, in the event that incompatibilities would arise, BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notice to Lessees, and Information to Lessees that will protect sensitive species and limit activities in certain areas, should they be leased. BOEM has also considered exclusions for areas related to wind leasing, sand resources, and endangered species as part of Alternatives C and D. Alternatives C and D were designed to reduce potential space use conflicts. In addition, Alternative D was designed to preserve additional flexibility for marine spatial planning between potential different ocean uses (i.e., OCS oil and gas development, offshore renewable energy development, marine mineral utilization, etc.). As mentioned in the comment, the GOA region supports many industries and activities. Although BOEM is responsible for managing OCS energy, it does not have authority over some other activities such as commercial fishing or diving in the GOA.

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			Therefore, it can't regulate those activities. However, BOEM does analyze non-OCS oil and gas activities, such as commercial fishing, state oil and gas operations, military activities, tourism, commercial shipping and transport, coastal recreation (including recreational fishing and diving), subsistence use, renewable energy leasing and non-energy marine minerals activities, as part of the ongoing OCS oil and gas activities associated with previous OCS oil and gas lease sales analysis and cumulative analysis in each applicable resource analysis in **Chapter 4** and **Appendix M** of the PEIS, in the cumulative impact summary in **Chapter 4.17** of the PEIS, and in Chapters 2 and in each applicable resource analysis in Chapter 4 of the SID, which is incorporated by reference into the PEIS.
National Ocean Policy Coalition-2	BOEM-2023-0046-3144	With regard to concerns about managing multiple human use activities in the Gulf of Mexico, the federal government's traditional multiple use management approach toward Gulf of Mexico commercial and recreational activities, including oil and gas, has served the country well and provided a critical backbone for the nation's economic and energy security. In addition to the oil and gas production noted above, the Gulf of Mexico accounts for over 40% of the nation's seafood and serves as an integral component of global trade and commerce.[7] Rather than generating conflicts that require solutions to "potential marine spatial planning conflicts" that unnecessarily impede U.S. economic growth, global competitiveness, and national security, Gulf of Mexico oil and gas development for decades has successfully co-existed alongside a myriad of other uses, as underscored by the history of fishing and energy activity alongside one another in the vicinity of the Flower Garden Banks National Marine Sanctuary, a diving paradise teeming with coral.	Thank you for your comment. BOEM considered space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind activities, and OCS significant sediment resources. Refer to **Chapter 4.0.2.2** of the PEIS for details how each potential space use conflict was addressed. The alternatives analyzed in this PEIS do not "generate conflicts" among different uses in the GOA. Rather, they identify potential space use conflicts and propose different solutions to these conflicts through the use of mitigating measures that will protect sensitive species and limit activities in certain areas, should they be leased (Alternative B) or by eliminating conflict by excluding certain areas from leasing through exclusions (Alternatives C and D).
Andy Radford-2	1/14/25 Public Meeting	In addition, BOEM does not demonstrate that existing Gulf of Mexico leasing exclusion stipulations and conditions are insufficient to achieve needed environmental protection or to avoid conflicts with other ocean uses. Thus, BOEM should not imagine such conflicts and use them as reasons to further constrain Gulf of Mexico oil and gas leasing.	Thank you for your comment. BOEM considered space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind activities, and OCS significant sediment resources. Refer to **Chapter 4.0.2.2** of the PEIS for details how each potential space use conflict was addressed. See the comment response Earthjustice et al.-5 for details on how potential space use conflicts could be reduced for each alternative. BOEM does not believe that leasing exclusion stipulations and conditions are insufficient to achieve needed environmental protection or to avoid conflicts with other ocean uses. As a matter of fact, Alternative B would encompass BOEM's historical approach to handling multiple uses in the GOA, because it is a regionwide lease sale that relies on mitigations to eliminate or reduce impacts. Under Alternative B, in the event that incompatibilities would arise, BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notices to Lessees, and Information to Lessees that will protect sensitive species and limit activities in certain areas, should they be leased.

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API et al.-7	BOEM-2023-0046-3145	Alternative A would restrict critical production of oil and gas and would have substantial adverse effects on the industry and on the region's economy. As for Alternatives C and D, they contain extensive exclusions from leasing that are inconsistent with OCSLA, lack sound justification and are not analyzed in detail in the DPEIS. The exclusions generally relate to potential conflicts with other uses of leased areas that have in the past been effectively managed case-by-case through lease conditions rather than exclusions, and that lessees and BOEM are able to address when they arise. The draft EIS proposes broad exclusions from leasing based on conflicting uses with little discussion (and in some instances, no discussion) of whether the conflict could be managed through BOEM's historical approach, rather than excluding the areas in question from leasing. The DPEIS does not explain why BOEM's approach was inadequate, and what necessitates such broad exclusions from leasing. The broad exclusions are especially inappropriate for wind areas now that all of the OCS has been temporarily withdrawn for wind leasing.[2] Moreover, despite Alternative C's additional acreage restrictions reportedly designed to avoid environmental risks, those risks are not, in fact, avoided by the exclusions, and the risk impacts are nearly identical to Alternative B. Once Alternative A is set aside, a review of BOEM's analysis of impacts from the other three alternatives demonstrates that the potential impacts of Alternative B are similar to those of Alternatives C and D, so that Alternative B should be selected.	Thank you for your comment. See the comment response Earthjustice et al.-4 for details on how potential space use conflicts could be reduced for each alternative. BOEM does not consider any alternative or associated mitigating measure to be inadequate. As a matter of fact, Alternative B would encompass BOEM's historical approach, as it is a regionwide lease sale that relies on mitigations to eliminate or reduce impacts. Under Alternative B, in the event that incompatibilities would arise, BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notice to Lessees, and Information to Lessees that will protect sensitive species and limit activities in certain areas, should they be leased. See the previous comment response Earthjustice et al.-4 discussing BOEM commonly applied mitigating measures and BOEM's analysis of alternatives with and without these measures. See the previous comment response portion of API et al.-5 that discusses BOEM's action alternatives, how they were developed, and analyzed while looking for targeted leasing opportunities. Alternatives C and D were designed to reduce potential space use conflicts. BOEM considered exclusions for areas related to wind leasing, sand resources, and endangered species as part of Alternatives C and D. In addition, Alternative D was designed to preserve additional flexibility for marine spatial planning between potential different ocean uses (i.e., OCS oil and gas development, offshore renewable energy development, marine mineral use, etc.). See the comment response API et al.-2 for details on the No Action Alternative's compliance with the NEPA statute and DOI implementing regulations as well as information on the selection of the preferred alternative. In reference to the impact levels determined for each alternative and their similarity, please refer to **Table 2.5-1** of the PEIS which summarizes the potential impacts of each alternative for each resource category. Although impact levels for some alternatives may appear the same, the table, along with each resource analysis in **Chapter 4** and **Appendix M**, details the differences between each alternative by describing impacts to the resource both within and outside of exclusion areas. Often, the greatest differences in impacts for each alternative are seen by comparing their occurrence inside or outside of the exclusion areas. In reference to the economic impacts expected under Alternative A, please refer to **Chapter 4.15**. The recent Presidential Memorandum, "Temporary Withdrawal of All Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects" (January 20, 2025), withdrew all areas within the OCS as defined in section 2 of OCSLA 43 U.S.C. 1331 from disposition for wind energy leasing as of January 21, 2025, and shall remain in effect until the Presidential Memorandum is revoked. This withdrawal temporarily prevents consideration of any area in the OCS for any new or renewed wind energy leasing for the purposes of generation of electricity or any other such use derived from the use of wind. Because this Presidential Memorandum indicates that the removal is temporary, and because these alternatives were formed before the Presidential Memorandum in order to determine if there is a need for the exclusion areas, BOEM has chosen to keep the alternative as it was designed to analyze the potential effects of excluding certain areas from leasing to determine their necessity.
Chevron-5	BOEM-2023-0046-3140	Furthermore, the analysis of potential impacts of routine activities and accidental events presented in Section 2.5 of the Draft PEIS concludes that the potential impacts associated with the selection of Alternative B (The Proposed Action – Regionwide OCS Lease Sale) are substantively similar to the selection of Alternative C (The Preferred Alternative – Inflation Reduction Act Targeted OCS Lease Sale Area). BOEM has not presented an appreciable reduction in potential impact risk from selecting Alternative B over Alternative C and therefore, Chevron recommends that Alternative B be selected for lease sales held under the current Leasing Program as no new areas of restriction should be added to the federal offshore leasing program without sufficient supporting scientific data to justify such actions.	Thank you for your comment. In reference to the impact levels determined for each alternative and their similarity, please see API et al.-7.

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National Ocean Policy Coalition-3	BOEM-2023-0046-3144	Notably, the Draft PEIS concludes that the impact-producing factors and resulting impacts from routine activities under the restrictive preferred alternative (Alternative C) would be “similar” to those under the less restrictive Alternative B.[8] Thus, selection of BOEM’s preferred alternative would result in the perverse outcome in which the nation’s access to critical resources and the economic and energy security benefits they provide would be restricted, without providing any appreciable benefit in terms of environmental impact.	Thank you for your comment. In reference to the impact levels determined for each alternative and their similarity, please see API et al.-7.
Earthjustice et al.-8	BOEM-2023-0046-5236	As an initial matter, although the three action alternatives differ somewhat in size and conditions, the Draft PEIS’s comparison of impacts demonstrates the unreasonably narrow range of alternatives actually being considered. For example, despite differences in size and scope, the Draft PEIS predicts the same amount of oil and gas production and same range of activity levels for Alternatives B, C, and D.[59] Moreover, for each resource category, the Draft PEIS concludes that the three action alternatives will have the same or largely the same impacts.[60] Such an approach precludes the decisionmaker and the public “from meaningfully evaluating the difference between the alternatives.”[61]	Thank you for your comment. Please rsee **Chapter 3.3.2** of the PEIS for the Expected Activity Scenario. The ranges within the Single Sale scenario are broad, representing the low and high levels of forecasted activity. As mentioned in the comment, while the selection of one representative proposed OCS oil and gas lease sale alternative over another could shift the location of the forecasted activities, the overall range of activity levels would not change under Alternative B, C, or D. In reference to the impact levels determined for each alternative and their similarity, see API et al.-7.
Earthjustice et al.-9	BOEM-2023-0046-5236	The “preferred alternative” to offer approximately 64.7 million acres for leasing in the Gulf of Mexico is inconsistent with our national energy needs and fails to balance offshore oil and gas development “with protection of the human, marine, and coastal environments.” This is particularly important considering that the Bureau of Ocean Energy Management (“BOEM”) has already leased large portions of the Gulf of Mexico. Adopting the no-action alternative would avoid increased harm to an environment that is already overexploited and significantly degraded to the detriment of Gulf communities.	The Secretary is charged with developing the National OCS Oil and Gas Program and is required to balance development with protection of the human, marine, and coastal environments while simultaneously ensuring receipt of fair market value for the lands leased and the rights conveyed by the Federal Government. BOEM’s mission is to responsibly manage the energy and mineral resources of the U.S. Outer Continental Shelf. As discussed in the PEIS, the revised need for the Proposed Action is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. 1331 et seq.). The PEIS analyzes three action alternatives and the no action alternative. All alternatives are under consideration as part of BOEM’s robust environmental review process. The alternative will be selected by the Assistant Secretary of Lands and Minerals Management (as the delegated authority) based on information detailed in the PEIS and administration priorities. They will also sign the Record of Decision and decide whether to hold a lease sale.
Earthjustice et al.-10	BOEM-2023-0046-5236	**III. The Alternatives Analysis is unreasonably narrow and fails to consider a reasonable range of alternatives.** In particular, agencies should “[u]se the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects,” including “alternatives that will reduce climate change-related effects or address adverse health and environmental effects that disproportionately affect communities with environmental justice concerns.”[55] “[N]o major federal project should be undertaken without intense consideration of other more ecologically sound courses of action, including shelving the entire project, or of accomplishing the same result by entirely different means.”[56] “The existence of a viable but unexamined alternative renders” an EIS inadequate.[57]	Thank you for your comment. The analyses in this PEIS were conducted in accordance with the text of the NEPA statute (42 U.S.C. 4321 et seq.), E.O. 14154, “Unleashing American Energy” (Jan. 20, 2025), and the DOI’s implementation of NEPA regulations (43 CFR 46). See **Chapter 1.5** of the PEIS for more detail. The NEPA regulations do not require the inclusion of alternatives that will reduce climate change-related effects or address adverse health and environmental effects that disproportionately affect communities with environmental justice concerns. Therefore, these types of alternatives were not included. In addition, with respect to considering an alternative that addresses environmental justice concerns, E.O. 14154 and a Presidential Memorandum, “Ending Illegal Discrimination and Restoring Merit-Based Opportunity” (Jan. 21, 2025), require DOI to strictly adhere to NEPA, 42 U.S.C. 4321 et seq. Further, E.O. 14154 and the Jan. 21, 2025 Memorandum repeal E.O.s 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023), which had mandated federal agencies to address environmental justice. Because E.O.s 12898 and 14096 have been repealed, agencies are no longer required to consider environmental justice generally in their environmental analyses, among other issues. BOEM has complied with the requirements of NEPA, including DOI’s regulations and procedures implementing NEPA at 43 C.F.R. 46 and 516 of the DOI Departmental Manual in place during the time of the preparation of this Final Programmatic EIS, consistent with the President’s January 2025 E.O. and Memorandum. This PEIS does analyze three action alternatives and the no action alternative. For a description of the alternatives considered, see **Chapter 2.2** of the PEIS. All alternatives are under consideration as part of BOEM’s robust environmental review process. The alternative will be selected by the Assistant Secretary of Lands and Minerals Management (as the delegated authority) based on information detailed in the PEIS and administration priorities. They will also sign the Record of Decision and decide whether to hold a lease sale.

Commenter	ID Number	Comment	Response
Earthjustice et al.-11	BOEM-2023-0046-5236	Finally, BOEM should consider alternatives that would avoid or minimize environmental justice impacts. The CEQ regulations provide that agencies should use the NEPA process to identify and assess alternatives that could reduce "environmental effects that disproportionately affect communities with environmental justice concerns."[71] In the Draft PEIS, BOEM acknowledges that "[i]ndirect impacts to minority and low-income populations would occur onshore and would result from the operations of the extensive infrastructure system that supports all onshore and offshore OCS oil- and gas-related activities."[72] Moreover, the significant pollution and health impacts from this onshore infrastructure on nearby communities have been well documented.[24] Yet nowhere does BOEM consider an alternative that could alleviate such effects by lowering or limiting the amount of oil and gas produced, transported, refined, and processed at these facilities.	Thank you for your comment. See the previous comment response in Earthjustice et al.-10 regarding DOI's implementation of NEPA Regulations as part of the analysis in this PEIS and Executive Order regarding DOI's regulations and implementation of NEPA. With respect to considering an alternative that would limit oil and gas production, BOEM's alternatives were created to address the purpose and need of the PEIS. The revised need for the Proposed Action is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. 1331 et seq.). This proposed alternative would not meet the need of the PEIS because it would restrict oil and gas production.
Earthjustice et al.-12	BOEM-2023-0046-5236	BOEM should consider alternatives to region-wide lease sales to comply with NEPA— as well as OCSLA, which requires that leasing areas be drawn "as precisely as possible."[66] Instead of offering lease sales based on the three separate planning areas—the Western Gulf, the Central Gulf, and the Eastern Gulf—BOEM proposes to include all unleased areas in the Gulf (minus minor exclusions noted in its so-called alternatives). Prior to the catastrophic BP oil spill in 2010, there were separate lease sales for each planning area. Even that large scale inhibited meaningful environmental review according to the National Commission on the BP Deepwater Horizon Oil Spill. Area-wide leasing meant that: > Companies could bid on any tract they wanted in a lease sale for a given planning area, thus giving them access to far more extensive offshore acreage at significantly less cost. … OCS lease sales cover such large geographic areas that meaningful [National Environmental Policy Act] NEPA review is difficult. A decision to dramatically increase the size of lease sales—known as area-wide leasing—was made over 20 years ago at the request of industry; it has necessitated environmental analyses of very large areas at the lease sale stage.[67] The Department of Interior itself recommended in a 2021 report that "BOEM should consider advancing alternatives to the practice of area-wide leasing, under which the entire planning area is offered with few exclusions for a lease sale."[68] The report noted that "[m]oving to a leasing model where smaller areas are offered" would help enable BOEM to include more specific criteria for environmental protection, subsistence use needs, resource potential, and financial considerations.[69] To ensure that the environmental review examines the unique ecological features of the different areas of the Gulf of Mexico, smaller leasing areas should be considered.	Thank you for your comment. In response to the comment on DOI's recommendation for leasing areas in the Report on the Federal Oil and Gas Leasing Program Prepared in Response to E.O. 14008, the recommendation in the report was to ensure that American taxpayers are receiving a fair return for offshore oil and gas resources. However, two alternatives in the PEIS do include offering smaller areas within the GOA Program Area 1 that consider targeted leasing options. The 2024-2029 National OCS Oil and Gas Leasing Proposed Final Program schedules three lease sales in the GOA Program Area. The GOA Program Area includes the Western GOA Planning Area and the portions of the Central and Eastern GOA planning areas not currently under Presidential withdrawal, where more than 99% of current OCS production occurs. The Secretary retains the discretion at the lease sale stage to determine whether, when, and under what terms, a lease sale should be held and the precise acreage to be offered. The alternatives in the PEIS were developed from the regionwide lease sales that were approved by the Secretary in the Record of Decision and Approval of the 2024-2029 National OCS Oil and Gas Leasing Proposed Final Program. Alternative B is a regionwide lease sale that is a flexible leasing approach that provides opportunity to bid on rejected, relinquished, or expired OCS lease blocks in all three GOA planning areas. See the previous comment response portion of API et al.-5 that discusses BOEM's action alternatives, how they were developed, and analyzed while looking for targeted leasing opportunities. All alternatives are under consideration as part of BOEM's robust environmental review process. The alternative will be selected by the Assistant Secretary of Lands and Minerals Management (as the delegated authority). They will also sign the Record of Decision and decide whether to hold a lease sale. Individual CPA and WPA lease sales were not considered viable alternatives because neither fits the regionwide lease sale alternative approved by the Secretary. See Earthjustice et al.-4 for the comment response describing BOEM's OCS Oil and Gas Program Planning and Decision Process and rationale for preparing this Programmatic EIS at this stage in the process. Additionally, BOEM has incorporated many of the recommendations of the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling. Consistent with OCLSA, BOEM has adopted the Commission's recommendation to ensure meaningful analysis of potential environmental impacts and identification of areas of ecological significance in the delineation of the geographic scope of the lease sale areas. See the previous comment response Earthjustice et al.-4 discussing BOEM commonly applied mitigating measures and BOEM's analysis of alternatives with and without these measures.

Commenter	ID Number	Comment	Response
Earthjustice et al.-13	BOEM-2023-0046-5236	BOEM should further examine alternatives that would limit the number of wells that could be drilled or the amount of oil and gas that could be developed to address the project's significant greenhouse gas emissions and resulting impacts.[70] It should consider an alternative that ties the acreage of new leasing to the amount of relinquished undeveloped leases.	Thank you for your comment. The analyses in this PEIS were conducted in accordance with the text of the NEPA statute (42 U.S.C. 4321 et seq.), E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and DOI's implementation of NEPA regulations (43 CFR 46). See **Chapter 1.5** of the PEIS for more detail. NEPA regulations do not require the inclusion of alternatives that will reduce climate change-related effects, including reducing greenhouse gas emissions. Therefore, an alternative that reduces greenhouse gas emissions is not necessary for this PEIS and was not included. In addition, BOEM has no regulatory authority over any onshore activities, including their location. Many other Federal and State agencies regulate onshore oil- and gas-related infrastructure, through air and wastewater discharge permitting and stream and wetland permitting. Through these permitting processes, the agencies are required to consider impacts for their proposed actions, including air emissions. Further, BOEM's alternatives were created to address the purpose and need of the PEIS. The revised need for the Proposed Action is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. 1331 et seq.) The proposed alternative in this comment would limit OCS oil and gas production, which would be inconsistent with the need of the PEIS because it would overly restrict leasing in the GOA. In addition, E.O. 14154 states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS, in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future. Therefore, tying new leases to relinquished undeveloped leases would not meet the goal of the E.O. However, Alternative B takes the relinquishment of undeveloped leases into consideration in that it provides frequent opportunity to bid on rejected, relinquished, or expired OCS lease blocks in all three GOA planning areas. In this respect, BOEM has taken relinquished undeveloped leases into consideration under Alternative B.
Earthjustice et al.-14	BOEM-2023-0046-5236	BOEM should also consider an alternative that would prohibit the use of particularly dangerous drilling activities such as offshore fracking and acidizing. As discussed below, lessees use well stimulation techniques such as fracking and acidizing to enhance the recovery of oil and gas from offshore wells. These techniques result in the generation billions of gallons of toxic produced water in the Gulf each year, which can have significant adverse impacts on Gulf water quality and wildlife.	Thank you for your comment. Well development activities are discussed in **Chapter 3.2.3** of the PEIS and workover activities are discussed in **Chapter 3.2.4** of the PEIS. Chapter 2.2.1.4 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, provides detailed information on hydraulic fracturing on the Gulf of America OCS, how it is accomplished, and how it differs from onshore fracking. Onshore and offshore fracking are two very different processes with different potential environmental impacts, even though they are commonly referred to by the same term, "fracking." In addition, Chapter 2.2.1.3 of the GOM Oil and Gas SID details information on discharges and regulations on OCS oil and gas discharges. It should be noted that the use of stimulation treatments is permitted by BSEE, and the production discharges are permitted by the USEPA under the NPDES permit.

Stated Preference for Alternative A

Commenter	ID Number	Comment	Response
Tom Fitzgerald-1	BOEM-2023-0046-5219	Bureau of Ocean Energy Management (BOEM) should adopt Alternative A as outlined in the Availability, etc.: Gulf of Mexico Regional Outer Continental Shelf (OCS) Oil and Gas notice. Adopting alternative A and not allowing the sale of any OCS leases is the only choice that aligns with the U.N. International Panel on Climate Change recommendations for keeping our planet safe from catastrophic warming. Without significant reductions in the use of fossil-fuels and reductions in methane emissions, it is unlikely that the goal of keeping warming at 1.5C or below will be reached.[1]	Thank you for your comment. We note that your preferred alternative is Alternative A.
Tom Fitzgerald-2	BOEM-2023-0046-5219	In consideration of executive order Temporary Withdrawal of All Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects issued by President Trump, BOEM should adopt alternative A to allow for time to reevaluate any potential EIS and sale of OCS leases. Considering the rapidly changing regulatory landscape, the responsible choice is to pause consideration of OCS leases.	Thank you for your comment. We note that your preferred alternative is Alternative A. E.O. 14154, "Unleashing American Energy" (January 20, 2025), states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS, in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future.
CBD-2	BOEM-2023-0046-3142	The Center urges BOEM to adopt the no-leasing/no-action alternative.	Thank you for your comment. We note that your preferred alternative is Alternative A.

Commenter	ID Number	Comment	Response
Christopher Lish-1	BOEM-2023-0046-5194	I'm writing to urge you to opt for the "No Lease Sale" option in the Draft Programmatic Environmental Impact Statement for the Gulf of Mexico Oil and Gas Leasing program. Offshore pipeline leaks are ten times higher in the Gulf of Mexico than the national rate. Oil spills devastate coastal communities. After the Exxon-Valdez, Taylor Oil, and Deepwater Horizon disasters, it's clear that offshore drilling will inevitably result in another catastrophe. Please protect coastal communities and endangered sea turtles and other marine life from oil and gas drilling in the Gulf of Mexico. Don't let the oil and gas industry destroy our precious ocean ecosystems and hurt coastal communities. I am calling on you to cancel these upcoming offshore lease sales.	Thank you for your comment. We note that your preferred alternative is Alternative A. Potential impacts of the Proposed Action on environmental, social, cultural, and economic resources are analyzed in **Chapter 4** of this PEIS. Unintended Releases into the Environment, including oil spills, are discussed in **Appendix B.3.1.1** of the PEIS and impact to resources from Unintended Releases to the Environment are discussed for each resource in **Chapter 4** and **Appendix M**. In reference to catastrophic oil spills, BOEM has analyzed a low-probability catastrophic event in conjunction with its analysis of potential effects, as requested by the CEQ pursuant to its regulation at 40 CFR 1502.22. A low-probability catastrophic spill is, by definition, not reasonably certain to occur.
Ruth Morlas-2	BOEM-2023-0046-2927	Second, I am writing to strongly oppose the approval of any further oil or other fossil fuel exploration or development in the GOM. I have read the Executive Summary and understand there are different alternatives being considered. I strongly support Alternative A - to NOT allow any OCS oil/gas lease sales. This alternative would best help the country meet its climate goals and more importantly, it would help protect biodiversity of populations of marine plants and wildlife that we desperately need for our own health and future survival. It is known that it's not enough to protect a species, but rather it is so important to protect populations of species that are providing ecological services in their habitat. For example the Rice Whale, which is critically endangered, is known to inhabit the very areas that BOEM is considering opening up for additional oil/gas exploration/extraction. Even with the utmost precautions, we cannot risk the extinction of these animals - they are another link in the web of life that we ourselves are part of.	Thank you for your comment. We note that your preferred alternative is Alternative A. Potential impacts of the Proposed Action on environmental, social, cultural, and economic resources are analyzed in **Chapter 4** and **Appendix M** of this PEIS.
Earthjustice et al.-15	BOEM-2023-0046-5236	We urge BOEM to adopt the no action alternative and cancel this lease sale because of its detrimental impacts on wildlife and coastal communities in the Gulf of Mexico. Offshore oil and gas activities damage the Gulf's vulnerable ecosystems, erode its coastlines, and deepen our climate crisis.	Thank you for your comment. We note that your preferred alternative is Alternative A. Potential impacts of the Proposed Action on environmental, social, cultural, and economic resources are analyzed in **Chapter 4**Error! Reference source not found. and **Appendix M** of this PEIS.
Sean Tran-1	1/16/25 Public Meetings	The draft PEIS outlines a number of alternatives in addition to the proposed action. On behalf of myself and Zero Hour I urge BOEM to adopt Alternative A, No Action, as the proposed action. According to the agency's own analysis and table 1.5-1 of the PEIS, direct and indirect impacts to air quality, water quality, coastal communities, benthic communities, pelagic communities, fish and invertebrates, birds, marine mammals, sea turtles, and land use, cultural historical and archeological resources, and coastal infrastructure would be none. Direct and indirect impacts if any to commercial fisheries, recreational fishing, and social factors, like employment, would be negligible or none. The agency estimates that economic impact could be minor to moderate and as I've already stated the oil and gas industry already leases 12 million acres of our public lands in public waters in the Gulf…. By choosing to hold an oil and gas lease sale in our public waters the federal government is choosing to threaten my generation's chances at a livable future and choosing to exacerbate already dangerous climate conditions. BOEM should proceed with Alternative A and issue no new oil and gas leases. Thank you.	Thank you for your comment. We note that your preferred alternative is Alternative A. Potential impacts of the Proposed Action on environmental, social, cultural, and economic resources are analyzed in **Chapter 4** and **Appendix M** of this PEIS.

Commenter	ID Number	Comment	Response
Zanagee Artis-1	1/16/25 Public Meetings	Oil and gas is a finite energy source that creates pollution in our communities and ecosystems and exacerbates climate change. Global energy security can only be achieved by transitioning to renewable energy. BOEM should proceed with the No Action Alternative and offer no new offshore oil and gas leases.	Thank you for your comment. We note that your preferred alternative is Alternative A. With respect to moving away from fossil fuel production and transitioning to renewable energy, E.O. 14154, "Unleashing American Energy" (January 20, 2025), states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS, in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future.

Stated Preference for Alternatives B-D

Commenter	ID Number	Comment	Response
Form Letter 1	BOEM-2023-0046- 0028	I am writing to express my strong support for Alternative B, a region-wide Gulf of Mexico lease sale that includes all available unleased blocks. The Gulf of Mexico is vital to America's energy security and economic stability. The Gulf produces nearly 2 million barrels of oil per day, powering our homes, businesses, and transportation. This industry supports thousands of jobs and generates billions of dollars in revenue for regional communities. It is a critical component of our nation's energy mix and plays a key role in ensuring we have affordable and reliable energy. Delaying lease sales or limiting access to these resources puts this energy production—and the economic benefits it provides—at risk. We need to expedite the completion of the Programmatic Environmental Impact Statement to ensure a lease sale can take place in 2025. I urge BOEM to move forward with Alternative B and maintain America's leadership in energy production. A strong and secure Gulf of Mexico benefits every American.	Thank you for your comment. We note that your preferred alternative is Alternative B. In reference to the expedition of the completion of the PEIS to hold a lease sale in 2025, BOEM's current schedule allows for a proposed OCS oil and gas lease sale to occur in late 2025.
API et al.-8	BOEM-2023-0046-3145	"Many of our members are involved in exploring for and developing oil and natural gas resources in the GOM and we support BOEM, at a minimum, holding all lease sales as scheduled in the 2024-2029 National OCS Oil and Gas Program, and offering all unleased acreage not subject to moratorium in those lease sales. Accordingly, BOEM should adopt Alternative B in the DPEIS; the other alternatives do not meet legal requirements and are not adequately justified in the DPEIS....." Though the DPEIS presents a reasonable range of alternatives for purposes of NEPA review, only Alternative B, the proposed alternative, satisfies applicable legal requirements and is supported by the record. Congress has repeatedly affirmed its mandate to lease the vast and valuable domestic oil and gas resources on the OCS and thereby promote the nation's economic growth and national security. Congress expressed its preference for region-wide leasing in the IRA, by directing the Secretary to conduct Lease Sales 259 and 261 and specifying that the sales occur in accordance with the environmental analyses and Record of Decision for those lease sales approved by the Secretary in January 2017. See IRA Sections 50264(a)(3) and (d) (directing Lease Sale 259); IRA Sections 50264(a)(4) and (e) (directing Lease Sale 261). The Record of Decision in question expressly provided for Region-wide leasing, stating that "the GOM sales would be region-wide and include unleased acreage not subject to moratorium or otherwise unavailable, in the Western, Central and Eastern Gulf of Mexico" and noting that this approach provided "greater flexibility to industry." Record of Decision at 3.[10] In directing Lease Sales 259 and 261 to proceed on this basis, Congress demonstrated its preference for region-wide leasing with minimal exclusions. The Secretary of the Interior's rationale for this approach, as endorsed by Congress, remains just as applicable today as in 2017; limited exclusions	Thank you for your comment. We note that your preferred alternative is Alternative B. The Secretary is charged with developing the National OCS Oil and Gas Program and is required to balance development with protection of the human, marine, and coastal environments while simultaneously ensuring receipt of fair market value for the lands leased and the rights conveyed by the Federal Government. BOEM follows all requirements set forth by OCSLA and is responsible for developing the National OCS Program, advising the Secretary, and administering the National OCS Program. See the comment response to Earthjustice et al.-12 for information on the lease sales scheduled in the 2024-2029 National OCS Oil and Gas Leasing Proposed Final Program, the formulation of alternatives, and the decision to hold a lease sale and the alternative choice. See the comment response API et al.-5 for rationale on the removal on certain areas from leasing. With respect for reasoning for adopting an alternative other than Alternative B, BOEM's action alternatives were designed to analyze the potential effects of excluding certain sensitive areas from leasing to determine their necessity. This information is discussed in **Chapter 2.2**. The exclusion of the sensitive areas under Alternatives C and D were included in the alternatives to analyze and determine if there is a need for the exclusion areas.

Commenter	ID Number	Comment	Response
		from leasing provide the greatest flexibility. BOEM should continue to adhere to this approach and dismiss the Alternatives other than Alternative B. A region-wide approach with minimal exclusions is particularly important in light of the reduced level of leasing authorized in the GOM region in the 2024-2029 Five-Year Program. The longstanding practice in the GOM region has been for BOEM to conduct annual lease sales with minimal excluded areas. BOEM now proposes to conduct only three lease sales through 2029 and suggested that BOEM may not hold all three sales. [11] Failing to hold all three, and reducing acreage offered in any one of those three sales would be inconsistent with OCSLA and the Executive Order "Declaring a National Energy Emergency", which instructs agencies to identify all lawful means to " facilitate the identification, leasing, siting, production, transportation, refining, and generation of domestic energy resources, including, but not limited to, on Federal lands." Moreover, because only three sales are authorized it is especially important that operators have flexibility in bidding on leasing opportunities, and not be subject to the significant constraints proposed in Alternatives C and D. Broader opportunities will incentivize investment in the region and will therefore increase the ability of the GOM leasing program to contribute to the nation's energy independence, support employment in the region, and achieve the program's other objectives. As discussed throughout these comments, the DPEIS does not provide a reasoned basis for adopting the other Alternatives. The Associations thus support Alternative B as properly implementing the requirements of OCSLA, the IRA, and other statutory provisions.	
National Ocean Policy Coalition-4	BOEM-2023-0046-3144	The Coalition urges BOEM to adopt the Proposed Action (Alternative B) that would offer all available unleased acreage for future leasing availability subject to narrow exceptions consistent with previous lease sales, and reject the preferred alternative (Alternative C) that would needlessly exclude significant acreage across the Gulf of Mexico from future leasing availability.[1]…. For the foregoing reasons, the Coalition strongly urges BOEM to adopt the Proposed Action (Alternative B) and reject its preferred alternative (Alternative C), which will help ensure that the Gulf of Mexico region and the nation overall continue to benefit from the economic and environmental contributions associated with robust Gulf of Mexico lease sales.	Thank you for your comment. We note that your preferred alternative is Alternative B.
Chevron-6	BOEM-2023-0046-3140	Chevron further urges BOEM to use resources wisely as it undertakes this NEPA review. The U.S. oil and gas industry in the Gulf of Mexico is one of the most analyzed industries in the world. Chevron does not believe holding lease sales with narrowed or targeted leasing opportunities is in the national interest and urges BOEM to offer maximum acreage for oil and gas leasing in these three sales under the 2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program consistent with Alternative B. We appreciate there may be areas in the GOM Program Area that require careful scientific consideration due to the potential environmental and biological sensitivity concerns, such as the Flower Garden Banks National Marine Sanctuary. However, we strongly urge BOEM to not categorically restrict areas with great resource potential from being explored and developed in the near-term. Our industry has continually evolved since we first ventured into offshore exploration, and we will continue to advance the technologies to develop resources in a safe and environmentally responsible manner.	Thank you for your comment. We note that your preferred alternative is Alternative B. The Secretary is charged with developing the National OCS Oil and Gas Program and is required to balance development with protection of the human, marine, and coastal environments while simultaneously ensuring receipt of fair market value for the lands leased and the rights conveyed by the Federal Government. The Secretary retains the discretion at the lease sale stage to determine whether, when, and under what terms, a lease sale should be held and the precise acreage to be offered. See the previous comment response portion of API et al.-5 that discusses BOEM's action alternatives, how they were developed, and analyzed while looking for targeted leasing opportunities. All alternatives are under consideration as part of BOEM's robust environmental review process. The alternative will be selected by the Assistant Secretary of Lands and Minerals Management (as the delegated authority). They will also sign the Record of Decision and decide whether to hold a lease sale.

Commenter	ID Number	Comment	Response
Andy Radford-3	1/14/25 Public Meeting	API supports alternative B, a region wide Gulf of Mexico OCS lease sale that includes all available unleased blocks, except for those exceptions noted in the draft PEIS. OCS Oil and gas operations are subject to comprehensive, multi-agency oversight and innumerable regulations, requirements and other safeguards to avoid, minimize and mitigate any environmental impacts. For most OCS oil and gas activities, including protected marine species. Over many years, BOEM has performed multiple NEPA reviews of Gulf of Mexico oil and gas leasing, comprising thousands of pages. In all cases these reviews have supported the safe and responsible leasing and development of OCS oil and gas subject to existing robust environmental safeguards. These studies show the Gulf of Mexico oil and gas operations are well understood, and API is not aware of any new information that result in the need to move away from region wide leasing….In all API feels it would be arbitrary to cancel the lease sale, as is the case for alternative A or to arbitrarily remove one leased acreage. We are targeted to approach as proposed in alternative C and D.	Thank you for your comment. We note that your preferred alternative is Alternative B. The Secretary is charged with developing the National OCS Oil and Gas Program and is required to balance development with protection of the human, marine, and coastal environments while simultaneously ensuring receipt of fair market value for the lands leased and the rights conveyed by the Federal Government. The Secretary retains the discretion at the lease sale stage to determine whether, when, and under what terms, a lease sale should be held and the precise acreage to be offered. Alternative B is a regionwide lease sale that is a flexible leasing approach that provides more frequent opportunity to bid on rejected, relinquished, or expired OCS lease blocks in all three GOAR planning areas. Please see the previous comment response portion of API et al.-5 that discusses BOEM's action alternatives, how they were developed, and analyzed while looking for targeted leasing opportunities. See the comment response API et al.-2 for details on the No Action Alternative's compliance with the NEPA statute and DOI implementing regulations, as well as information on the selection of the preferred alternative.
David Duke-1	1/14/25 Public Meeting	My name is David Duke. I represent the Offshore Operators Committee, a technical trade association, for the United States Industry operators. I just wanted to echo the comments, provided by Andy Radford and the American Petroleum Institute. Thank you	Thank you for your comment. We note that your preferred alternative is Alternative B.
Lori LeBlanc-1	1/16/25 Public Meeting	LMOGA supports the verbal comments made by the American Petroleum Institute at the BOEM public meeting held on January 14th, 2025, and we are providing these additional comments. LMOGA members support the proposed Alternative B of the DPEIS the region-wide GOM OCS sale that includes all available unleased blocks except for those exceptions noted in the DPEIS. Continuing a regular oil and gas leasing schedule on the OCS is consistent with both federal statute and our country's global environmental leadership goals and we and will be needed in a substantial measure for many decades to come. We are opposed to any alternative that eliminates new offshore oil and gas sales as this is a serious economic risk for millions of American families and businesses. Gulf of Mexico energy producers supply nearly 15% of our nation's oil production and over 2% of our nation's natural gas production. Leaving open the option to hold zero future lease sales puts US energy security at risk and compromises US producers' ability to provide affordable reliable energy to the American people. The offshore oil and natural gas development supports over 350,000 jobs throughout the US, contributing billions to the economy and local state and federal tax revenues. Specifically in Louisiana, it would have drastic impacts on the nearly 250,000 Louisianans that rely on the energy industry to support their families. LMOGA also opposes any alternative which removes significant OCS acreage in the in the central and western Gulf of Mexico available to oil and gas leasing due to inconclusive evidence of the presence of the Rice's whale. Doing so is unwarranted based on limited and questionable scientific data.	Thank you for your comment. We note that your preferred alternative is Alternative B. For information on economic impacts of each alternative, please refer to **Chapter 4.15**. See the comment response API et al.-5 for rationale on the removal on certain areas from leasing. BOEM's action alternatives were designed to analyze the potential effects of excluding certain sensitive areas from leasing to determine their necessity. The exclusion of the Rice's whale proposed core distribution area and proposed critical habitat area under Alternatives C and D were included in the alternatives to analyze and determine if there is a need for the exclusion areas.

Commenter	ID Number	Comment	Response
NMFS, SERO-2	BOEM-2023-0046-3146	While there are benefits and drawbacks to each of the alternatives presented, NMFS supports the selection of an alternative that would best avoid conflicts with NOAA trust resources (e.g., critical habitat, Flower Garden Banks National Marine Sanctuary Areas, sensitive topographic features, etc.). For example, while Alternative D presents a scenario in which a smaller footprint of available acreage for oil and gas leasing, selection of this alternative would effectively force oil and gas development to occur in deeper waters, where development is inherently more logistically difficult. The elimination of nearshore development options would also maximize the distances oil and gas industry associated vessels will have to transit, thereby increasing the risks of vessel interactions with protected species and their habitats while increasing costs to industry. Moving exploration and development farther offshore (i.e., Alternative D) may have farther reaching acoustic impacts on the marine environment than nearshore activities. For example, anthropogenic noise from oil and gas vessels and seismic survey sources produce low-frequency sounds that propagate farther in deep waters than in shallow continental shelf waters. This would further degrade the GOM's marine soundscape which is critical for the many marine mammals that rely on sound to communicate, forage and fulfill other life history needs.	Thank you for your comment. We note that your preferred alternative avoids conflicts with NOAA trust resources (e.g., critical habitat, Flower Garden Banks National Marine Sanctuary Areas, sensitive topographic features, etc.). For a detailed analysis on the impacts of each alternative to marine mammals, including the specific concerns raised with vessel traffic and noise, please refer to **Chapter 4.8**.
NMFS, SERO-3	BOEM-2023-0046-3146	Therefore, implementing measures that minimize the risk of oil spills and enhance oil spill response in the GOM are critically important conservation measures. Additionally, minimizing vessel strike risk, entanglement risk, and acoustic impacts from vessel and seismic activities in and around Rice's whales are also important conservation measures. NMFS notes that Alternatives C and D both contain exclusions for the Rice's whale core distribution area and important central and western Gulf habitat areas.	Thank you for your comment. We note that your preferred alternative is selection of an alternative that would best avoid conflicts with NOAA trust resources (e.g., critical habitat, Flower Garden Banks National Marine Sanctuary Areas, sensitive topographic features, etc.). As the comment noted, Alternatives C and D exclude the proposed core distribution areas and proposed critical habitat of Rice's whale. When considering impacts to marine mammals, under Alternative B, BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notice to Lessees, and Information to Lessees that will protect sensitive species and limit activities in certain areas, should they be leased. For information on response activities in the event of an oil spill, please see **Appendix B.3.2**.
Ruth Morlas-3	BOEM-2023-0046-2927	In the unfortunate event that alternative A is not chosen, a less detrimental alternative (although still very detrimental), would be Alternative D.	Thank you for your comment. We note that your preferred alternative is Alternative A, but would support Alternative D if Alternative A is not selected.
Zanagee Artis-2	1/16/25 Public Meeting	I believe that the agency should proceed with a no lease alternative. However, if the agency is going to proceed then it should adopt Alternative C, the preferred alternative, as a proposed action. As the agency writes in section 2.2.3, Alternative C, like the proposed action, would satisfy the Inflation Reduction Act stipulations needed to issue offshore wind energy leases. However, unlike the proposed action, the preferred alternative removes whole or partial blocks of sensitive ecosystems and habitats including the Rice's whale proposed critical habitat. Rice's whale has been well documented by the federal government and is a critically endangered whale with fewer than 100 individuals remaining in the Gulf of Mexico. It would be a moral failing and a failure of government responsibility to allow this critically endangered whale to be driven to extinction as a result of offshore drilling that is unnecessary and detrimental to coastal communities and our climate.	Thank you for your comment. We note that your preferred alternative is Alternative A, but would support Alternative C if Alternative A is not selected. Please note that BOEM implements the 2025 NMFS BiOp and associated Attachments and Appendices, which contain protocols BOEM applies for ESA compliance, and prevents or reduces impacts on listed species. See **Appendix G** of the PEIS for more detail.
Earthjustice et al.-16	BOEM-2023-0046-5236	BOEM properly included two alternatives excluding this habitat from oil and gas leasing—Alternatives C and D—in the Draft PEIS.[75] We strongly support BOEM's selection of an alternative that excludes Rice's whale habitat from leasing as the Preferred Alternative.[76]	Thank you for your comment. We note that your preferred alternative is Alternative C or D.

TOPIC 4 – ENVIRONMENTAL ISSUES AND CONCERNS

Climate Change

Commenter	ID Number	Comment	Response
Earthjustice et al.-17	BOEM-2023-0046-5236	The multiple impacts of climate change on coral reefs will have a cascading effect, ultimately harming coastal communities and economies that depend on healthy reefs for fish habitat, tourism, and shoreline protection. Climate change is also changing ecosystem productivity, altering important trophic relationships with potential impacts throughout entire ecosystems. Although changes to species' ranges and phenologies indicate that some species are able to adjust to changing climatic conditions, not all species have the same capacity to adapt and climate change may lead to local and global extinctions. Accelerating climate change poses risks to human and ecological systems that may lead to tipping points, irreversibly altering ecosystems and livelihoods.	Thank you for your comment. BOEM acknowledges reasonably foreseeable impacts of such factors as sea level rise, increases in sea temperature and surface temperatures, ocean acidification, increasing storms and their severity to the OCS, as well as impacts onshore and elsewhere throughout this PEIS. BOEM analyzed and addressed these effects to all applicable resources in **Chapter 4** and **Appendix M** of the PEIS throughout the analysis and summarized in **Chapter 4.17** of the PEIS. In addition, these effects are discussed in Chapter 3.4 of the SID and the influence on baseline conditions for each resource is discussed as part of the resource description in the SID: Fish and Invertebrates (Chapter 4.4.3), Coastal Communities and Habitats (Chapter 4.31.), Benthic Communities and Habitats (Chapter 4.3.2), Pelagic Communities and Habitats (Chapter 4.3.3), Tourism and Recreational Resources (Chapter 4.4.5), Economic Factors (Chapter 4.4.7), Land Use and Coastal Infrastructure (Chapter 4.4.1), Commercial Fisheries (Chapter 4.4.2), Recreational Fishing (Chapter 4.4.3), Subsistence Fishing (Chapter 4.4.4), and Social Factors (Chapter 4.4.6). The SID is incorporated by reference into this PEIS.
Sean Tran-2	1/16/25 Public Meeting	Hi, my name is Sean Tran and I'm an organizer with the youth-led climate justice organization Zero Hour. Not far from my hometown in Irvine California firefighters are still working to contain large fires that burned over 35,000 acres in Los Angeles County in just the first 24 hours. Over 108,000 people have been forced to evacuate. These fires were intensified and made possible because of climate change. Despite this, the BOEM's Draft PEIS for the Gulf of Mexico Regional Outer Continental Shelf Oil and Gas Lease Sales fails to properly consider and evaluate the exacerbating effects that the proposed lease will have on climate change. The BOEM's EIS estimates that a new lease sale would lead to a production of nearly a billion barrels of oil over the next years at a time when the US is a net exporter of oil and gas and is producing record breaking levels of oil year after year. The US is producing more oil today than any other country has ever produced in history.	Thank you for your comment. BOEM acknowledges reasonably foreseeable impacts of such factors as sea level rise, increases in sea temperature and surface temperatures, ocean acidification, increasing storms and their severity to the OCS, as well as impacts onshore and elsewhere throughout this PEIS. BOEM considered the impacts of reasonably foreseeable effects of other environmental factors on each resource analyzed in **Chapter 4** and **Appendix M** of this PEIS and summarized in **Chapter 4.17**, as part of the analysis. In addition, these effects are discussed in Chapter 3.4 of the SID and the influence of them on baseline conditions for each resource is discussed as part of the resource description in the SID. The SID is incorporated by reference into this PEIS. NEPA directs federal agencies to assess the impacts of all alternatives and compare them to the no action alternative, i.e. an incremental analysis. Courts have directed BOEM to include foreign emissions where possible when conducting such analyses, and to include an estimate of the incremental change in foreign oil's downstream emissions. Please refer to **Chapter 4.0.2.1** of the PEIS and **Appendix K** for the GHG analysis. With respect to wildfires in California, the severity of those wildfires is evident. Wildfire emissions and air pollution are discussed in **Chapter 4.1.2.3** of the PEIS under Other Environmental Factors, where additional information was added to explain that rising temperatures and increased wildfires are expected to increase criteria air pollutants such as ozone and particulate matter. The National Ambient Air Quality Standards include ozone and $PM_{2.5}$ and provide public health protection. Climate-related effects to air quality are expected to be greater in the future as discussed in **Chapter 4.1.2.3** of the PEIS under Other Environmental Factors.
Sean Tran-3	1/16/25 Public Meeting	In 2024, there were wildfires in the bayous of Southern Louisiana and numerous hurricanes battered the Gulf Coast including hurricanes Beryl, Francine, and Helene which have collectively cost the Gulf Coast and other impacted states tens of billions of dollars. Climate disasters will continue to be exacerbated by consumption of oil and gas and offshore drilling contributes to that problem. It is time to end the era of fossil fuels.	Thank you for your comment. BOEM acknowledges reasonably foreseeable impacts of such factors as sea level rise, increases in sea temperature and surface temperatures, ocean acidification, increasing storms and their severity to the OCS as well as impacts onshore and elsewhere throughout this PEIS. BOEM considered the impacts of reasonably foreseeable effects of other environmental factors on each resource analyzed in **Chapter 4** and **Appendix M** of this PEIS and summarized in **Chapter 4.17**, as part of the analysis. In addition, these effects are discussed in Chapter 3.4 of the SID and the influence of them on baseline conditions for each resource is discussed as part of the resource description in the SID. The SID is incorporated by reference into this PEIS. With respect to wildfires and their impacts on states bordering the Gulf of America, their impact is evident. See the comment response Sean Tran-2 for more detail on wildfire emissions, air pollution, and climate-related effects to air quality.

Greenhouse Gases - General

Commenter	ID Number	Comment	Response
Tom Fitzgerald-3	BOEM-2023-0046-5219	OCS lease sales will lead to increased fossil-fuel production and use, as well as direct methane emissions from the platforms.[2] In 2024 the Energy Information Agency reported that 14% of U.S. crude oil production and 5% of U.S. dry natural gas production. Production in the Gulf of Mexico.[3] Increased production in the Gulf of Mexico will lead to further greenhouse gas emissions and increase future warming.	Thank you for your comment. BOEM's analysis of GHG life cycle emissions resulting from the proposed action (**Appendix K** of the Final PEIS and summarized in **Chapter 4.0.2.1**) indicates that domestic life cycle emissions from OCS oil and natural gas (including upstream, midstream, and downstream) are similar to those resulting from displaced energy substitutes given that OCS production would replace large portions of domestic energy market substitutes. However, when considering the impact of changes in foreign oil production and consumption, global emissions increase in each activity level in the proposed action.
Earthjustice et al.-18	BOEM-2023-0046-5236	**C. BOEM did not Consider the Full Impacts of the Climate Crisis.** International scientific evidence has unequivocally established that human-caused climate change is a severe and pervasive threat to all aspects of society. The climate crisis is largely driven by the burning of fossil fuels, and the impacts of climate change are projected to worsen without a significant and rapid reduction in global reliance on fossil fuels….. ....The Intergovernmental Panel on Climate Change ("IPCC") and other scientific bodies and institutions[123] have made clear that current projected global greenhouse gas ("GHG") emissions will exceed the 1.5 °C goal of the Paris Agreement, leading to catastrophic and potentially irreversible damage in the United States and globally. Using updated nationally determined contributions ("NDCs") submitted prior to the 26th United Nations Climate Change Conference of the Parties ("COP26"), the IPCC projects that global GHG emissions in 2030 will likely exceed 1.5 °C, and after 2030 it will be more difficult to limit warming to below 2 °C[124]. Despite the more ambitious NDCs from COP26, other reports similarly confirm that global emissions in 2030 will be roughly twice the amount required to stay within 1.5 °C and may lead to warming of 2.4 °C by the end of the century.[125] Research has determined that to stay within the 1.5 °C goal of the Paris Agreement, no new fossil fuel facilities can be developed, and existing fossil fuel production must be rapidly phased out.[126]…. …. President Biden has expressed the view that climate change is a pervasive and "existential … threat to human existence as we know it." [131] In his Executive Order on Tackling the Climate Crisis at Home and Abroad, President Biden asserted that "there is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory.[132] "In a statement at COP26, President Biden stated that we are at an "inflection point" in the fight against climate change and that he hopes the United States will be "leading by the power of our example[133]. However, the United States is the world's leader in oil and gas production[134], the world's second largest coal producer, and is currently increasing domestic oil production. [134] Assuming continued new leasing on the outer Continental Shelf, the U.S. Energy Information Administration projects that U.S. oil and gas production will increase by 17% and 24% from 2021 to 2050, respectively.[135]…. Scientific research provides estimates of the remaining carbon budget—the maximum amount of CO2 that can be emitted that would keep global warming to a given level—to determine the likelihood of meeting the goals of the Paris Agreement….	Thank you for your comment. BOEM provided a discussion of potential net-zero pathways and associated impacts to energy demand on the incremental emissions from a decision for the proposed action in **Appendix H,** and summarized in **Chapter 4.0.2.1,** of the Draft PEIS. However, this analysis (**Appendix K** in the Final PEIS) has been modified given the recent E.O.s from January 2025 and change in administration priorities, policies and regulations including a CEQ interim final rule to remove the existing implementing regulations for NEPA and disbanding of the IWG and withdrawal of any guidance, instruction, recommendation, or document issued by the IWG. With respect to the U.S. energy production, E.O. 14154, "Unleashing American Energy" (January 20, 2025), states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS, in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future. BOEM acknowledges that this is a time of rapid change in federal policy and recent E.O.s provide guidance on BOEM policy. With respect to E.O. 14008, "Tackling the Climate Crisis at Home and Abroad" (January 27, 2021), E.O. 14154 revoked E.O. 14008. In addition, E.O. 14148, "Initial Recissions of Harmful Executive Orders and Actions" (January 28, 2025) rescinded Biden era E.O.s related to climate change, including: E.O. 14008, "Tackling the Climate Crisis Home and Abroad" (January 27, 2021), E.O. 14013, "Rebuilding and Enhancing Programs to Resettle Refugees and Planning for the Impact of Climate Change on Migration" (February 4, 2021), E.O. 14027, "Establishment of the Climate Change Support Office" (May 7, 2021), and E.O. 14030, "Climate-Related Financial Risk' (May 14, 2021). Therefore, the goals outlined in those E.O.s are no longer BOEM policy. With respect to the Paris Climate Agreement, on January 27, 2025, the Secretary-General was notified of the United States' withdrawal from the Paris Agreement. Furthermore, E.O. 14162, "Putting America First in International Environmental Agreements" (January 20, 2025), ordered the withdrawal of the United States from any agreement, pact, accord, or similar commitment made under the United Nations Framework Convention on Climate Change. Therefore, the U.S. has no other GHG reduction commitments. BOEM has also considered the impacts reasonably foreseeable effects of other environmental factors such as sea level rise, ocean acidification, warming air and water temperatures, and increased storm activity in each individual resource analyzed in **Chapter 4** and **Appendix M** and summarized in **Chapter 4.17** of this PEIS, as part of the analysis. In addition, these environmental factors are discussed in Chapter 3.4 of the SID, and the influence of them on baseline conditions for each resource is discussed as part of the resource description in the SID. The SID is incorporated by reference into this PEIS.

Commenter	ID Number	Comment	Response
		Even without any new fossil fuel extraction projects, emissions from existing production would be 66% higher in 2030 than what is needed to limit warming to 1.5 °C. [141]Burning developed coal, oil and gas reserves would produce 936 GtCO2, well above the remaining carbon budget for limiting warming to 1.5 °C[142]. Developed oil and gas fields alone would produce 488 GtCO2[143] fully exhausting and exceeding the IPCC's estimated carbon budget to remain within 1.5 °C of warming with a 67% probability…..Assessing the carbon budget with a 67% probability of remaining within 1.5 °C of warming, there are only seven years of emissions at the current rate before the carbon budget is depleted.[149]	

Greenhouse Gases –SC-GHG Analysis

Commenter	ID Number	Comment	Response
Institute for Policy Integrity-1	BOEM-2023-0046-3141	**I. BOEM has a direct obligation under the National Environmental Policy Act (NEPA)—independent of any executive orders or guidance—to contextualize the impacts of GHG emissions associated with its actions, and the SC-GHG is the best available tool to provide that required context.** When discussing its decision to use SC-GHG values in its analysis, BOEM mentions guidance from the Council on Environmental Quality (CEQ), which directs agencies to "apply the best available estimates of the SC-GHG to the incremental metric tons of each individual type of GHG emissions expected from a proposed action and its alternatives."[2] It also mentions the recently repealed Executive Order 13990, which stated that it is important for federal agencies to "capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account."[3] Finally, it mentions a 2023 memo from the Interagency Working Group on the SC-GHG, which stated that "agencies should use their professional judgement to determine which estimates of the SC-GHG reflect the best available evidence, are most appropriate for particular analytical contexts, and best facilitate sound decision-making."[4] In the time since BOEM published its draft EIS, Executive Order 13990 has been rescinded,[5] all Interagency Working Group documents have been withdrawn,[6] and legal developments have brought into question whether agencies must follow CEQ guidance on environmental review.[7] Despite these developments, BOEM should continue to use the SC-GHG in its final EIS, given its direct legal responsibilities under NEPA. BOEM need not rely on any of the directives cited above when explaining its choices regarding the use of SC-GHG values. Instead, BOEM should explain that it is using an SC-GHG, and EPA's 2023 values specifically, because NEPA requires agencies "to the fullest extent possible" to assess all "reasonably foreseeable environmental effects" of their actions, by using "methods and procedures…which will ensure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making," by "mak[ing] use of reliable data and resources," and "ensur[ing] the…scientific integrity of the discussion and analysis."[8] Similarly, in the Energy Policy Act of 2005, Congress advised that "agencies conducting assessments of risks to human health and the environment from energy…production, transport…[or] distribution…activities…shall consider the	Thank you for your comment. BOEM has removed the SC-GHG estimates from the Final PEIS based on recent administration changes in priorities, policies, and regulations. CEQ issued an interim final rule, which went into effect on April 11, 2025, to remove the existing implementing regulations for NEPA, in response to E.O. 14154, "Unleashing American Energy" (January 20, 2025). In addition, in response to E.O. 14154, the IWG was disbanded and any guidance, instruction, recommendation, or document issued by the Interagency Working Group (IWG) was withdrawn. NEPA does not require an agency to quantify project impacts through a specific methodology, such as estimating the "social cost of carbon," "social cost of methane," or "social cost of greenhouse gases." A protocol to estimate what is referenced as the "social cost of carbon" (SCC) associated with greenhouse gas (GHG) emissions was developed by a federal Interagency Working Group on the Social Cost of Greenhouse Gases. E.O. 14154 disbanded the IWG and withdrew any guidance, instruction, recommendation, or document issued by the IWG. Section 6(c) of E.O. 14154 states: The calculation of the "social cost of carbon" is marked by logical deficiencies, a poor basis in empirical science, politicization, and the absence of a foundation in legislation. Its abuse arbitrarily slows regulatory decisions and, by rendering the United States economy internationally uncompetitive, encourages a greater human impact on the environment by affording less efficient foreign energy producers a greater share of the global energy and natural resource market. E.O. 14154 further directs agencies to ensure consistency with the guidance in OMB Circular A-4 of September 17, 2003, when estimating the value of changes in greenhouse gas emissions from agency actions. BOEM has not included any estimates for the SCC for the Final PEIS for multiple reasons. First, this action is not a rulemaking. Rulemakings are the administrative actions for which the IWG originally developed the SCC protocol. Second, E.O. 14154 clarifies that the IWG has been disbanded and its guidance has been withdrawn. Further, the NEPA statute (42 U.S.C. 4321 et seq.) does not require agencies to conduct a cost-benefit analysis. Including an SCC analysis without a complete cost-benefit analysis, which would include the social benefits of the proposed action to society as a whole and other potential positive benefits, would be unbalanced, potentially inaccurate, and not useful to foster informed decision-making. Any increased economic activity—in terms of revenue, employment, labor income, total value added, and output—that is expected to occur as a result of the proposed action is simply an economic impact, not an economic benefit, inasmuch as any such impacts might be viewed by another person as a negative or undesirable impact due to a potential increase in the local population, competition for jobs, and concerns that changes in population will change the quality of the local community. "Economic impact" is distinct from "economic benefit," as understood in economic theory and methodology, and the socioeconomic impact analysis required under NEPA is distinct from a cost-benefit analysis, which NEPA does not require. In addition, many benefits and costs from agency actions cannot be monetized and, even if monetizable, cannot meaningfully be compared directly to SCC calculations for a number of reasons, including because of differences in scale (local impacts vs global impacts).

Commenter	ID Number	Comment	Response
		best available science."[9] Consequently, BOEM must provide a reasonably thorough discussion and necessary contextual information on major foreseeable environmental consequences like greenhouse gas emissions. The SC-GHG metric, and particularly EPA's 2023 version, is the best available tool to provide the context required by NEPA. The SC-GHG directly reflects the discrete effects of climate change in a way that quantifying the tons of GHG emissions alone does not….. Though some important damage categories are currently omitted due to insufficient data and modeling,[11] the damage modules do a reasonable job of capturing many of the discrete climate effects that decisionmakers and the public care about. Monetizing climate damages provides the informational context required by NEPA, as opposed to a purely quantitative estimate of tons or a qualitative description of discrete climate effects like sea-level rise, which provide little context…. In particular, "the impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impact analysis that NEPA requires," and it is arbitrary to fail to "provide the necessary contextual information about the cumulative and incremental environmental impacts."[13] To "provide the necessary contextual information," economic theory shows that one useful tool is monetization of environmental impacts…. Similarly, non-monetized effects are often irrationally treated as worthless.[16] On several occasions, courts have struck down administrative decisions for failing to give weight to nonmonetized effects.[17]…. Whether or not an agency attempts to conduct a full cost-benefit analysis, NEPA requires that agencies disclose environmental effects with sufficient detail and context. As this section has explained, simply tallying the volume of emissions fails to give the public and decisionmakers the required information about the magnitude of discrete climate effects from those emissions. The SC-GHG metric, and specifically EPA's 2023 version, provides the context that NEPA requires. **II. BOEM should use EPA's 2023 SC-GHG values in its final EIS, consistent with the approach proposed in its draft EIS.** In its draft EIS, BOEM notes that its parent agency, the Department of the Interior (DOI), has conducted its own review and concluded that EPA's 2023 values for the SC-GHG "constitute the 'best available science' for purposes of Departmental decision-making and/or analysis." [19] Following this guidance, BOEM states that it will use the EPA values in its analysis and gives additional reasons why it will do so. For these reasons, as well as additional justifications, BOEM should continue to use EPA's 2023 values in its final EIS. **A. EPA's 2023 values apply the recommendations issued by the National Academies of Sciences in 2017.** BOEM recognizes that EPA's updated values apply recommendations issued by the National Academies of Sciences….[20]	Finally, purported estimates of SCC would not measure the actual environmental impacts of a proposed action and may not accurately reflect the effects of GHG emissions. Estimates of SCC attempt to identify economic damages associated with an increase in carbon dioxide emissions—typically expressed as a one metric ton increase in a single year—and typically includes, but is not limited to, potential changes in net agricultural productivity, human health, and property damages from increased flood risk over hundreds of years. The estimate is developed by aggregating results across models, over time, across regions and impact categories, and across multiple scenarios. The dollar cost figure arrived at based on consideration of SCC represents the value of damages avoided if, ultimately, there is no increase in carbon emissions. But SCC estimates are often expressed in an extremely wide range of dollar figures, depending on the particular discount rates used for each estimate, and would provide little benefit in informing BOEM's decision. For these reasons, DOI has also rescinded its memorandum of October 16, 2024, "Updated Estimates of the Social Cost of Greenhouse Gases," which had directed DOI bureaus to calculate SCC using the methodology contained in the Environmental Protection Agency's Final Rule of March 8, 2024, 89 Fed. Reg. 16,820. To summarize, BOEM is not evaluating SCC for the Final PEIS because: (1) BOEM is not engaged in a rulemaking for which the now-rescinded SCC protocol was originally developed; (2) the IWG has been disbanded and all technical supporting documents and associated guidance have been withdrawn; (3) NEPA does not require agencies to prepare SCC estimates or cost-benefit analyses; (4) costs attributed to GHGs are often so variable and uncertain that they are unhelpful for BOEM analysis; and (5) the full social benefits of carbon-based energy production have not been monetized, and quantifying only the costs of GHG emissions, but not the benefits, would yield information that is both potentially inaccurate and not useful. See **Chapter 4.0.2.1** of the PEIS and **Appendix K** for the GHG analysis.

Commenter	ID Number	Comment	Response
		B. EPA's 2023 values incorporate recent scientific advancements across multiple relevant fields. BOEM also recognizes that EPA's updated values "incorporate many recent advancements in modeling technology, projecting probability distributions, quantifying uncertainty, discounting methodology, and the most recent peer-reviewed scientific literature."[23] EPA's inclusion of these advancements makes its values the most robust and comprehensive climate-damage estimates currently available…. **C. EPA's 2023 values underwent an extensive peer review process and received praise from expert reviewers.** BOEM did not mention in its draft EIS, but should mention in its final EIS, that expert peer reviewers offered extensive praise for EPA's estimates….[26] **D. EPA's 2023 values are not based, in whole or in part, on the work of the Interagency Working Group on the SC-GHG (IWG), making them compliant with recent executive orders.** A recently issued executive order withdrew and designated as "no longer representative of government policy" all "estimates of the social cost of greenhouse gases, including the estimates for the social cost of carbon, the social cost of methane, or the social cost of nitrous oxide based, in whole or in part, on the IWG's work or guidance."[33] BOEM can comply with this directive, while also meeting its obligation under NEPA to properly contextualize the impacts of its actions, by using EPA's 2023 values for the SC-GHG, which are not based on the IWG's work…. **III. BOEM should preferentially use a 2% discount rate in its SC-GHG emissions analysis.** On page 4-13 of its draft EIS, BOEM "applies the USEPA's [SC-GHG] estimates to the annual estimates of GHG emissions and discounts them back to their net present value in 2024 dollars."[36] On the following page, it uses discount rates of 1.5%, 2.0%, and 2.5% to do this discounting. These are the same discount rates that EPA uses for its 2023 values. While it can be useful to include estimates that use all three of these values, BOEM should preferentially use the 2% discount rate. Using a 2% discount rate is consistent with economic best practices and the latest economic evidence….[37] For these reasons, BOEM should preferentially use the 2% discount rate. In no case should BOEM revert to a high discount rate based on returns to capital, which would be inappropriate for climate analysis.	

Commenter	ID Number	Comment	Response
Earthjustice et al. -19	BOEM-2023-0046-5236	**D. <u>BOEM Is Required to Consider Life Cycle Greenhouse Gas Emissions and Their Costs.</u>** While we do not agree with BOEM's conclusions regarding the greenhouse gas emissions that will result from its proposed action, we appreciate that BOEM has attempted to consider lifecycle greenhouse gas emissions and their costs.[213] BOEM also compares the emissions of the proposed action to U.S. emissions reduction targets and considers the social costs of the project's emissions. Finally, BOEM models the effects of the Inflation Reduction Act ("IRA") and foreign emissions in its analysis.[214] BOEM should ensure that the final PEIS complies retains these elements, while also correcting its greenhouse gas analyses. Agencies must also disclose the costs of the greenhouse gas emissions produced by a project. [215] Using a social cost of carbon metric, as BOEM does here, is an acceptable protocol for disclosing the climate costs of a project.[216] And having decided to use that protocol, it would be arbitrary for BOEM to depart from using it in the final PEIS.[217] BOEM appropriately uses a range of discount rates to calculate the social costs in its Draft PEIS—ranging from 1.5% to 2.5%—which complies with recent agency guidance, as well as recommendations from respected academic institutions.[218] Agencies must also compare how a project's GHG emissions will affect global emissions and U.S. emissions reduction targets.[219] While we disagree with BOEM's ultimate findings on how continued leasing in the Gulf will affect U.S. targets and contribute to climate change on a global scale, BOEM should correct its analysis and then keep this discussion in the final PEIS.	Thank you for your comment. BOEM does not see where the commenter identifies the items in the greenhouse gas emissions analysis that require correction. However, BOEM has removed the SC-GHG estimates from the Final PEIS based on recent administration changes in priorities, policies and regulations including a CEQ interim final rule to remove the existing implementing regulations for NEPA and disbanding of the IWG and withdrawal of any guidance, instruction, recommendation, or document issued by the IWG. See the comment response for Institute for Policy Integrity-1 concerning the estimation of the social cost of carbon (SCC), the recent changes to those analyses, and why BOEM is not evaluating SCC for the Final PEIS.
API et al.-9	BOEM-2023-0046-3145	**b. The Social Cost of Greenhouse Gases Is Not Appropriate for Use in the DPEIS.** Although the Associations support the appropriate consideration of climate change impacts in NEPA analyses, the Associations reiterate that the SC-GHG is not appropriate for use by BOEM in this DPEIS. SC-GHG is a monetized cost-benefit analysis tool developed for economically significant regulatory rulemakings; NEPA does not compel cost-benefit analysis, particularly for an individual leasing decision. 40 C.F.R. § 1502.22…. The President's January 20, 2025 E.O. "Unleashing American Energy" contains provisions addressing the use of SC-GHG analysis in agency decision-making…. BOEM's analysis of the SC-GHG in the DPEIS must be revised to conform to these new requirements, including to the EPA guidance addressed in section 6(d) once it becomes available. We anticipate that the existing DPEIS analysis will require substantial revisions, especially because the E.O. indicates that the anticipated guidance may prohibit use of SC-GHG methodologies altogether. Pending issuance of this guidance, the Associations provide the following comments on the DPEIS.	Thank you for your comment. BOEM has removed the SC-GHG estimates from the Final PEIS based on recent administration changes in priorities, policies, and regulations, including a CEQ interim final rule to remove the existing implementing regulations for NEPA and disbanding of the IWG and withdrawal of any guidance, instruction, recommendation, or document issued by the IWG. See the comment response for Institute for Policy Integrity-1 concerning the estimation of the SCC, the recent changes to those analyses, and why BOEM is not evaluating SCC for the Final PEIS.

Commenter	ID Number	Comment	Response
		The Associations have substantial concern about BOEM's unbalanced application of SC-GHG. Though BOEM may nominally disclaim the role of SC-GHG estimates in its decision-making, including their role in presenting an incomplete cost-benefit analysis that fails to consider all the benefits of domestic oil and gas development, use of the SC-GHG estimates here risks misleading decision-makers and the public, and suggests that BOEM's inherently unreliable analysis is subject to meaningful quantification. The Associations incorporate the industry comments previously submitted (on October 5, 2022 by API, et al.) on the Proposed 2024-2029 Five-Year Program and Draft PEIS (Docket No. BOEM–2022–0031) and (on November 21, 2022) on the Draft Supplemental Environmental Impact Statement for Gulf of Mexico Lease Sales 259 and 261 (Docket No. BOEM-2022-0048). The SC-GHG was developed to monetize the social value of reduced GHG emissions for use in regulatory cost-benefit analysis as part of the Regulatory Impact Analysis ("RIA") associated with economically significant regulations under Executive Order 12866. Such rulemakings require full monetization of all costs and benefits and include review by the Office of Management and Budget ("OMB").[21] But the SCGHG was never designed for use in environmental reviews under NEPA, and it is ill-suited to that purpose. Throughout the DPEIS, BOEM analyzes impacts in categories like "negligible," "minor," or "moderate," but does not attempt to monetize or quantify those impacts further. Only in the SC-GHG analysis does BOEM attempt to quantify (and monetize) its analysis more precisely. If BOEM chooses to monetize an OCS oil and gas sale's emissions using the social cost of greenhouse gases (SC-GHG) it should seek to improve its overall analysis. Without monetizing and presenting all the economic benefits alongside the cost of GHG emissions, BOEM does not provide sufficient context to decision makers and the public. For example, two of BOEM's scenarios find that an OCS lease sale reduces domestic CO2e emissions while lowering energy costs and increasing domestic energy consumption. Yet, BOEM finds that their mid-activity ($207 million) and high activity case ($1.3 billion) also impose social costs after monetizing GHG emissions using EPA's 2023 cost estimates and a 2.5% discount rate. However, BOEM does not note in this section that a single GOM lease sale's annual averaged economic impact can support 7,407 (18,941) jobs and generate $863 million ($2.2 billion) in GDP in their mid (high) scenario. (4-213) Similarly, when BOEM examines foreign impacts from an OCS lease sale it only quantifies the costs that stem from increased foreign oil and gas usage without performing a substitution analysis or netting the benefits—environmental or otherwise—from increased oil and gas consumption. If BOEM is going to include the costs of foreigners' increased energy use, presumably BOEM should include the benefits. Overall, Appendix H presents the cost of GHG emissions from an OCS lease sale without providing decisionmakers with additional context that would be helpful for them to judge its merits. ....The DPEIS (at 4-13) cites to a one-page memorandum issued by the IWG on December 22, 2023. That memorandum, as with other IWG documents, has now been withdrawn. Even when that memorandum was in effect, the Associations note that it required agencies to determine what estimates of the SC-GHG "are most appropriate for particular analytical contexts, and best	

Commenter	ID Number	Comment	Response
		facilitate sound decision-making." Had BOEM conducted that analysis, it would properly have determined that sound decision-making required setting aside efforts to analyze SC-GHG given the limitations of available information and analysis. BOEM cites to CEQ's January 9, 2023 interim NEPA guidance on consideration of greenhouse gas emissions and climate change. 88 Fed. Reg. 1196 (January 9, 2023). That CEQ interim guidance may soon change. In any event, that document was issued on an interim basis subject to public comment; as of the date of these comments, over two years later, CEQ has not issued an updated guidance document. CEQ also declined to include any SC-GHG requirement in its amendments to its NEPA implementing regulations. CEQ's interim guidance document recommends that in "most circumstances, once agencies have quantified GHG emissions" in a NEPA document, agencies should then provide an estimate of SCGHG. 88 Fed. Reg. at 1202 (emphasis added). CEQ's wording concedes that agencies should not prepare an estimate in all circumstances, but does not identify the situations in which agencies should decline to provide such an estimate. Given that CEQ's recommendation is premised on an agency first quantifying GHG emissions, and that BOEM is not able to provide a reliable quantification for reasons already discussed, this situation is one in which BOEM should omit any SC-GHG analysis. ….In the event that the anticipated EPA guidance on SC-GHG analysis leaves BOEM with discretion to apply a SC-GHG analysis in this context, there is legal authority indicating the BOEM can properly decline to do so. The D.C. Circuit has found that where an agency determines that there are difficulties associated with applying SC-GHG in a NEPA analysis, it is permissible for the agency to decide not to conduct such an analysis, and instead limit its review to an analysis of GHG emissions. See Center for Biological Diversity v. FERC, 67 F.4th 1176, 1184 (D.C. Cir. 2023) (FERC approval of LNG facilities); Alabama Municipal Distributors Group v. FERC, 100 F.4th 207, 214-15 (D.C. Cir. 2024) (FERC pipeline approval); see also Dakota Resource Council v. US Department of the Interior, No. 22-CV-1853, 2024 WL 1239698 at 18-21 (D.D.C. March 22, 2024) (BLM oil and gas lease sales). That would be the proper course for BOEM to follow here.	

Greenhouse Gases - MarketSim Modeling

Commenter	ID Number	Comment	Response
Earthjustice et al.-20	BOEM-2023-0046-5236	**E. BOEM's Analysis of The Proposed Action's Emissions is Flawed.** BOEM's conclusions regarding the greenhouse gas emissions that will be produced by the proposed action are fundamentally flawed. BOEM relies on incorrect assumptions and flawed models to analyze the greenhouse gas emissions of the proposed action, and in so doing, reaches the arbitrary and capricious conclusion that allowing decades of new leasing in the Gulf of Mexico will result in only a slight increase in emissions compared to no leasing. For the same reasons, its analysis of the proposed action's effects on U.S. emission reduction targets and the social costs of emissions are also flawed.	Thank you for your comment. In reference to the two court cases cited to support the assertion that MarketSim is flawed, courts have not found MarketSim to have flawed assumptions or methodologies. Rather, court opinions have found that BOEM must estimate shifts in foreign energy markets and foreign GHG emissions. BOEM has responded to these court opinions and updated its analysis accordingly. BOEM has not changed the assumptions or analysis for this Final PEIS from those in the Draft PEIS. As part of the Draft PEIS, in response to stakeholder comments on the GHG analyses for BOEM's 2024-2029 National OCS Oil and Gas Leasing Program, BOEM has reframed the energy substitutes as displacements. This analysis shows GHG emissions associated with the substitute energy sources that are displaced by new OCS oil and gas production as negative values reducing total GHG emissions under the proposed action rather than as positive values increasing GHG emissions under the No Action Alternative. Thus, the total proposed action emissions are the GHG emissions from new OCS production plus the reduction in GHG emissions from displaced energy substitutes. The framing of the analysis has no impact on the reported GHG emissions associated with the proposed action.

Commenter	ID Number	Comment	Response
		BOEM's misleading assumptions artificially lower the amount of GHGs that will be produced by the proposed action, masking the true extent of the project's impacts, in violation of NEPA. NEPA requires agencies to ensure the "scientific integrity" of their environmental review documents, as well as to "make use of reliable data."[220] Agencies may not artificially minimize the impacts of their proposed actions.[221] Despite acknowledging that a single lease could be active for forty years or more, BOEM erroneously concludes that "[i]n total, the life cycle analysis of domestically produced or consumed energy shows that selection of the proposed action results in only small changes in emissions from those under the No Action Alternative."[222] BOEM notes that in low- and mid- level activity scenarios, the proposed action will result in "a slight decrease in emissions," while the high-level activity scenario results in a "small increase in GHG emissions above the No Action Alternative baseline level of emissions."[223] BOEM reaches its flawed conclusion in part by treating "displaced" production—energy sources that would not be produced because of the lease sale—as emissions reductions to be subtracted from the total greenhouse gas emissions of the project.[224] BOEM calculates the life cycle GHG emissions from a lease sale, and then subtracts the life cycle emissions from "other energy sources [that] would not be produced (i.e., displaced)," such as "oil imports and domestic onshore oil and gas."[225] This is a departure from how BOEM has previously analyzed lease sale emissions and is arbitrary and capricious. BOEM did not factor emissions from "displaced" sources into its evaluation of lease sale emissions in the Lease Sale 259/261 EIS.[226] Likewise, BOEM did not include "displaced" sources in evaluating potential emissions from the lease sale program.[227] For those two documents, BOEM instead accounted for emissions from other energy sources in the No Action alternative. BOEM's inclusion of "displaced" sources in calculating the project's emissions renders its other greenhouse gas analyses flawed. BOEM's analysis of how the proposed action will affect U.S. emissions targets also includes "displaced" production, and as such, the agency incorrectly concludes that continued development will have a net beneficial effect in the long-run and facilitate meeting U.S. targets.[228] So does its analysis of the social costs of greenhouse gas emissions.[229] Additionally, while BOEM has stated how the proposed action affects U.S. Paris Agreement emissions reduction commitments and makes cursory reference to the existence of carbon budgets, its analysis remains deficient.[230] It is insufficient to simply state the project's effects— indeed, the project's effects might look quite small when compared to national and international emissions targets—rather, BOEM must explain how those emissions actually affect the environment.[231]	In response to E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), CEQ issued an interim final rule removing the existing implementing regulations for NEPA effective April 11, 2025; those removals do not change the statutory NEPA requirements, which require a detailed statement of the reasonably foreseeable environmental effects of the proposed agency action, any reasonably foreseeable adverse environmental effects which cannot be avoided should the proposed action be implemented, and an analysis of not implementing the proposed action (42 U.S.C.4332 (C)(i), (ii), and (iii)). BOEM's use of MarketSim allows for meeting these NEPA requirements. MarketSim allows BOEM to capture the impacts of the alternatives and compare them to the No Action Alternative through an incremental analysis. BOEM presents the GHG emissions resulting from both the proposed action's activity and production as well as those of the energy substitutes displaced by the proposed action's anticipated production. The displaced substitutes are the energy that would have been produced and consumed under the No Action Alternative absent the proposed action's OCS production. The substitution analysis allows stakeholders and decision makers to compare and contrast both estimates. With regard to contextualizing those emissions in the absence of emission targets and SC-GHG values, BOEM compares the total estimated emissions volumes to those of U.S. states. With respect to SC-GHG analyses, BOEM has removed the SC-GHG estimates from the Final PEIS based on recent administration changes in priorities, policies and regulations including a CEQ interim final rule to remove the existing implementing regulations for NEPA and disbanding of the IWG and withdrawal of any guidance, instruction, recommendation, or document issued by the IWG. See the comment response for Institute for Policy Integrity-1 concerning the estimation of the SCC, the recent changes to those analyses, and why BOEM is not evaluating SCC for the Final PEIS.

Commenter	ID Number	Comment	Response
		Additionally, BOEM has continued to rely on the flawed MarketSim model when calculating lifecycle GHG emissions.[232] Courts have repeatedly held that the MarketSim model is flawed and produces inaccurate GHG analyses.[233]	
API et al.-10	BOEM-2023-0046-3145	**b. The Social Cost of Greenhouse Gases Is Not Appropriate for Use in the DPEIS.** ….BOEM documents areas of uncertainty within its model but it does not perform a sensitivity analysis or alter key parameters—e.g., long-term elasticities. If BOEM performed a robust sensitivity analysis it would provide a more comprehensive picture, regarding a lease sale's potential impact, for policymakers and the public. BOEM previously noted that its activity levels assume different prices for oil—e.g. $40, $100, $160 per barrel—and gas. BOEM should incorporate these price levels in their baseline as this assumption impacts the amount of oil an OCS lease sale displaces in their model.[22] ….As discussed in the previous section, analyzing the GHG impacts of a lease sale requires a complex analysis of energy production worldwide, including substitution and elasticity across energy sources. Conducting this analysis properly appears to be outside the capabilities of BOEM's model, and is constrained by limitations in available data, so that BOEM's quantification of the GHG implications of leasing decisions is inherently unreliable. Layering a novel SC-GHG estimate on top of an analysis that is already impracticable does not improve the quality of agency decision-making and instead impairs the ability of the public and agency staff to determine the implications of BOEM's decisions. This is especially true given that BOEM is legally prohibited from taking this analysis into account in making leasing decisions.	Thank you for your comment. In the Draft PEIS, BOEM references the MarketSim sensitivity analysis and its GHG analyses methodology. Please see **Appendix H** of the Draft PEIS (**Appendix K** in the Final PEIS), which is summarized in **Chapter 4.0.2.1,** of the PEIS for this reference. That sensitivity analysis is discussed in Chapter 4 of BOEM's Economic Analysis Methodology and can be found at: https://www.boem.gov/2024-2029-Economic-Analysis-Methodology). The details of the sensitivity analysis are located in Appendix A of BOEM's Market Simulation model documentation (available at https://espis.boem.gov/final%20reports/BOEM_2023-055.pdf). As a modeled representation of energy markets, MarketSim was designed to inform BOEM policymakers and the public of the direction and magnitude of energy market outcomes associated with leasing on the OCS. Although the model captures many of the complex relationships that affect substitution patterns and other energy market outcomes, MarketSim's representation of these relationships is imperfect, as is the case with any energy market model. Energy market models are designed to capture how markets respond to any number of changes in a market, but the nature of these responses is constantly evolving due to many factors such as changes in labor costs, technological change and innovation, consumer preferences, regulation by state and federal agencies, and geopolitical considerations. The scope of effects that BOEM currently captures in MarketSim reflects the breadth and level of detail of the available data, in terms of both model parameters that characterize the behavior of energy producers and consumers and baseline projections of U.S. and foreign energy supply and demand. Taking these limitations into account, MarketSim is the best tool available for estimating the market responses and displacement of energy market substitutes and form the basis for BOEM's estimates of incremental emissions impacts. BOEM seeks feedback on improvements to MarketSim, specifically the ability to model foreign energy markets to improve the displacement/substitution and resulting incremental GHG emissions analysis. With respect to the SC-GHG, BOEM has removed the SC-GHG estimates from the Final PEIS based on recent administration changes in priorities, policies and regulations including a CEQ interim final rule to remove the existing implementing regulations for NEPA and disbanding of the IWG and withdrawal of any guidance, instruction, recommendation, or document issued by the IWG. See the comment response for Institute for Policy Integrity-1 concerning the estimation of the SCC, the recent changes to those analyses, and why BOEM is not evaluating SCC for the Final PEIS.

Commenter	ID Number	Comment	Response
API et al.-11	BOEM-2023-0046-3145	"....BOEM cannot justifiably rely on its analysis of greenhouse gas (GHG) emissions to restrict leasing and particularly cannot rely on speculative modeling of foreign emissions. BOEM is not authorized to take GHG emissions into account in implementing OCSLA in any event, but the Associations oppose inclusion of erroneous analysis in the agency's record. Similarly, BOEM should omit discussion of the social cost of greenhouse gases from its analysis, given the limitations of available data and the limited context in which that tool is properly applied.... **7. The Analysis of Greenhouse Gases in the DPEIS Fails to Support More Limitations on Leasing.** Under OCSLA and NEPA, DOI is neither required nor permitted to consider downstream climate effects in implementing leasing programs for the Outer Continental Shelf. See Center for Biological Diversity v. U.S. Department of Interior, 563 F.3d 466, 485 (D.C. Cir. 2009) (OCSLA does not authorize consideration of downstream climate effects); see Sierra Club v. FERC, 867 F.3d 1357, 1372 (D.C. Cir. 2019) (NEPA does not require agencies to evaluate environmental effects that they lack authority to consider). Nevertheless, because the DPEIS addresses climate effects through GHG estimates, the Associations note that a fair and accurate assessment of those effects likewise supports selection of Alternative B in the DPEIS.... The DPEIS forecasts an increase in foreign GHG emissions associated with oil and gas leasing, but as the Associations explain below, the DPEIS's modeling of foreign emissions likely overstates foreign emissions reductions under the No Action Alternative and thereby unduly casts that alternative in an artificially more favorable light. Moreover, the DPEIS proffers a social cost of greenhouse gas emissions analysis that the new Executive Order "Unleashing American Energy" confirms suffers from "harmful and detrimental inadequacies," section 6(c), and that is based on unreliable information. BOEM should instead have declined to conduct a social cost of greenhouse gases (SC-GHG) analysis, as is within BOEM's discretion.	Thank you for your comment. Recent court decisions have held that BOEM must take a "hard look" at, and quantitatively estimate, greenhouse gas emissions in its EISs for plans and lease sales. With regard to foreign emissions estimates, NEPA requires agencies to evaluate the direct and indirect effects of the proposed action and courts have found that foreign emissions are an indirect effect BOEM must consider, which BOEM has done since October 2021. See the comment response for API et al.-10 for a description of the MarketSim model and its use. BOEM has removed the SC-GHG estimates from the Final PEIS based on recent administration changes in priorities, policies and regulations including a CEQ interim final rule to remove the existing implementing regulations for NEPA and disbanding of the IWG and withdrawal of any guidance, instruction, recommendation, or document issued by the IWG. See the comment response for Institute for Policy Integrity-1 concerning the estimation of SCC, the recent changes to those analyses, and why BOEM is not evaluating SCC for the Final PEIS.

API et al.-12	BOEM-2023-0046-3145	**a. BOEM's modeling of foreign oil and gas markets is deficient.** The Associations agree with BOEM that any analysis of lease sales' impact on foreign oil production and consumption should be presented separately from domestic GHG estimates. But oil and gas trades in worldwide markets, so BOEM's GHG analysis must take into account effects on foreign oil and gas production and consumption. BOEM discusses its GHG analysis in detail in Appendix H and is candid about the limitations of its analysis of foreign markets. Appendix H (at H-28) states that "BOEM lacks the ability to estimate foreign oil midstream GHG emissions." Appendix H also concedes that changes in foreign oil consumption would cause substitution of other energy sources and is not captured by BOEM's model. See DPEIS at H-29, H-30 ("BOEM acknowledges that displacement of substitutes would certainly occur and that a portion of the increased emissions currently quantified would be mitigated by displaced GHG emissions from energy substitutes."). BOEM adds (at H-30) that "the same uncertainty exists in regard to estimating the displacement of energy substitutes in the upstream and midstream." BOEM asserts that these unquantified variables (midstream emissions and substitution) "would not be enough to offset the increase in GHG emissions currently estimated from foreign oil's upstream and downstream," but provides no support for this claim. Id. BOEM concedes that the limitations on its data are substantial, stating that "because the quantifiable foreign analysis is not comprehensive, domestic production and consumption emissions are not directly comparable to the foreign estimates. Therefore, BOEM is not providing a combined quantitative estimate of domestic and foreign emissions because it would be potentially misleading to add them together." Id. Currently, it appears as though Market Sim does not account for the imperfect competitive structure of the global oil market (for example, see Boug et al. (2016) which finds support for imperfect competition in the oil market, and that OPEC's behavior has changed significantly recently). Specifically, the analysis does not consider potential imperfect competitive actions from foreign suppliers that have excess capacity, such as OPEC+, or suppliers that respond to other metrics besides price, such as market share. Additionally, it has been suggested that OPEC+ functions as a balancing mechanism whereby it assesses liquids demand, then non-OPEC+ supply, and then determines what level of OPEC+ supply is needed to balance demand and supply. In contrast, the foreign consumption and supply elasticities used for the DSEIS's analysis assume foreign markets only respond to price. Accounting for these numerous additional market realities could create significantly different results. For example, Golombek et al. (2018)19 developed a dominant firm model to characterize OPEC's market power and arrives at elasticities of supply that are significantly different than those used in BOEM's analysis. There is the additional issue of scale. Economic models are not precision instruments; they can be used to forecast general trends and give an idea of the magnitude of impact key variables (e.g., prices) may have on certain outcomes (e.g., production). Expecting a model to accurately forecast a change of about a tenth of one cent per barrel of oil or associated production impacts over a multi-decade period is not realistic. See H-14 n.12 ("The average price reductions under the proposed action relative to baseline over the 34 years of oil and natural gas production at the high activity level are	See the comment response for API et al.-10 for a description of the MarketSim model and its use. Absent an incremental analysis, BOEM would be forced to report OCS activity and production emissions on their own, without accounting for displaced substitutes, in which case the emissions attributable to the action would be much higher. NEPA, however, directs federal agencies to assess the impacts of all alternatives and compare them to the no action alternative, i.e. an incremental analysis. Courts have directed BOEM to include foreign emissions where possible when conducting such analyses, and to include an estimate of the incremental change in foreign oil's downstream emissions. BOEM relies on its current approach of assessing global energy market effects and the associated GHG emissions impacts based on a combination of quantitative and qualitative analysis. BOEM seeks feedback on improvements to MarketSim, specifically the ability to model foreign energy markets to improve the displacement/substitution and resulting incremental GHG emissions analysis. The commenter is correct that MarketSim does not model imperfect competition in oil markets. Instead MarketSim models the oil market as perfectly competitive. This market structure within MarketSim is appropriate given the added uncertainties associated with modeling imperfect competition. For example, while OPEC+ may exert market power in the global oil market, how it chooses to exercise that power to achieve both economic and political objectives may change over time. For example, OPEC+ may indeed at times act as a balancing mechanism in global markets, bringing supply and demand in balance. At other times, however, it may seek to take advantage of its dominant supplier status and withhold supply to gain leverage with geopolitical rivals or to pursue other foreign policy objectives. Because of the uncertainty regarding how OPEC+ may choose to exert its market power at different points in time, BOEM maintains that the simpler approach of modeling the global oil market as perfectly competitive is more appropriate. A more practical constraint on modeling the global oil market with the imperfect market structure described by the commenter is the availability of appropriate baseline data. Because MarketSim is forward-looking, BOEM would require a multi-decadal forecast of oil supply and demand for OPEC+ countries that is consistent with the forecast that the Bureau uses from EIA for the U.S. BOEM agrees with the commenter that sensitivity analysis examining alternative values for MarketSim model parameters and data would allow policymakers and the public to understand the robustness of the model's results. To that end, BOEM has performed a sensitivity analysis which was cited in **Appendix H** (GHG Analysis) of the Draft PEIS (**Appendix K** in the Final PEIS) which is summarized in **Chapter 4.0.2.1,** of the PEIS for this reference. That sensitivity analysis is discussed in Chapter 4 of BOEM's Economic Analysis Methodology and can be found at: https://www.boem.gov/2024-2029-Economic-Analysis-Methodology). The detail of the sensitivity analysis is located in Appendix A of BOEM's Market Simulation model documentation (available at https://espis.boem.gov/final%20reports/BOEM_2023-055.pdf). This sensitivity analysis systematically examines how MarketSim's results changed when using different elasticity parameters and baseline data. The sensitivity analysis suggested by the commenter is not feasible within the MarketSim framework. Whereas MarketSim is designed to equilibrate supply and demand based on changes in energy prices, the sensitivity analysis suggested by the commenter would hold both prices and demand constant in response to the lease sale. A priori, there is no reason to believe that supply would shift between sources of supply with no changes in demand or price. If the marginal supplier were to change, that would have an effect on prices, which would lead to a change in demand as well. With regard to API's comment excerpt on consumer surplus, while BOEM does not calculate consumer, producer, or economic welfare at the lease sale stage, the price changes, combined with the full and incremental volumes give some idea of what those values might be. However, BOEM has removed the SC-GHG and there is now no consideration of monetized impacts in the Final PEIS. See the comment response for Institute for Policy Integrity-1 concerning the estimation of SCC, the recent changes to those analyses, and why BOEM is not evaluating SCC for the Final PEIS. BOEM does provide discussion of net benefits, including consumer, producer, and economic welfare at the National Program stage to assist the Secretary in evaluating economic, social, and environmental factors, and balancing the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone, as required by 43 U.S.C. 1344(a) (see Chapter 5.3 of the National Program at: https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/2024-2029_NationalOCSProgram_PFP_Sept_2023_Compliant.pdf.)

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		$0.11 per barrels higher for oil, $0.002 per thousand cubic feet higher for natural gas, $0.008 per ton higher for coal, and $0.002 per kilowatt higher for electricity.”). And since BOEM has not furnished any statistical metrics from the model (goodness-of-fit statistics such as R2), there is no reason to conclude that a per barrel price estimate is statistically different from zero or that a corresponding reduction in consumption is distinguishable from background noise or random error. Given the large variation in the estimates of elasticities, if BOEM continues to perform these analyses, a sensitivity analysis is warranted for a more transparent and defensible analysis here. As part of this sensitivity analysis, the Associations suggest BOEM use another scenario where global prices do not change, and where foreign suppliers target an overall price trend equal to the No Action Alternative. This case would not have an overall price effect and therefore the quantity of energy demanded would not be impacted. The sensitivity analysis would also estimate the GHG impact of sourcing energy from different geographical locations. The welfare losses associated with purportedly reduced oil consumption in the No Action Alternative should be explicitly acknowledged and estimated as well. Specifically, the loss of consumer surplus (willingness of consumers to pay above the prevailing market price rather than do without it) and the loss of producer surplus (the willingness of producers to supply below the prevailing market price) stemming from reducing production and consumption of oil should be examined and estimated along with any projected reduction in GHG emissions. A key dimension of the analysis of foreign oil consumption is that, in addition to the uncertainty of BOEM’s estimates, the quantities of GHG emissions associated with a single oil and gas leasing decision are very small when compared to GHG emissions worldwide. The DPEIS describes the GHG effects it discusses as small, but does not provide adequate context as to just how small the differences in GHG emissions BOEM projects will be. The DPEIS (at 3-15) says: “It is important to note that a single lease sale, no mater which alternative is selected, would represent only a small portion of activity and a small incremental contribution (0.3 – 1.8%) to the overall Cumulative OCS Oil and Gas Program activity forecasted to occur between 2024 and 2093.” BOEM’s (admittedly highly imprecise) modeling of changes in foreign oil consumption as a result of the proposed lease sale predicts an increase of between 11 million and 164 million barrels, depending on levels of activity in the energy market. (H-20, table H.2- 13) BOEM had earlier predicted global consumption of 1.3 trillion barrels over the course of production of an oil and gas lease.20 Assuming that remains the approximate scale of comparison, that means that the change in foreign oil consumption will be between .0008 and .01 of one percent. BOEM concedes (at 4-12) that the changes in domestic GHG emissions associated with this decision “results in only small changes in emissions,” but does not go on to explain that their projected changes in foreign emissions are likewise very small indeed. Thus, whatever alterations or assumptions BOEM utilizes in its GHG modeling methodology, and whether or not BOEM concludes GHG emissions are nominally “higher” or “lower” for the No Action Alternative, the differences are very small and should be immaterial to the agency’s leasing decision.	With respect to the analysis of foreign oil consumption, BOEM provides context by comparing the GHG emissions estimates to those of a number of U.S. States familiar to stakeholders (see **Appendix K, Chapters K.2.3** and **K.2.4**). Additionally, given the removal of the SC-GHG, BOEM does address the impacts of Other Environmental Factors in the Non-OCS oil and gas impact analysis for the ongoing and reasonably foreseeable analyses in each resource analysis in **Chapter 4** and **Appendix M** of the PEIS. These Other Environmental Factors can include factors influenced by GHG emissions. Despite removal of the SC-GHG, the relationship between increased GHG emissions and impacts remain: increased emissions can lead to increased average temperatures, increased sea levels, and ocean acidity, which can lead to increased illness and deaths (human and animal), crop damage, property damage, and environmental services decline, to name a few.

Well Stimulation

Commenter	ID Number	Comment	Response
Earthjustice et al.-21	BOEM-2023-0046-5236	**F. BOEM Failed to Adequately Examine the Environmental Impacts of Fracking and other Well Stimulation Treatments.** BOEM's reliance on EPA's regulation of discharges to conclude that offshore oil and gas lease sales will have minor or negligible water quality impacts is flawed. BOEM cannot solely rely on another agency—EPA—to prevent environmental degradation,[234] and it has an independent duty to analyze the effects of its action. Under NEPA, BOEM must take a hard look specifically at the impacts of the proposed action and the cumulative impacts the discharges. Each year oil companies discharge billions of gallons of produced water in the Gulf—between 2012 and 2022 operators discharged between 13.6 billion and 27.2 billion gallons of produced water each year.[235] An analysis of federal records 2010 to 2020 showed 3,000 instances of offshore fracking,[236] 700 cases of acidizing offshore wells, which would mean more than 73 million gallons of well stimulation pollution dumped into the Gulf over a decade. Each well treatment releases about 20,000 gallons[237] of discharges including biocides, polymers, and solvents, into the Gulf of Mexico. There are no numeric limits on produced water or fracking waste discharges, meaning that oil companies routinely poison Gulf waters and wildlife. BOEM must conduct an independent analysis in its EIS of water quality impacts, including cumulative impacts with the existing and planned offshore drilling activities.	Chapter 2.2.1.4 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, provides detailed information on hydraulic fracturing on the Gulf of America OCS, how it is accomplished, and how it differs from onshore fracking. Onshore and offshore fracking are two very different processes with different potential environmental impacts, even though they are commonly referred to by the same term, "fracking." In addition Chapter 2.2.1.3 of the GOM Oil and Gas SID details information on discharges and regulations on OCS oil and gas discharges. It should be noted that the use of stimulation treatments is permitted by BSEE, and the production discharges are permitted by the USEPA under the NPDES permit. BOEM recognizes the variability and complexity related to the full range of chemicals used for well completion including hydraulic fracturing fluids. In response, **Chapter 4.2.3** of the PEIS was updated to address these uncertainties and the potential effects of hydraulic fracturing and completion fluid discharges on water quality as defined in **Chapter 4.2** of the PEIS. Please also see edits to **Chapter 4.2** of the PEIS where BOEM has added information regarding the regulation of hydraulic fracturing wastes and produced water, including toxicity testing requirements. These discharges represent a small fraction of overall wastewater in the GOA and typically occur over short durations. These fluid wastes would be treated, tested, and, in most cases, discharged to the OCS waters as per the NPDES permit. Based on available data, BOEM's conclusions regarding the impacts on water quality remain unchanged. With reference to the cumulative impacts of discharges and wastes on water quality, please see **Chapters 4.2** and **4.17** of the PEIS.

General Physical, Biological and Social Resource Analysis

Commenter	ID Number	Comment	Response
NMFS, SERO-4	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● impacts that could cause changes in the abundance, distribution, habitat use, or migration patterns of living marine resources (e.g., due to new physical structures, noise sources);	Thank you for your comment. Impacts to habitats for fishes and invertebrates, marine mammals, and sea turtles are encompassed in other sections of the PEIS including **Chapter 4.3** Coastal Communities and Habitats, **Chapter 4.4.** Benthic Communities and Habitats, and **Chapter 4.5** and **Appendix M.2** Pelagic Communities and Habitats. Specific impacts to fish and invertebrates, marine mammals, and sea turtles are included in **Chapters 4.6, 4.8**, and **4.9** of the PEIS. Impacts from OCS oil and gas installation and exploration activities (e.g., seismic airgun surveys and pile driving) are assessed throughout **Chapter 4.6, 4.8, and 4.9** of the PEIS. In addition, impacts from OCS oil and gas installation and exploration activities (e.g., seismic airgun surveys and pile driving) are assessed throughout Chapters 4.3.4.2.2, 4.3.6.2.2, and 4.3.7.2.2 of the SID, which is incorporated by reference.
NMFS, SERO-5	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● impediments to conducting scientific surveys and safety risks around offshore oil and gas features for our ongoing data collection operations	Thank you for your comment. BOEM acknowledges that the installation of some types of offshore energy infrastructure can potentially affect some of NOAA's federal survey program activities. NOAA has successfully and safely implemented its federal survey program in the GOA alongside and in evolution with the oil and gas industry, which began in the 1940s. At this time, BOEM does not think there is mitigation necessary under the circumstances, given the long history of NMFS surveys and oil and gas operations managing to co-exist. For background, BOEM offers available areas for leasing. Once a lease is secured and there is a plan to commence construction or other activities, BOEM reviews those plans for structure and environmental concerns. Reviews are conducted by the Office of Leasing and Plans and the Office of Environment in BOEM as well as BSEE. Many of these structures have been in place for years and BOEM is unaware of any safety issues with surveys. BOEM does not regulate activities that occur around approved structures.

Commenter	ID Number	Comment	Response
Earthjustice et al.-22	BOEM-2023-0046-5236	**4. Ecosystem impacts of climate change.** Climate change has had widespread impacts on species and ecosystems. Terrestrial, marine, and freshwater ecosystems are all being significantly altered by climate change, harming biodiversity, species populations and habitats, and ecological processes. Warming will continue shifting species ranges as well as phenological changes—changes in the timing of seasonal biological events—potentially leading to phenological mismatches, such as unavailability of primary food sources when migratory species arrive at feeding grounds. More intense droughts and loss of seasonal snow and ice will lead to further reduced stream flows, impacting the competing needs of aquatic species and agriculture. Extreme low oxygen (hypoxic) events are projected to increase in frequency and extent over the next century. Hypoxia has directly caused mortality events for crabs and fish in the U.S. Atlantic, Pacific, and Gulf of Mexico.	Thank you for your comment. BOEM acknowledges the reasonably foreseeable impacts of climate-related factors to the OCS as well as impacts onshore and elsewhere throughout this PEIS. BOEM analyzed and addressed the impacts to baseline conditions and reasonably foreseeable future effects to GOA resources including range expansions, deoxygenation, altered patterns of ocean precipitation, and changes to habitats and ecological processes) throughout the analysis of each resource in **Chapter 4** and **Appendix M** and summarized in **Chapter 4.17** of the PEIS. In addition, these factors and effects are discussed in Chapter 3.4 of the SID and their on baseline conditions for each resource is discussed as part of the resource description in Chapter 4 of the SID. The SID is incorporated by reference into this PEIS. Please note that additional information has been added to **Chapter 4** and **Appendix M** of the PEIS to further address some of the potential impacts mentioned in this comment.

Air Quality

Commenter	ID Number	Comment	Response
API et al.-13	BOEM-2023-0046-3145	As part of its evaluation of ozone impacts, BOEM states that “when considering that the existing baseline conditions of the Houston-Galveston-Brazoria area are in nonattainment for ozone (O3), cumulative impacts could be moderate to major if notable and measurable levels of O3 caused by an OCS oil and gas lease sale were to reach the Houston-Galveston-Brazoria area, slowing down the long-term ability of the area to recover from chronic nonattainment status for O3” (DPEIS at 4-244, citing Li et al. 2023). The underlying study (Li et al. 2023) does not appear to find a connection between emissions from offshore oil and gas platforms and onshore ozone concentrations in the Houston area. Rather, the study describes ozone impacts associated with meteorological conditions where winds recirculate air masses from over-water areas of the Gulf of Mexico with elevated ozone levels due to onshore emissions over the Houston area for a second time. The study does not draw connections between offshore oil and gas emissions and such ozone concentrations in the Houston-Galveston-Brazoria area. In fact, a conclusion from the Li et al. 2023 paper states: “This study reveals the important role of chemical O3 production over Galveston Bay and the Gulf of Mexico from precursors emitted from the adjacent land and the Houston Ship Channel or transported regionally from the northeastern states.” At a minimum, BOEM should clarify within the DPEIS that the moderate to major cumulative impacts considered were not associated with air emissions connected to lease sales	Thank you for your comment. In **Chapter 4.1.2.5** of the PEIS, the reference to Li et al. (2023) related to this specific comment was removed, and the connection to the proposed action was clarified, distinguishing it from OCS oil and gas lease sales.
Earthjustice et al.-23	BOEM-2023-0046-5236	**I. The Draft PEIS Underestimates the Impacts of Methane Emissions From the Lease Sale.** BOEM’s analysis of methane emissions highlights the urgent need to update its regulations regarding air quality reporting. Before holding a GOM oil and gas lease sale, the agency should be able to more accurately analyze the impacts of methane emissions from such a sale. In the Draft PEIS, the agency is simultaneously admitting deficiencies with the largely self-reported data it relies on while also giving the green light to move forward with leasing not knowing the full extent of the methane emissions. Methane is a potent greenhouse gas released into the air during offshore drilling operations through accidental leaks or purposeful venting or flaring.	Thank you for your comment. For the purposes of this response, the *Outer Continental Shelf Air Quality System (OCS AQS): Year 2021 Emissions Inventory Quality Assurance/Quality Control (QA/QC) Study* will hereinafter be referred to as *2021 Inventory Study*. As discussed in **Chapter 4.1** of the PEIS, this chapter focuses on GHGs in relation to air quality, rather than their broader effects on climate related effects, which are covered in **Chapter 4.0.2.1** of the PEIS and **Appendix K** of the PEIS. Negative impacts to air quality would range from negligible to moderate (**Table 2.5-1** of the PEIS). In **Chapter 4.1.2.1** of the PEIS, BOEM discussed findings from reports that identified uncertainties related to the underestimation of methane emissions. Given the environmental risks to localized offshore areas that face the most immediate effects from methane emissions, as well as safety risks that could occur from unintended releases and associated response activities, up to moderate impacts to air quality could occur. Major impacts are not expected due to the oxidation of methane and its limited effect on ozone production, which minimizes methane’s impact to air quality at the regional or population-level. Clarification was provided in **Chapter 4.1.2.3** of the PEIS. Impact level definitions for moderate and major are provided in **Table 4.0-3** of the PEIS.

Commenter	ID Number	Comment	Response
		According to the International Energy Agency, "[t]ackling methane emissions from oil and gas operations is one of the most important measures to limit near-term global warming."[352] The Draft PEIS acknowledges the Year 2017 Emission Inventory Study underestimates methane emissions, yet BOEM still relies on it to estimate methane emissions for lease sales.[353] Based on the study, BOEM projects that a single OCS oil and gas lease sale would result in "negligible" air quality impacts in a high-case activity levels scenario.[354] Yet due to the "uncertainty" in the 2017 study, it suggests impacts could be "moderate" instead.[355] Existing literature, including articles cited by BOEM, indicates that methane emissions offshore could far exceed government reporting. Considering methane from losses and venting and carbon dioxide from combustion, Gorchov Negron et al. 2023 found the climate impacts of drilling in the Gulf of Mexico are over twice what is reported in government inventories, and on average, shallow water platforms in the Gulf are worse for the climate than typical oil production around the world.[356] Other reports on methane emissions in the region support this concerning conclusion.[357] The Draft PEIS has insufficiently estimated methane emissions from a GOM oil and gas lease sale. BOEM points out that it cannot use the data from the more recent Outer Continental Shelf Air Quality System (OCS AQS): Year 2021 Emissions Inventory Quality Assurance/Quality Control (QA/QC) study due to problems with non-platform reporting.[358] But the 2021 emissions inventory shows significant increases (over 300%) in methane emissions for both platform and non-platform sources in 2021 compared to 2017.[359] So while the 2021 study is incomplete (and also likely an underestimate, according to independent studies), the 2017 data is deeply flawed because it is outdated. BOEM is using data that is nearly a decade old and has been shown to underestimate emissions. Although offshore methane emissions could be much higher than the 2017 study indicates, the agency asserts that the study "conservatively capture[s] the full range of potential effects from the proposed action."[360] As such, BOEM's methane analysis is in tension with itself. The Draft PEIS cannot "conservatively" account for possible methane impacts from a GOM lease sale when it relies on data that likely undercounts emissions drastically. BOEM must better account for methane emissions in the Final PEIS. Although the agency has deferred that analysis based on uncertainty, it can and should do more to estimate emissions better. And to improve future analyses, the agency must update its air quality reporting regulations to rely more on direct measurement rather than its current process of relying almost entirely on emissions factors. A proper analysis would help BOEM assess alternatives further. For example, the Draft PEIS suggests that compared to Alternative B (the proposed alternative), Alternative C (the preferred alternative) and Alternative D could reduce net greenhouse gas emissions by substantially shifting activity to depths greater than 200 meters, where less venting activity could occur.[361] An adequate analysis might reveal those reductions to be substantial.	Regarding the use of the *Year 2017 Emission Inventory Study* rather than the *2021 Inventory Study*, Table 163 shows a "+ 328%" change but is limited to "drilling rigs and support vessel emissions" in the *2021 Inventory Study*, a fraction of the OCS oil and gas-related emissions, and does not include emissions from platform and other non-platform sources (e.g., helicopters; refer to Section 9.3 of the *2021 Inventory Study*). Secondly, only 4 and 17.13 tons/year of methane emissions were reported to the inventories for year 2017 and 2021, respectively. Given such small relative emission numbers, even a small change in the emission amounts results in a large percentage change. Lastly, nearly all methane emissions are emitted from platform sources in the *2021 Inventory Study*. In Table 147 of the *2021 Inventory Study*, the methane emissions from platform sources reported 187,894 tons/year for 2017 and 95,834 tons/year for 2021, a 48% decrease primarily due to decreased volumes from cold venting. A variety of factors can cause increases and decreases in emissions across all pollutants, highlighting the importance of using one complete dataset to ensure unbiased conclusions about impacts. Thus, the most recent and complete *Year 2017 Emission Inventory Study* was used for the analysis. Using the *Year 2017 Emissions Inventory Study*, rather than the *2021 Inventory Study*, reduces the risk of underestimating the full range of emissions and potential effects from the proposed action. **Chapter 4.1.3** of the PEIS was revised to remove "conservatively" and clarify that the *2017 Emission Inventory Study* was used to "more completely capture the range of potential effects from all types of OCS oil- and gas-related sources under the proposed action." A variety of factors can cause increases and decreases in emissions across all pollutants, highlighting the importance of using one complete dataset to ensure unbiased conclusions about impacts. Thus, the most recent and complete *Year 2017 Emission Inventory Study* was used for the analysis. Using the *Year 2017 Emissions Inventory Study*, rather than the *2021 Inventory Study*, reduces the risk of underestimating the full range of emissions and potential effects from the proposed action. As discussed in **Chapter 4.1.2.1** of the PEIS, there are currently no offshore air quality monitors that can be used to monitor facilities; however, BOEM, BSEE, NASA, and NOAA are actively collaborating on how to incorporate remote sensing technologies to improve monitoring of emissions, including methane, and regulatory compliance in the future. The projected oil and gas production (**Table 3.3-1** of the PEIS) and expected activity scenario (**Table 3.3-2** of the PEIS) across all water depths would not differ between Alternatives B-D. BOEM's analysis acknowledges that there could be a reduction in the proposed action's net contribution to regional and national methane levels and future climate change impacts if less shallow water production occurs (refer to **Chapter 4.0.2.1** of the PEIS). However, this reduction would not result in a meaningful difference in terms of the overall impacts of methane on regional air quality conditions, which is negligible across all action alternatives. Furthermore, even if Alternative C or D were selected, substantial areas in shallow waters would still be available for leasing. Therefore, if/whether actual leasing and development activities are less prevalent in shallow water would still be primarily driven by industry decision-making, and not necessarily as a result of the selected alternative alone.

Commenter	ID Number	Comment	Response
API et al.-14	BOEM-2023-0046-3145	For methane, the analysis of potential emissions from a new OCS oil and gas lease sales includes conservative (i.e., high-end) assumptions for methane emissions associated with future leases. Methane emissions associated with actual development of new leases is likely to be lower than what is presented in this analysis. The DPEIS states that it relies on methane emissions data from 2017 (Wilson et al. 2019a) to establish baseline emissions data instead of more recent emissions data from 2021 (Thé et al. 2023). (DPEIS at 4-27, 4-34) Based on analysis in Thé et al. 2023, methane emissions reported in 2021 were ~49% lower than those reported in 2017, primarily due to decreased volumes from cold venting. Extrapolations based on data from Wilson et al. 2019a would not capture reductions in methane emissions between 2017 and 2021. In addition, the majority of the methane emissions as the result of lease sales were estimated to occur from facilities in less than 200 meters of water-depth, based on emission profiles from current shelf facilities. If new lease sales were to lead to additional developments in the shelf at new platforms or tie-ins to existing facilities, these new developments could lead to additional production-based metering requirements for facilities where production now exceeded 2,000 BOED, and facilities would remain subject to time duration limits on flaring and venting events under 30 CFR 250 Subpart K. These types of factors do not appear to be included in the DPEIS analysis for methane....	For the purposes of this response, the *Outer Continental Shelf Air Quality System (OCS AQS): Year 2021 Emissions Inventory Quality Assurance/Quality Control (QA/QC) Study* will hereinafter be referred to as *2021 Inventory Study*. Thank you for your comment. **Chapter 4.1.3** of the PEIS was revised to clarify that the *2017 Emission Inventory Study* was used to "more completely capture the range of potential effects from all types of OCS oil- and gas-related sources under the proposed action." A variety of factors can cause increases and decreases in emissions across all pollutants, highlighting the importance of using one complete dataset to ensure unbiased conclusions about impacts and that the full range of potential effects are disclosed in the Programmatic EIS (i.e., not underestimated). Furthermore, Table 147 of the *2021 Inventory Study* reported a 48% decrease in methane emissions from 2017 to 2021, but it did not account for all oil and gas sources. Table 147 on page 200 of the *2021 Inventory Study* only addresses emissions from platforms and does not capture methane emissions from drilling rigs and support vessels (i.e. non-platform emissions). Also, the data on non-platform emissions are limited and do not capture emissions from all OCS oil- and gas-related sources (refer to Section 9.3 of the *2021 Inventory Study*). For these reasons, BOEM used the *Year 2017 Emission Inventory Study* for this analysis. Both the 2017 and 2021 inventories use the same mathematical calculations for the platform database (refer to Section 6.5.2 of the *2021 Inventory Study*). If the platform database in the *2021 Inventory Study* were used to estimate methane emissions for the proposed action, BOEM would have reached the same overall conclusions for impacts to air quality, which were determined to be negligible under the high-case scenario (see **Chapter 4.1.2.3** of the PEIS). The mathematical equations in the *Year 2017 Emission Inventory Study* and *2021 Inventory Study* use volumes to estimate emissions for flaring and venting sources, instead of relying on time duration limits (refer to equation 66 for cold vents and equation 15 for flaring in the *2021 Inventory Study*). To BOEM's knowledge, there is no information indicating that the time duration limits on flaring and venting events under 30 CFR 250. K would affect the monthly volumes or calculations used to estimate annual methane emissions for this Programmatic EIS (see **Chapter 4.1.2.3**).

Water Quality

Commenter	ID Number	Comment	Response
Earthjustice et al.-24	BOEM-2023-0046-5236	Each year oil companies discharge billions of gallons of produced water in the Gulf—between 2012 and 2022 operators discharged between 13.6 billion and 27.2 billion gallons of produced water each year.[235] An analysis of federal records 2010 to 2020 showed 3,000 instances of offshore fracking,[236] 700 cases of acidizing offshore wells, which would mean more than 73 million gallons of well stimulation pollution dumped into the Gulf over a decade. Each well treatment releases about 20,000 gallons[237] of discharges including biocides, polymers, and solvents, into the Gulf of Mexico. There are no numeric limits on produced water or fracking waste discharges, meaning that oil companies routinely poison Gulf waters and wildlife. BOEM must conduct an independent analysis in its EIS of water quality impacts, including cumulative impacts with the existing and planned offshore drilling activities. EPA's regulation of water pollution from offshore oil and gas sources is woefully inadequate. EPA allows the unlimited discharge of produced water, including toxic fracking chemicals. Produced water contains several toxic chemicals, including polycyclic aromatic hydrocarbons ("PAHs") and heavy metals.[238] Studies of fish and invertebrates near produced water discharges exhibit acute effects, and even exposures as far as 10 km from the discharge.[239] Additionally, fracking uses hundreds of chemicals that cause cancer or damage to the nervous, cardiovascular, and endocrine systems; and can be incredibly toxic to fish and other marine life.[240] Numerous chemicals used to acidize wells are F-graded hazardous chemicals—carcinogens, mutagens, reproductive toxins, developmental toxins, endocrine	Thank you for your comment. BOEM discusses the impacts of produced water from OCS oil- and gas-related activities on water quality, including ongoing and reasonably foreseeable impacts, in **Chapter 4.2.2** of the PEIS. For more information on produced water, please refer to **Appendix B.2.1** of the PEIS and Chapter 2.2 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS. Please see the edits to **Chapter 4.2.2.1** of the PEIS as well as **Table B.2-2 in Appendix B** of the PEIS where BOEM has updated and added additional information regarding the discharge of produced water, which is the largest waste stream from offshore oil and gas production. Please also see additional information added to **Appendix B.2.2.2** of the PEIS where more information was provided from the *Final report: joint industry project study of well, treatment, completion, and workover effluents* regarding the completion fluid findings. The impacts of produced waters on fish and invertebrates are discussed in **Chapter 4.6.2.1** of the PEIS. Also see edits to **Chapter 4.6.2.1** of the PEIS where BOEM has added specific information about the impacts of produced water on fish. For more information on produced water impacts on fish and invertebrates, see also Chapter 4.5.2 of BOEM's Biological Environmental Background Report and Chapter 4.3.4.2.2 of the SID, which is incorporated by reference. The USEPA regulates all waste streams generated from OCS oil- and gas-related activities through permits issued by the relevant USEPA region with jurisdictional oversight. Permits issued under Section 402 (NPDES) of the CWA for offshore activities must comply with applicable water quality standards, as well as Section 403 (Ocean Discharge Criteria) of the CWA. As part of the NPDES permitting process, the USEPA provides notice of draft permits and allows for public comment, giving stakeholders the opportunity to submit feedback on the permit and the supporting documentation provided. For more information on the USEPA's permitting process, including details about public comment submissions, please visit https://www.epa.gov/npdes-permits. Additionally, the Ocean Discharge Criteria Evaluation for the proposed General Permit

Commenter	ID Number	Comment	Response
		disruptors, or high acute toxicity chemicals.[241] Discharges from offshore fracking are likely to cause adverse marine ecosystem effects.[242] A 2021 study identified that produced waters comingled with hydraulic fracturing chemicals had acute toxicity and thiol reactivity in some cases up to nine months after fracking.[243] BOEM cannot rely on the industry study for the finding that "discharges are not likely to pose a greater environmental risk than produced-water discharges"[244] because the study was rife with shortcomings—too many undisclosed chemicals, too many unassessed chemicals, and too few samples tested for toxicity.[245] What the industry study did indicate is that there is cause for concern about the chemicals that were assessed…. EPA's General Permit lacks toxicity thresholds for almost all chemicals used in well treatment. A recent scientific review of fracking flowback toxicity thresholds for common chemicals should be analyzed to examine the toxicity limits for those constituents and disclose the environmental effects of discharges.[246] As also described below, EPA's NPDES General Permit for New and Existing Sources and New Discharges in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico, as well as the similar NPDES General Permit for the Eastern Gulf of Mexico (collectively, "General Permit")[247] has insufficient limits and monitoring of the chemicals associated with well treatment and completion fluids, including fracking chemicals, to protect water quality. The permit fails to require adequate monitoring and …. The permit fails to ensure that toxicity testing occurs concurrently with instances of fracking flowback discharges. An analysis of substances in wastewater for 14 fracks in federal waters and 15 reports from fracking in state waters shows that the chemicals are toxic to aquatic life and may have damaging impacts on the environment…. Fracking and other well stimulation chemicals can kill or harm a wide variety of wildlife…. BOEM must evaluate the water quality harms from violations of the EPA permit and lack of enforcement stemming from EPA's self-regulatory approach. The permit covers more than 10,000 facilities, and largely relies on self-regulation with only occasional enforcement of the worst actors. At the time of these comments, a third of the operators in the Gulf of Mexico covered under this permit are currently in violation of the permit. Rather than faulty reliance on EPA's general permits for offshore oil and gas activities, BOEM must examine in its PEIS the environmental impacts of offshore oil and gas water pollution.	for Region 6 can be found at https://www.epa.gov/system/files/documents/2022-07/2022_GMG290000_ODCE.pdf. And for Region 4 can be found at https://www.epa.gov/system/files/documents/2023-06/draft%202022%20ODCE%2003272023_06072023MD.pdf For more information on the USEPA Region 6's NPDES permit GMG290000, including contacts for questions or comments, please see https://www.epa.gov/npdes-permits/western-and-central-gulf-mexico-offshore-oil-gas-npdes-program. There is a five-year cycle for the general NPDES permit, and the next one will be updated in 2027. For more information on the USEPA Region 4's NPDES permit GEG460000, including contacts for questions or comments, please see https://www.epa.gov/npdes-permits/eastern-gulf-america-offshore-oil-gas-npdes-permits Though BOEM does not regulate these discharges or enforce violations of the CWA, it conducts NEPA analyses to assess potential impacts on water quality and reviews exploration and production plans, development operations coordination documents, and decommissioning permits, as detailed in Chapter 2.2 of the GOM Oil and Gas SID. Specifically, reasonably foreseeable impacts on water quality are addressed in **Chapter 4. 2** of the PEIS, while impact-producing factors are discussed in **Appendix B** of the PEIS and Chapter 2.2.1.4 of the GOM Oil and Gas SID. To evaluate water quality in the GOA, BOEM uses existing credible scientific evidence from peer-reviewed publications, technical reports, and state and federal initiatives, such as the USEPA's National Aquatic Resource Surveys. In addition to these sources, BOEM continuously seeks ways to enhance its assessments through its studies program and other collaborative efforts with regulators, industry, and the scientific community. In reference to hydraulic fracturing fluids, Chapter 2.2.1.4 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, provides detailed information on hydraulic fracturing on the Gulf of America OCS, how it is accomplished, and how it differs from onshore fracking. Onshore and offshore fracking are two very different processes with different potential environmental impacts, even though they are commonly referred to by the same term, "fracking." In addition, Chapter 2.2.1.3 of the GOM Oil and Gas SID details information on discharges and regulations on OCS oil and gas discharges. It should be noted that the use of stimulation treatments is permitted by BSEE, and the production discharges are permitted by the USEPA under the NPDES permit. BOEM recognizes the variability and complexity related to the full range of chemicals used for well completion including hydraulic fracturing fluids. In response, **Chapter 4.2.3** of the PEIS was updated to address these uncertainties and the potential effects of hydraulic fracturing and completion fluid discharges on water quality as defined in **Chapter 4.2** of the PEIS. Please also see edits to **Chapter 4.2** of the PEIS where BOEM has added information regarding the regulation of hydraulic fracturing wastes and produced water, including toxicity testing requirements. These discharges represent a small fraction of overall wastewater in the Gulf of America and typically occur over short durations. These fluid wastes would be treated, tested, and, in most cases, discharged to the OCS waters as per the NPDES permit. Based on available data, BOEM's conclusions regarding the impacts on water quality remain unchanged. In reference to produced waters toxicity, the USEPA recently updated the toxicity testing requirements for Well Treatment Fluids, Completion Fluids, and Workover Fluids in their most recent NPDES general permit for Region 6. These updates include more stringent measures, such as specific acute toxicity limits and the addition of chronic monitoring requirements, to better assess potential long-term impacts from these discharges. The final permit is more comprehensive than the previous one, reflecting the latest data on chemical usage, mandating more toxicity testing for completion fluids, and ensuring more extensive monitoring to protect water quality and aquatic ecosystems. In their response to comments for the 2023 NPDES permit, the USEPA Region 6 noted that no scientific evidence has been observed to indicate significant adverse changes in ecosystem diversity, productivity, or stability, nor any threat to human health through direct exposure to pollutants or consumption of exposed aquatic organisms. Furthermore, the USEPA found no loss of aesthetic, recreational, scientific, or economic values considered unreasonable in relation to the benefits derived from the discharges authorized under the permit (USEPA 2023).

Commenter	ID Number	Comment	Response
			In reference to compliance, BSEE inspectors assist the USEPA with NPDES offshore platform compliance by identifying potential violations and notifying the USEPA. For a detailed description of the roles of the USEPA and BSEE, including their responsibilities for inspections, enforcement, and compliance, please refer to Chapters 5.11 and 5.12 of the GOM Oil and Gas SID, as well as Chapter 3.8 of the *Gulf of America OCS Regulatory Framework* (BOEM 2025), both of which are incorporated by reference into the PEIS. In reference to permit violations, BOEM has coordinated with the US EPA, and USEPA has provided the following information. As of June 2025, USEPA records indicate there are 88 operators with permit coverage under the Offshore National Pollutant Discharge Elimination System (NPDES) General Permit, covering for 2,024 facilities in the central and western outer continental shelf of the Gulf of America. Facilities with permit coverage include platforms, mobile offshore drilling units (MODUs), and subsea structures. The USEPA identifies noncompliance of the NPDES Offshore General Permit through inspections by the USEPA and BSEE Inspectors and from required self-reported data by operators through Discharge Monitoring Reports (DMRs) and the 24-hour Reporting Portal. Non-compliance includes discharging fluids that exceed effluent limits; having a leak, spill, or sheen event; failing to monitor permitted discharges; failing to submit DMRs; failing to sample properly; failing to have permit coverage or proper permit coverage for certain discharges. The USEPA Region 6's enforcement and compliance activities on the NPDES Offshore General Permit are publicly available at the following two websites: https://www.epa.gov/tx/enforcement-compliance-assurance-documents-texas https://www.epa.gov/la/enforcement-and-compliance-assurance-documents-louisiana This comment and response has been shared with the USEPA in order to provide them with these concerns as they prepare to update the general NPDES permit for 2027.

Coastal Communities and Habitats

Commenter	ID Number	Comment	Response
Earthjustice et al.-25	BOEM-2023-0046-5236	Ocean acidification further harms coastal resources. Ocean acidification occurs when excess CO2 is dissolved in the ocean, decreasing the pH of the water. Acidification is greater along U.S. coastlines than the global average due to ocean circulation patterns and freshwater and nutrient inputs.[188] Ocean acidification adversely impacts the shellfish industry because acidifying waters can lead to shell dissolution of calcifying organisms, as well as limit shell growth.[189] Increased acidification is expected to reduce harvests of U.S. shellfish, with cumulative consumer losses of $230 million across all U.S. shellfish fisheries by 2099 under a high emissions scenario.[190] In one model of ocean acidification in California, acidification had negative economic impacts on California's state-managed crab, shrimp, mussel, clam, and oyster fisheries. In the Northwest United States, shellfish growers have implemented monitoring systems to track ocean acidity because of the significant impact of acidification on shellfish.	Thank you for your comment. The impacts of ocean acidification to coastal habitats and invertebrates, including shellfish, are considered in **Chapter 4.3** of the PEIS. It is also discussed in detail in **Appendix M.2** of the PEIS. In addition, ocean acidification is discussed in Chapter 3.4.4 of the SID and the influence of ocean acidification on baseline conditions for each resource is discussed as part of the resource description in Chapter 4 of the SID. The SID is incorporated by reference into the PEIS.

Benthic Communities and Habitats

Commenter	ID Number	Comment	Response
NMFS, SERO-6	BOEM-2023-0046-3146	In 2023, NMFS designated critical habitat for three species of coral – boulder, mountainous, and lobed star coral – at the Flower Gardens Banks. The designation includes West Flower Garden, East Flower Garden, Rankin, 28-Fathom, Bright, Geyer, and McGrail Banks. Alternative B excludes only West and East Flower Garden Banks, and the PEIS should assess potential direct and indirect impacts to coral critical habitat for each of the alternatives.	Thank you for your comment. The critical habitat designation for these corals is discussed in **Chapter 4.4** of the PEIS and in Chapter 4.3.1 of the SID, which is incorporated by reference. The potential direct and indirect impacts to protected corals and their associated critical habitat from identified IPFs are analyzed in **Chapters 4.4.2.1** and **4.4.2.2** of the PEIS. A comparison of the analysis of relative impacts to protected corals for Alternatives A-D is provided in Chapter **4.4.2.3** and is summarized in **Table 4.4-4** of the PEIS. Please note that Alternatives B, C, and D exclude leasing in whole and partial blocks within the boundaries of the Flower Garden Banks National Marine Sanctuary as of the July 2008 Memorandum on Withdrawal of Certain Areas of U.S. OCS from Leasing Disposition and Alternative D excludes leasing in whole and partial blocks around the expanded Flower Garden Banks National Marine Sanctuary as of March 22, 2021. Therefore, the entire NMFS designated critical habitat is excluded from leasing under Alternative D, but as discussed in Chapter **4.4.2.3** of the PEIS, lease stipulations and mitigations would be applied to protect sensitive benthic features included in areas leased under Alternatives B and C.

Fishes and Invertebrates

Commenter	ID Number	Comment	Response
NMFS, SERO-7	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● runoff and/or remobilization of chemicals and toxic pollutants into the marine environment via increased vessel traffic and activities associated with exploration, production, and decommissioning that can affect species protected under the MMPA, ESA-listed species and their habitats, fish stocks managed under the MSA, their forage species, and their prey;	***Please note that this response is specific to the portion of the comment that relates to fish and invertebrates. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Additional language has been added to **Chapter 4.6** of the PEIS, Fishes and Invertebrates, under *Discharges and Wastes* to clarify that the impacts of potential contaminants (including those from sources such as deck drainage and runoff) to GOA fish and invertebrates are included in the analysis. Additional discussion of runoff and other water quality concerns can be found in **Chapter 2.2** of the PEIS, Water Quality. Analysis in **Chapter 4.6** encompasses impacts to all fishes and invertebrates of the GOA, including managed species, forage species, and other prey species.
NMFS, SERO-8	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● impacts to habitat for MSA-managed fish stocks, ESA-listed species and their habitats, and species protected under the MMPA from installation and exploration activities (e.g., seismic airgun surveys, pile driving);	***Please note that this response is specific to the portion of the comment that relates to fish and invertebrates. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Analysis in **Chapter 4.6** of the PEIS encompasses impacts to all fishes and invertebrates of the GOA, including managed species and ESA-listed species. Impacts to habitats for fishes and invertebrates are encompassed in other sections of the PEIS including **Chapter 4.3** Coastal Communities and Habitats, **Chapter 4.4.** Benthic Communities and Habitats, and **Chapter 4.5** and **Appendix M.2** Pelagic Communities and Habitats. Impacts from OCS oil and gas installation and exploration activities (e.g., seismic airgun surveys and pile driving) are assessed throughout **Chapter 4.6** of the PEIS. In addition, impacts from OCS oil and gas installation and exploration activities (e.g., seismic airgun surveys and pile driving) are assessed throughout Chapter 4.3.4.2.2 of the SID, which is incorporated by reference.
NMFS, SERO-9	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● noise from oil and gas installation and operational activities at a level that could cause harm and/or overall disturbance via increased acoustic pollution that could impact biologically significant behaviors (e.g., foraging, migrating, resting, reproduction) for species protected under the MMPA, ESA-listed species and their habitats, and fish stocks;	***Please note that this response is specific to the portion of the comment that relates to fish and invertebrates. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Impacts to fish and invertebrates from noise is discussed in **Chapter 4.6** of the PEIS. In addition, impacts to fish and invertebrates from noise is discussed in 4.3.4.2.2 of the SID, which is incorporated by reference into the PEIS. Additional language has been added within **Chapter 4.6** of the PEIS Fishes and Invertebrates to clarify that impact assessments include impacts to fish stocks. Impacts to behavior are assessed in **Chapter 4.6** under the *Noise* sections.
NMFS, SERO-10	BOEM-2023-0046-3146	In 2018, NMFS listed the giant manta ray and oceanic whitetip shark as threatened species. Both occur in the Gulf of Mexico and should be addressed in the PEIS.	Thank you for your comment. ESA-listed fishes, including the giant manta ray and oceanic whitetip shark, are discussed and included throughout **Chapter 4.6** of the PEIS, Fishes and Invertebrates. Impact conclusions account for impacts to these species.
NMFS, SERO-11	BOEM-2023-0046-3146	In 2024, NMFS listed queen conch as a threatened species. Queen conchs occur throughout the Caribbean Sea, the Florida Keys, and around Bermuda but they are also present in the Flower Garden Banks. Please include queen conch in the effect analysis of the proposed alternatives within the PEIS.	Thank you for your comment. Edits have been made to ensure inclusion of the queen conch in **Chapter 4.6** of the PEIS, Fishes and Invertebrates.

Birds

Commenter	ID Number	Comment	Response
Earthjustice et al.-26	BOEM-2023-0046-5236	BOEM fails to properly consider noise and light pollution on birds. BOEM acknowledges that lighting may impact birds and sea turtles, but it does little more than that concluding that the effects are negligible to moderate for the various alternatives. At least 200,000 migratory birds are killed by collisions with existing platforms in the Gulf annually.[342] Senzaki et al. (2020) found "that anthropogenic noise and light can substantially affect breeding bird phenology and fitness."[343] While the Draft PEIS treats the entire region uniformly, Celata et al. (2022) found differences in potential exposure for various seabird species, with species that utilize nearshore habitats and the western and central portions of the Gulf more likely to overlap with oil and gas platforms than highly pelagic species or those that utilize the eastern portion of the study area.[344]	Thank you for your comment. The affected environment and environmental consequences for birds (**Chapter 4.7** of the PEIS) assess the best publicly-available and peer-reviewed scientific information. BOEM has reviewed Senzaki et al. (2020) and notes that the study also stated "All-species models of the five responses revealed weak associations with noise, light and other anthropogenic predictors." Therefore, BOEM does not believe it is appropriate to include this study in the analysis. As for Celata (2022), the memorandum was an initial iterative process for the development of preliminary wind energy areas. Therefore, BOEM does not believe it is appropriate to include this memorandum in oil- and gas-related analysis. Additional language has been added to **Chapter 4.7.2.1** on lighting and visual impacts for oil- and gas-related activities. The FWS concurrence letter for the reinitiated biological opinion as of March 28, 2025, is summarized in **Appendix G** of the PEIS.

Marine Mammals

Commenter	ID Number	Comment	Response
NMFS, SERO-12	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● entanglement risks (primary and secondary) to species listed under the ESA and/or protected under the Marine Mammal Protection Act (MMPA);	***Please note that this response is specific to the portion of the comment that relates to marine mammals. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. BOEM considered the potential effects of entanglement (primary and secondary) on marine mammals in **Chapter 4.8.2** of the PEIS in the *Offshore Habitat Modification/Space Use* and *Unintended Releases into the Environment* subsections. Entanglement is also discussed in Chapters 4.3.6.2.1 and 4.3.6.2.3 of the SID, which is incorporated by reference into the PEIS.
NMFS, SERO-13	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● vessel strikes to species listed under the ESA and/or protected under the MMPA;	***Please note that this response is specific to the portion of the comment that relates to marine mammals. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. BOEM considered the potential effects of vessel strikes on marine mammals in **Chapters 4.8.2.2** and **4.8.2.3** of the PEIS in the *Strikes and Collisions* subsections. The analysis has been updated with relevant scientific literature. Vessel strikes are also discussed in Chapters 4.3.6.2.1 and 4.3.6.2.3 of the SID, which is incorporated by reference into the PEIS.
NMFS, SERO-14	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● runoff and/or remobilization of chemicals and toxic pollutants into the marine environment via increased vessel traffic and activities associated with exploration, production, and decommissioning that can affect species protected under the MMPA, ESA-listed species and their habitats, fish stocks managed under the MSA, their forage species, and their prey;	***Please note that this response is specific to the portion of the comment that relates to marine mammals. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Regarding marine mammals and their habitats, BOEM considered the potential effects from pollutants in **Chapter 4.8.2** of the PEIS in the *Offshore Habitat Modification/Space Use* and *Unintended Releases into the Environment* subsections. The analysis has been updated to indicate that additional discussion of potential water quality impacts from runoff, vessels, and other activities can be found in **Chapter 4.2** of the PEIS. Impacts from OCS oil- and gas-related activities to water quality and marine mammals are also discussed in Chapters 4.2, 4.3.6.2.2, and 4.3.6.2.3 of the SID, which is incorporated by reference into the PEIS.
NMFS, SERO-15	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● impacts to habitat for MSA-managed fish stocks, ESA-listed species and their habitats, and species protected under the MMPA from installation and exploration activities (e.g., seismic airgun surveys, pile driving);	***Please note that this response is specific to the portion of the comment that relates to marine mammals. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Regarding marine mammals and their habitats, BOEM considered the potential effects from installation and exploration activities (e.g., seismic airgun surveys and pile driving) in **Chapter 4.8.2** of the PEIS. The analysis has been updated with relevant scientific literature. Potential effects from installation and exploration activities (e.g., seismic airgun surveys and pile driving) can also be found in Chapter 4.3.6.2.2 of the SID, which is incorporated by reference into the PEIS.

Commenter	ID Number	Comment	Response
NMFS, SERO-16	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● noise from oil and gas installation and operational activities at a level that could cause harm and/or overall disturbance via increased acoustic pollution that could impact biologically significant behaviors (e.g., foraging, migrating, resting, reproduction) for species protected under the MMPA, ESA-listed species and their habitats, and fish stocks;	***Please note that this response is specific to the portion of the comment that relates to marine mammals. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Regarding marine mammals, BOEM considered noise from installation and operational activities in **Chapters 4.8.2.1** and **4.8.2.3** of the PEIS in the *Noise* subsections. The analysis has been updated with relevant scientific literature. Noise impacts to marine mammals were also considered in Chapters 4.3.6.2.1 and 4.3.6.2.2 of the SID, which is incorporated by reference into the PEIS.
NMFS, SERO-17	BOEM-2023-0046-3146	Rice's whales' core distribution area is in the northeastern GOM. The delineation of the core distribution area is based on visual sighting data, and includes a 30-km buffer around known whale sightings that accounts for animal movement of tagged whales and uncertainty. Additionally, observed sightings, passive acoustic monitoring (PAM), and habitat suitability modeling have shown that Rice's whales occur in all 100-400 meter deep waters in the western and central GOM. Their occurrence in the western and central GOM is persistent, with PAM detections of Rice's whale calls occurring throughout the year, on 15-33% of days, and in every month of the year.[6] Targeted research on Rice's whale biology and threats (e.g., focused surveys and PAM in Rice's whale habitat, ambient noise monitoring, expanded tagging, environmental DNA) are needed to better understand Rice's whale distribution, abundance, and seasonality in the western and central GOM, and to understand and mitigate potential impacts to Rice's whales from offshore oil and gas activities. We recommend BOEM assess potential co-occurrence of this species with oil and gas activities and avoid impacts to it when evaluating endangered and threatened species considerations in the PEIS. This includes propagation of anthropogenic noise into Rice's whale habitat from vessels and seismic activities that occur outside of Rice's whale habitat.	Thank you for your comment. Rice's whales as part of the affected environment are discussed in **Chapter 4.8.1** of the PEIS, which includes references to Soldevilla et al. (2024) among other relevant scientific literature. Further, BOEM considered NMFS's analysis of the Rice's whale range in the 2025 NMFS BiOp (NMFS 2025b). BOEM considered potential impacts from oil and gas activities to marine mammals, including Rice's whales, in **Chapter 4.8.2** of the PEIS. The analysis has been updated with relevant scientific literature and BOEM will continue to monitor current scientific literature. Further, existing regulatory requirements and protective measures for marine mammals can be found in **Table 4.8-2** of the PEIS. Rice's whales, along with other marine mammals, are also considered in Chapter 4.3.6 of the SID, which is incorporated into the PEIS by reference. In addition, any impact associated to protected ESA-listed species and protocols/mitigations are part of the NMFS and FWS biological opinions as summarized in **Appendix G** of the PEIS. As noted in **Appendix G** of the PEIS, the relevant terms and conditions, reasonable and prudent measures, as well as the provisions of the 2020 NMFS BiOp (as amended) that are a part of the proposed action in the 2025 NMFS BiOp (e.g., the vessel mitigations found in the 2025 NMFS BiOp at Section 3.1.6.5 and Attachment A.6 Vessel Transit within Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA)), and other protocols identified in the 2025 NMFS BiOp Attachments and Appendices are made a binding part of the lease in the "Protected Species" Stipulation. Any future BiOp amendments or COAs will be binding on subsequent post-lease actions. The 2025 NMFS BiOp, as amended, and supporting documents can be found at https://www.fisheries.noaa.gov/resource/document/biological-and-conference-opinion-bureau-ocean-energy-management-and-bureau. The 2025 NMFS BiOp Attachments and Appendices can be found at: https://www.fisheries.noaa.gov/resource/document/attachments-and-appendices-2025-gulf-america-oil-and-gas-biological-opinion.
NMFS, SERO-18	BOEM-2023-0046-3146	The same study also documented declines in populations of odontocetes both within and outside of the surface oil footprint. This finding suggests that the impacts from the DWH oil spill were more far-reaching than previously thought. Given this information, potential impacts to marine mammals from unintended release of chemicals or oil should be considered well beyond the immediate vicinity of spills or releases. On page 4-118, the PEIS states that "marine mammals typically would actively avoid poor environmental conditions." However, resident marine mammal populations often demonstrate site fidelity despite poor environmental conditions. Although dolphins and other cetaceans are able to detect the presence of oil, they do not necessarily avoid it.[11] For example, bottlenose dolphins in Barataria Bay, Louisiana were heavily exposed to oil during Deepwater Horizon. These dolphins did not migrate but instead remained in the area and were observed swimming through oil months following the spill.[12] Likewise, the Frasier et al. study did not detect abundance declines in the Deepwater Horizon oil spill area during the response period, suggesting most animals remained in the vicinity. Moreover, some species, like Rice's whales, have restricted ranges and habitat requirements and may not be able to avoid spill locations.	Thank you for your comment. BOEM considered potential impacts from oil spills on marine mammals in **Chapters 4.8.2.2** and **4.8.2.3** of the PEIS in the *Unintended Releases into the Environment* subsections. The analysis has been updated, and Frasier et al. (2024), Gubbay and Earll (2000),and Schwacke et al. (2014) have been incorporated into the analysis. Potential impacts from oil spills on marine mammals are also considered in Chapter 4.3.6.2.3 of the SID, which is incorporated by reference into the PEIS. In addition, BOEM has analyzed a low-probability catastrophic event in the *Gulf of Mexico Catastrophic Spill Event Analysis: High-Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on Gulf of Mexico Outer Continental Shelf* in conjunction with its analysis of potential effects, as requested by the CEQ pursuant to its regulation at 40 CFR 1502.22. A low-probability catastrophic spill is, by definition, not reasonably certain to occur. Impacts to marine mammals from a low-probability catastrophic spill is considered in that document.

Commenter	ID Number	Comment	Response
NMFS, SERO-19	BOEM-2023-0046-3146	With respect to other seafloor disturbance activities, there are additional considerations for marine mammals that have not been addressed in comments previously provided to BOEM. During installation, maintenance, and/or decommissioning processes related to oil and gas activities, sediment-buried pollutants (e.g., heavy metals and hydrocarbons) could potentially become remobilized in the environment and negatively impact marine mammals.[13] Resuspension of these pollutants could result in direct and indirect impacts on the surrounding marine environment and marine mammals' use of that habitat. The highest contaminant concentrations are generally located in coastal waters due to human activities, however, seafloor areas impacted by the DWH oil spill should also be considered in the site selection process. As stated in the PEIS, geological and geotechnical surveys are planned to collect surface and near-surface sediment samples to assess seafloor properties. Conducting sediment toxicity tests to guide the selection of cable routes and other bottom disturbing activities is the best way to avoid the remobilization and dispersion of contaminants. Please consider the effects and impacts associated with other bottom disturbing activities, such as pipelines, that have been reviewed by Taormina et al., including electromagnetic field and heat emissions, and apply appropriate mitigation measures to most effectively reduce impacts to marine mammals and the surrounding environment.	Thank you for your comment. BOEM has reviewed and included updated relevant scientific information regarding potential effects from seafloor disturbance activities on marine mammals in **Chapters 4.8.2.1** and **4.8.2.3** of the PEIS in the *Offshore Habitat Modification/Space Use* and *Bottom Disturbance* subsections. BOEM will continue to monitor current scientific literature. Potential effects from seafloor disturbance activities on marine mammals are also discussed in Chapters 4.6.3.2.1 and 4.6.3.2.2 of the SID, which is incorporated by reference into the PEIS. Further, additional discussion of potential water quality impacts from sediment resuspension can be found in **Chapter 4.2** of the PEIS and Chapter 4.2 of the SID, which is incorporated by reference. Impacts to benthic communities and habitats from discharges and wastes and bottom disturbance is further discussed in **Chapter 4.4.2.1** of the PEIS and Chapter 4.3.2.2.2 of the SID, which is incorporated by reference. It should be noted that these discharges and bottom disturbing activities, including cable laying, would occur on the soft bottom sea floor, and be distanced from the sensitive benthic habitats by the protective measures detailed in **Table 4.2-2** of the PEIS. Discharges are also highly regulated (**Table 4.4-2** of the PEIS) to reduce contaminant levels entering the GOA. Also, as discussed in **Chapter 4.8.2.1** of the PEIS, some marine mammals may use sensitive benthic resources (e.g., topographic features and live bottoms); bottom disturbing, and drilling and production discharge activities are distanced from those habitats to protect them, therefore distancing the activities from the marine mammal usage areas as well. Based on this information, BOEM does not believe that sediment toxicity tests would be necessary, as activities that may contain or disrupt sediment contaminants would be sufficiently distanced from areas some marine mammals may use. Existing regulatory requirements and protective measures for marine mammals can be found in **Table 4.8-2** of the PEIS. BOEM analyzed each alternative for the Proposed Action, with and without these measures in the PEIS. Furthermore, BOEM consults with Federal, tribal, and State agencies responsible for regulatory environmental compliance to assure appropriate environmental mitigating measures are relevant and up to date. To conclude, any impact associated to protected ESA-listed species and protocols/mitigations are part of the NMFS and FWS biological opinions as summarized in **Appendix G** of the PEIS. As noted in **Appendix G** of the PEIS, BOEM implements the 2025 NMFS BiOp and associated Attachments and Appendices, which contain protocols BOEM applies for ESA compliance, and prevents or reduces impacts on listed species.
Earthjustice et al.-27	BOEM-2023-0046-5236	**G. The Draft PEIS falls short of adequately analyzing the impacts of the proposed action or Rice's whale.** **1. The Draft PEIS accurately characterizes the habitat and distribution of Rice's whale but should incorporate additional evidence of this habitat.** The Draft PEIS accurately characterizes the Rice's whale's habitat as extending from an area in the upper depths of the DeSoto Canyon in the eastern Gulf along the continental shelf break between the 100- and 400-meter isobaths (depth contours) through the central and western Gulf.[262] This characterization is consistent with the best available science on the whale's habitat, including the results of a comprehensive five-year study conducted by NMFS, and with NMFS' proposed designation of this same area as critical habitat for the Rice's whale under the ESA.[263] BOEM should ensure that the final PEIS retains this description of Rice's whale habitat, and should also supplement its analysis with additional data on the distribution of the whale. NMFS' five-year study, titled "Trophic Interactions and Habitat Requirements of Gulf of Mexico Rice's Whales" was completed in 2021…. Together and individually, these multiple lines of evidence demonstrated that the Rice's whale persistently inhabits the western and central Gulf between the 100- and 400-meter isobaths, in addition to occupying the DeSoto Canyon in the eastern Gulf of Mexico as was previously documented.[265] Based on the five-year study and other evidence, NMFS concluded in 2023 that the "best scientific information available" supported the designation of this area as critical habitat that is "essential to the conservation" of Rice's whales.[266]	Thank you for your comment. Regarding Rice's whales, Soldevilla et al. (2022), Soldevilla et al. (2024), Kok et al. (2023), and Kiszka et al. (2023), in addition to other relevant scientific literature, are discussed in the marine mammal affected environment in **Chapter 4.8.1** of the PEIS and Chapter 4.3.6 of the SID, which is incorporated by reference. Additional relevant scientific literature on Rice's whale distribution and sightings, including from Garrison et al. (2024) and Farmer et al. (2022), has been incorporated into **Chapter 4.8.1** of the PEIS. Peer-reviewed publications informed by NMFS's project, "Trophic Interactions and Habitat Requirements of Gulf of Mexico Rice's Whales," are included in the assessment. Further, BOEM considered NMFS's analysis of the Rice's whale range in the 2025 NMFS BiOp (NMFS 2025b). BOEM will continue to monitor current scientific literature.

Commenter	ID Number	Comment	Response
Earthjustice et al.-28	BOEM-2023-0046-5236	Providing a full and accurate depiction of the distribution of Rice's whales is critical to taking a "hard look" at the environmental consequences of oil and gas activities stemming from the Proposed Action, as is required by NEPA.[267] Under any of the alternatives considered, the Proposed Action would primarily offer for lease areas in the western and central Gulf of Mexico.[268] Without accurately depicting the spatial overlap between Rice's whale habitat and oil and gas activities resulting from the Proposed Action, the Draft PEIS cannot accurately assess the likely proximity of Rice's whales to those activities and their impacts—including noise, oil spills, and vessel traffic. Further, NEPA requires that agencies ensure the scientific integrity of environmental analyses and use high-quality information and accurate scientific analysis.[269]	Thank you for your comment. BOEM has reviewed and included updated relevant scientific information regarding Rice's whale distribution and potential effects from oil- and gas-related activities on marine mammals, including Rice's whales, in **Chapters 4.8.1** and **4.8.2** of the PEIS. BOEM will continue to monitor current scientific literature. BOEM analyzed the impacts to marine mammals, including Rice's whale, under each alternative in **Chapter 4.8.2.3** of the PEIS. The analysis includes alternatives which both include and exclude the Rice's whale core distribution area and the Rice's whale proposed critical habitat area from the areas available for lease. As explained in **Chapter 4.8.2.3** of the PEIS, most impacts to marine mammals from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternatives C and D because areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding activity, and these activities would not occur in excluded areas. Impacts from most routine activities would be limited to the areas leased under these alternatives. One exception is noise, which could potentially travel from the sound source into excluded areas, resulting in impacts to marine mammals. The impacts from accidental events would be the same for all alternatives since an accident could occur from any routine OCS oil- and gas-related activity, regardless of the location, and considering the applicable mitigating measures and regulatory requirements. For example, strikes from vessel traffic can occur throughout the Gulf from port to lease activity. In addition, oil spills and response activities could occur in the excluded areas. The potential spatial redistribution of activity under Alternatives C or D does not affect impact levels for marine mammals (even though under Alternative D vessel traffic through the 100- to 400-m (328- to 1,312-ft) isobath could increase) given the application of mitigating measures (i.e., A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols and A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA) [see **Table 4.8-2** of the PEIS]), which would substantially reduce or prevent potential vessel interactions.
Earthjustice et al.-29	BOEM-2023-0046-5236	The Draft PEIS supports its characterization of the Rice's whale habitat with evidence of the species' year-round occurrence in the central and western Gulf from NMFS' five-year study.[270] This evidence includes two studies that used passive acoustics to detect Rice's whale vocalizations with hydrophones placed at multiple survey sites along the shelf break. The first of these two studies, conducted from 2016 to 2017, detected Rice's whale vocalizations as frequently as one in every six days at the westernmost survey site ("Flower Garden West") with no obvious evidence of seasonality.[271] The second study, conducted from 2019 to 2020, detected more than twice as many Rice's whale calls at the Flower Garden West site as the first study, detecting Rice's whale long-moan calls on one in every three survey days.[272] Rice's whale long- moan calls were also detected on nearly one in every four survey days at a new survey site in the western Gulf offshore Corpus Christi, Texas.[273] Both studies detected Rice's whale calls in the western Gulf year-round without a strong seasonal cycle, indicating the whale's persistent presence in this area.[274] As further evidence of Rice's whale habitat, the Draft PEIS cites another component of NMFS' five-year study, which demonstrates that the whale's primary prey favors the same shelf-break habitat throughout the northern Gulf of Mexico where the whales have been shown to persistently occur.[275] The Draft PEIS also points to visual detections from the government's large vessel surveys conducted from 2003 to 2019, which included one confirmed Rice's whale detection in the western Gulf of Mexico.[276] However, this data understates the visual evidence of the whale's presence in the western Gulf.[277] Since 2019 there have been additional confirmed sightings of Rice's whales in the western Gulf, including two confirmed sightings by NOAA Fisheries Fisheries scientists during aerial surveys conducted in April 2024[278]	Thank you for your comment. The two Rice's whale sightings in the western Gulf in April 2024 (NOAA Fisheries 2024) are included in the marine mammal affected environment in **Chapter 4.8.1** of the PEIS. Additional scientific information on Rice's whale sightings has been incorporated into **Chapter 4.8.1** of the PEIS. BOEM will continue to monitor current scientific literature. In addition, in order to protect the Rice's whale, the 2025 NMFS BiOp includes, in its Attachments and Appendices, protocols to prevent or minimize potential impacts to Rice's whales (NMFS 2025a).

Commenter	ID Number	Comment	Response
		and one confirmed sighting by NOAA Fisheries scientists in late 2024 during a vessel survey for marine mammal and seabird abundance and distribution.[279] In addition, two fishermen reported seeing a Rice's whale off the coast of Galveston in summer 2023, which they documented in a video.[280] BOEM should incorporate these sightings into its discussion of the affected environment for the Rice's whale.[281]	
Earthjustice et al-30	BOEM-2023-0046-5236	Further, we recommend that the PEIS incorporate two recent habitat suitability analyses from NOAA into its discussion of Rice's whale habitat.[282] Both analyses delineate the same shelf- break waters across the northern Gulf between the 100- and 400-meter isobaths as highly suitable habitat for the whale. The first analysis identified habitat in the northwestern Gulf based on three largely independent lines of information: sightings data from the government's large-vessel surveys (described above), acoustic data from NMFS' multi-year monitoring effort (described above), and a habitat suitability model rooted in salient oceanographic features, including water depth, bottom temperature, and primary productivity.[283] The second NOAA analysis developed a model of the whale's distribution based on bathymetric and oceanographic features and predicted suitable habitat for the whale throughout the Gulf in areas between 100 and 400 meters depth.[284] In addition, we recommend that the PEIS incorporate NMFS' spatial estimates of Rice's whale distribution and density across the Gulf.[285] These estimates indicate that at least one third (n=33.3 to 38.8%) of the population occurs in the Central and Western Planning Areas in each season of the year.[286] Importantly, an analysis performed in 2023 with the same density information concluded that about 94% of the population is contained within the same strip of habitat located between the 100- and 400-meter isobaths.[287]	Thank you for your comment. Regarding Rice's whales, additional relevant scientific literature, including from Farmer et al. (2022) and Garrison et al. (2024), has been incorporated into the marine mammal affected environment in **Chapter 4.8.1** of the PEIS. BOEM will continue to monitor current scientific literature.
Earthjustice et al.-31	BOEM-2023-0046-5236	**2. The Draft PEIS fails to adequately analyze the impacts of oil spills on Rice's whale.** The Draft PEIS fails to adequately analyze the potential impacts of an oil spill on Rice's whale by omitting catastrophic oil spills from its analysis and by inaccurately rating impacts from oil spills as "negligible to moderate" instead of "negligible to major." Oil spills represent a significant threat to the Rice's whale population, as demonstrated by the fallout from the BP Deepwater Horizon disaster, which had catastrophic effects on the whale.… [0] Considering the small size of the population, the lingering effects of the Deepwater Horizon spill are already driving Rice's whales to the brink of extinction, as defined by the conventional metrics employed by NMFS in its species status review, apart from any other anthropogenic or environmental stressors.[291] Despite the lasting impacts of Deepwater Horizon on the population, the Draft PEIS provides no analysis of the impacts of a catastrophic oil spill on Rice's whales or any marine mammals,[292] asserting generally that catastrophic spill events are "not reasonably foreseeable" and not "part of the proposed action."[293] Nor does BOEM's Gulf of Mexico Catastrophic Spill Event Analysis, which the Draft PEIS incorporates by reference,[294] provide any meaningful discussion of potential impacts to the Rice's whale from a catastrophic spill.[295] The Catastrophic Spill Event Analysis notes that the Rice's whale lives in the GOM, but incorrectly states that there are "currently no data on habitat use and migration patterns nor are there sufficient data to determine their population trends … making it difficult to analyze how a hypothetical catastrophic spill may impact this species."[296] Separately, the report acknowledges that a catastrophic	Thank you for your comment. BOEM considered the potential effects of oil spills on marine mammals, including Rice's whales, in **Chapters 4.8.2.2** and **4.8.2.3** of the PEIS in the *Unintended Releases into the Environment* subsections. Existing regulatory requirements that can reduce the potential impacts of an oil spill on marine mammals can be found in **Table 4.8-2** of the PEIS. The potential effects of oil spills on marine mammals are also considered in Chapter 4.3.6.2.3 of the SID, which is incorporated by reference. In addition, the impacts of the *Deepwater Horizon* explosion, oil spill, and response have been considered in the baseline for the analysis in the PEIS. BOEM will continue to monitor current scientific literature. Catastrophic oil spills have not been omitted from the analysis. The BOEM (2021) *Gulf of Mexico Catastrophic Spill Event Analysis: High Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on the Gulf of Mexico Outer Continental Shelf; 2nd Revision* is used and incorporated by reference in the PEIS. The BOEM (2021) report provides an assessment of potential impacts resulting from a low-probability catastrophic spill in the Gulf similar in nature to the *Deepwater Horizon* oil spill, which is not reasonably foreseeable nor a part of the proposed action, but has been evaluated nonetheless in response to CEQ's report following the *Deepwater Horizon* explosion, oil spill, and response (CEQ 2010). Catastrophic spills of 1 million barrels or more are extremely rare, and the estimated return period for a spill of this magnitude is 165 years. The probability in any given year for a spill to occur on this scale is therefore about 0.6 percent (Ji et al. 2014). From these estimates, catastrophic events are not considered reasonably foreseeable as part of the proposed action under NEPA. Based on this, BOEM does not assign impact ratings to a low-probability catastrophic spill, which is not reasonably foreseeable nor a part of the proposed action. As noted in **Appendix G** of the PEIS, BOEM implements the 2025 NMFS BiOp and associated Attachments and Appendices, which contain protocols BOEM applies for ESA compliance, and prevents or reduces impacts on listed species.

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		oil spill lasting up to 90 days "could have population-level effects on many offshore species of marine mammals (e.g., sperm whales, Bryde's whales, etc.)."[297] These brief statements do not constitute a hard look at the potential impacts of a catastrophic oil spill on Rice's whale, and they exclude existing information about the whale's habitat use, population trends, and vulnerability to oil spills. Moreover, while the Draft PEIS generally incorporates the Catastrophic Spill Event Analysis by reference, the Draft PEIS makes no actual reference to this report in its discussion of the impacts from oil spills on marine mammals.[298] As discussed in section VI, catastrophic oil spills are a reasonably foreseeable impact of the Proposed Action, and the PEIS must take a hard look at the impacts of a catastrophic oil spill, in addition to the impacts of smaller spills, on the Rice's whale. The regular occurrence of Rice's whales in the Western and Central Planning Areas, as detailed above, puts them at greater risk of exposure to a large oil spill. Each one of the blowout scenarios modeled by BOEM in its 2021 analysis of catastrophic spill events—whether they occurred in shallow or deep water, whether near the shelf break or hundreds of kilometers away—would result in contamination of Rice's whale habitat, as illustrated in the figures below.[299] The Draft PEIS also erroneously concludes that oil spills resulting from the Proposed Action would have "negligible to moderate" impacts on marine mammals under all action alternatives, defining "moderate" impacts to protected species as impacts "that would not affect the fitness of the population."[300] This impact rating does not accurately reflect the potential for a large or catastrophic oil spill to cause population-level effects to Rice's whales. Due to the critically endangered status and small size of the remaining Rice's whale population, NMFS has repeatedly emphasized the importance of protecting all remaining Rice's whales…. The Draft PEIS recognizes that exposure to oil spills may affect marine mammals in a variety of ways, including "decreased health, reproductive fitness, and longevity, increased vulnerability to disease, and possible mortality."[302] For baleen whales in particular, like the Rice's whale, the Draft PEIS states that "[o]il spills may also affect feeding behavior"—a critical life function—by fouling baleen plates.[303] The Draft PEIS defines "major" impacts to protected species as including "physical injury, permanent disruption of behavioral patterns, or mortality … to the extent the viability of the population is diminished."[304] Accordingly, BOEM must adjust the impact rating for oil spills on the Rice's whale to "negligible to major."	
Earthjustice et al.-32	BOEM-2023-0046-5236	**3. The Draft PEIS fails to adequately analyze the impacts of noise on the Rice's whale.** The Draft PEIS grossly understates the impacts of noise from seismic surveys on the Rice's whale, assigning a rating of "negligible to moderate" to unmitigated noise impacts, and a rating of "negligible to minor" to mitigated noise impacts under all action alternatives.[305] The Draft PEIS recognizes that unmitigated noise impacts from the Proposed Action have the potential to cause "physical injury, permanent disruption of behavioral patterns, or mortality" of Rice's whale; due to the vulnerability of the population, unmitigated noise impacts should properly be categorized as "major" under BOEM's impact ratings.[306] Absent the inclusion of significantly stronger mitigation measures for noise from seismic surveys, mitigated noise impacts should also be assigned the "major" rating.	Thank you for your comment. BOEM considered the potential effects of noise on marine mammals, including Rice's whales, in **Chapters 4.8.2.1** and **Chapter 4.8.2.3** of the PEIS in the *Noise* subsections**.** The analysis has been updated with relevant scientific information concerning noise. BOEM will continue to monitor current scientific literature. Noise is also considered in Chapters 4.3.6.2.1 and 4.3.6.2.2 of the SID, which is incorporated into the PEIS by reference. Existing regulatory requirements and protective measures that reduce or prevent potential noise impacts to marine mammals can be found in **Table 4.8-2** of the PEIS. BOEM analyzed each alternative for the Proposed Action, with and without these measures in the PEIS. Furthermore, BOEM consults with Federal, tribal, and State agencies responsible for regulatory environmental compliance to assure appropriate environmental mitigating measures are relevant and up to date. To conclude, any impact associated with protected ESA-listed species and protocols/mitigations are part of the NMFS and FWS biological opinions as summarized in **Appendix G** of the PEIS. As noted in **Appendix G** of the PEIS, BOEM implements the 2025 NMFS BiOp and associated Attachments and Appendices, which contain protocols BOEM applies for ESA compliance, and prevents or reduces impacts on listed species.

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		Acoustic communication is essential to the life functions of baleen whales like the Rice's whale. Rice's whales require quiet conditions sufficient to "receive and interpret sound for the purposes of navigation, communication, and detection or [sic] prey, predators, and other threats," without significant impediment.[307]…. As recognized in the Draft PEIS, Rice's whales produce low-frequency calls (including the long-moan call), leaving them particularly vulnerable to masking by the low-frequency sounds produced by seismic surveys.[310] Rice's whales' long-moan calls are likely to be of significant import to the species (e.g., for breeding or foraging),[311] given their rate of call production, the distances their calls propagate (20 to 75 kilometers), and their association with groups in at least some instances. Due to the high energy cost of their foraging strategies, baleen whales are limited in their ability to compensate for impairments in their foraging regimes.[312] Based on the literature concerning right, blue, and humpback whales,[313] it can be assumed that Rice's whales have similar requirements to carefully maintain their energy budgets, and that impairment can lead to energetic and fitness consequences for the species, as documented in other marine mammals…. Rice's whale habitat already experiences persistent elevated levels of ambient noise, particularly in the western and central Gulf of Mexico where seismic activity is the highest.[316] A recent study found that ambient noise levels at Rice's whale call frequencies (i.e., the 60-160 Hz band) were approximately 7 dB re 1μPa2/Hz higher at a recording location in the Rice's whale habitat in the western Gulf relative to the whale's habitat in DeSoto Canyon in the eastern Gulf.[317] Ambient noise levels were even higher at other recording locations across the whale's habitat in the central Gulf.[318] With these levels of ambient noise, as NMFS' expert status review put it, "whales would be unlikely to hear their nearest neighbors."[319] Similar decreases in communication space, resulting from chronic noise, have raised conservation concerns for other baleen whale species.[320] Seismic surveys for oil and gas exploration—as would be undertaken under leases issued through the Proposed Action—contribute significantly to ambient noise levels in the northern Gulf of Mexico. Multiple studies have shown that seismic airguns dominate the soundscape through much of the northern Gulf, including in Rice's whale habitat, with other industrial noise and shipping also contributing.[321] Seismic airgun noise has been demonstrated to propagate long distances in the Gulf of Mexico, over several hundred kilometers.[322] Some individual seismic surveys in the Gulf of Mexico persist for months at a time, operating day and night, and the frequency of activity makes seismic noise a chronic stressor in many parts of the Gulf.[323] It has repeatedly been hypothesized, including by NMFS, that the lower Rice's whale densities detected outside the DeSoto Canyon may be due to higher levels of ambient noise.[324] Given the Rice's whale's vulnerability to extinction, even a single death, serious injury, or profound behavior disruption from unmitigated noise impacts stemming from the Proposed Action could undermine the ability of the population to recover.[325] The Draft PEIS acknowledges that unmitigated noise impacts may cause these consequences.[326] Even with the currently-applied mitigation measures aimed at avoiding seismic blasts when a Rice's whale is observed within 500 meters of an airgun array,[327] seismic noise may cause	

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		masking, behavioral changes, or other disruptions to the essential life functions of Rice's whales, as detailed above. Consequently, mitigated and unmitigated noise impacts to Rice's whale resulting from the Proposed Action must be assigned a rating of "major."	
Earthjustice et al.-33	BOEM-2023-0046-5236	**4. The Draft PEIS accurately analyzes vessel strikes as posing major impacts to Rice's whales but should incorporate additional evidence of the species' vulnerability to vessel strikes.** …..We recommend that BOEM consider and incorporate into the PEIS two studies demonstrating that the behavior of the Rice's whale increases the species' vulnerability to vessel strikes.[336] These studies analyze information on diving, foraging, and resting behavior obtained from two tagged Rice's whales over periods of 25 hours or greater. Both whales were observed within 15 meters of the sea surface for 85% of the time at night, highlighting their vulnerability to vessel strikes. While the Draft PEIS recognizes this aspect of Rice's whale behavior and cites NMFS' website,[337] incorporating articles that document the actual evidence of this behavior will provide higher-quality information and more accurate scientific analysis, as is required by NEPA.[338] In addition, we recommend that the PEIS include in its vessel strike analysis an unpublished report that provides an account of vessel strike risk to the Rice's whale from oil and gas industry vessels throughout the whale's full habitat.[339] This report replicated the vessel strike analysis documented in the 2020 biological opinion for the Rice's whale using an updated density surface model that accounts for the full distribution of the species (i.e., including the western and central Gulf as well as the eastern Gulf). The report concluded that oil and gas industry vessels traveling at all speeds account for 40% of the vessel strike risk to Rice's whales, and oil and gas industry vessels traveling at speeds greater than 10 knots account for 32% of the vessel strike risk to Rice's whales.[340] Information on the relative risk of vessel strike from oil and gas industry vessels compared with other vessels in the Gulf of Mexico is relevant to analyzing the risk of vessel strike from the Proposed Action and is currently missing from the Draft PEIS.[341]	Thank you for your comment. BOEM considered the potential effects of vessel strike on marine mammals, including Rice's whales, in **Chapters 4.8.2.2** and **4.8.2.3** of the PEIS in the *Strikes and Collisions* subsections. The analysis has been updated with relevant scientific literature, including the incorporation of Soldevilla et al. (2017). In addition, **Chapter 4.8.1** of the PEIS includes discussion of Kok et al. (2023). The affected environment and environmental consequences for marine mammals (**Chapter 4.8** of the PEIS) assess the best publicly-available and peer-reviewed scientific information. BOEM will continue to monitor current peer-reviewed scientific literature. In addition, vessel strikes are considered in Chapters 4.3.6.2.1 and 4.3.6.2.3 of the SID, which is incorporated by reference into the PEIS. Existing regulatory requirements and protective measures that reduce or prevent potential vessel strike impacts to marine mammals can be found in **Table 4.8-2** of the PEIS. BOEM analyzed each alternative for the Proposed Action, with and without these measures in the PEIS. Furthermore, BOEM consults with Federal, tribal, and State agencies responsible for regulatory environmental compliance to assure appropriate environmental mitigating measures are relevant and up to date. To conclude, any impact associated with protected ESA-listed species and protocols/mitigations are part of the NMFS and FWS biological opinions as summarized in **Appendix G** of the PEIS. As noted in **Appendix G** of the PEIS, BOEM implements the 2025 NMFS BiOp and associated Attachments and Appendices, which contain protocols BOEM applies for ESA compliance, and prevents or reduces impacts on listed species. NMFS found that vessel strikes were one of the biggest risks from the GOA oil and gas program to ESA-listed whales and found that risk resulted in jeopardy for the Rice's whale (NMFS 2025b). In the 2025 NMFS BiOp, NMFS included a reasonable and prudent alternative (RPA) that, in its expert determination, reduces that risk to Rice's whale to prevent jeopardy (NMFS 2025b). DOI is currently considering the RPA. BOEM and BSEE have not yet made a determination on whether and to what extent to apply the RPA in the GOA. As stated in the Protected Species Stipulation, when an operator seeks BOEM or BSEE approval of any plan, permit, or other authorization under a lease, they will be required to comply with the most recent consultations, opinions, mitigations, and Conditions of Approval (COAs) available at the time.
Earthjustice et al.-34	BOEM-2023-0046-5236	Additionally, the impacts to marine mammals have not been adequately examined. Whitehead and Shin (2022) attribute declining sperm whale (Physeter macrocephalus) populations in the Gulf of Mexico to the area's industrialization.[347] They state that "in nearshore areas with substantial anthropogenic impact, sperm whale populations are, in current times, in some jeopardy."[348]	Thank you for your comment. The affected environment and environmental consequences for marine mammals (**Chapter 4.8** of the PEIS) assess the best publicly-available and peer-reviewed scientific information. BOEM has reviewed Whitehead and Shin (2022) and notes that the study also states, "However, as a general caution, we stress that the estimated trends indicated in Table 3 are mostly either very small or very uncertain, or both." Therefore, BOEM does not believe it is appropriate to include this study in the analysis. BOEM will continue to monitor current scientific literature.
Earthjustice et al.-35	BOEM-2023-0046-5236	Research demonstrates that the BP spill continues to affect regional dolphin populations, leaving them vulnerable to emerging threats including restoration activities proposed in the aftermath of the Deepwater Horizon disaster.[349] Barataria Bay dolphins are at serious risk that needs to be analyzed.[350] They have problems with inflammation, immunity, reproductive failure, cardiac dysfunction, and lung dysfunction—with multigenerational immune concerns.[351]	Thank you for your comment. BOEM considered the potential effects of oil spills on marine mammals, including dolphins, in **Chapters 4.8.2.2** and **4.8.2.3** of the PEIS in the Unintended Releases into the Environment subsections. The analysis has been updated with relevant scientific literature concerning the impacts of oil spills on dolphins. BOEM will continue to monitor current scientific literature. The impact of oil spills on marine mammals is also considered in Chapter 4.3.6.2.3 of the SID, which is incorporated by reference into the PEIS.

Sea Turtles

Commenter	ID Number	Comment	Response
NMFS, SERO-20	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● entanglement risks (primary and secondary) to species listed under the ESA and/or protected under the Marine Mammal Protection Act (MMPA);	***Please note that this response is specific to the portion of the comment that relates to sea turtles. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. BOEM analyzes the potential impacts of entanglement to sea turtles for OCS Oil- and Gas-Related Routine Activities and Accidental events in **Chapter 4.9.2** of the PEIS. The analysis considers pathways to both primary and secondary entanglement. Primary entanglement during OCS Oil- and Gas-Related activities is discussed in **Chapters 4.9.2.1** and **4.9.2.3** of the PEIS under the Offshore Habitat Modification/Space Use subsections. Secondary entanglement is discussed in **Chapters 4.9.2.1, 4.9.2.2,** and **4.9.2.3** of the PEIS in both the Unintended Releases into the Environment and Offshore Habitat Modification/Space Use subsections. Entanglement is also discussed in Chapters 4.3.7.2.1 and 4.3.7.2.3 of the SID, which is incorporated by reference into the PEIS.
NMFS, SERO-21	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● vessel strikes to species listed under the ESA and/or protected under the MMPA;	***Please note that this response is specific to the portion of the comment that relates to sea turtles. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Analysis in **Chapters 4.9.2.2** and **4.9.2.3** of the PEIS encompasses potential impacts to sea turtles from strikes and collisions. Vessel strikes are also discussed in Chapters 4.3.7.2.1 and 4.3.7.2.3 of the SID, which is incorporated by reference into the PEIS.
NMFS, SERO-22	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● runoff and/or remobilization of chemicals and toxic pollutants into the marine environment via increased vessel traffic and activities associated with exploration, production, and decommissioning that can affect species protected under the MMPA, ESA-listed species and their habitats, fish stocks managed under the MSA, their forage species, and their prey;	***Please note that this response is specific to the portion of the comment that relates to sea turtles. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Regarding sea turtles and their habitats, BOEM considered the potential effects from pollutants in **Chapter 4.9.2** of the PEIS in the Offshore Habitat Modification/Space Use and Unintended Releases into the Environment subsections. Additional scientific literature has been added to further assess the potential impacts of pollutants to sea turtles in **Chapter 4.9.2.2** of the PEIS in the Unintended Releases into the Environment subsection. Additional discussion of runoff and other water quality concerns can be found in **Chapter 4.2** of the PEIS, Water Quality. Impacts from OCS oil- and gas-related activities to water quality and sea turtles are also discussed in Chapters 4.2, 4.3.7.2.2, and 4.3.7.2.3 of the SID, which is incorporated by reference into the PEIS.
NMFS, SERO-23	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● impacts to habitat for MSA-managed fish stocks, ESA-listed species and their habitats, and species protected under the MMPA from installation and exploration activities (e.g., seismic airgun surveys, pile driving);	***Please note that this response is specific to the portion of the comment that relates to sea turtles. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Analysis in **Chapter 4.9.2** of the PEIS encompass potential impacts to sea turtle habitat, specifically *Sargassum* habitat for OCS oil- and gas-related activities. Additionally, impacts from OCS oil- and gas-related activities to benthic habitats that sea turtles may use are described in **Chapter 4.9.2.1** of the PEIS, subsections Offshore Habitat Modification/Space Use and Bottom Disturbance. Additional discussions of potential impacts to sea turtle habitat from OCS oil- and gas-related activities can be found in **Chapter 4.3** of the PEIS, Coastal Communities and Habitats; **Chapter 4.4** of the PEIS, Benthic Communities and Habitats; and **Chapter 4.5** and **Appendix M.2** of the PEIS, Pelagic Communities and Habitats. Impacts to sea turtles specifically from noise associated with OCS oil- and gas-related activities, including pile driving and geophysical and geological surveys is discussed in **Chapter 4.9.2.1** of the PEIS. Potential effects to sea turtles from installation and exploration activities (e.g., seismic surveys and pile driving) can also be found in Chapter 4.3.7.2.2 of the SID, which is incorporated by reference into the PEIS.
NMFS, SERO-24	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● noise from oil and gas installation and operational activities at a level that could cause harm and/or overall disturbance via increased acoustic pollution that could impact biologically significant behaviors (e.g., foraging, migrating, resting, reproduction) for species protected under the MMPA, ESA-listed species and their habitats, and fish stocks;	***Please note that this response is specific to the portion of the comment that relates to sea turtles. Other portions of this comment are addressed for each applicable resource.*** Thank you for your comment. Potential impacts to sea turtles from noise are assessed in **Chapter 4.9.2.1** and **4.9.2.3** of the PEIS under the Noise subsections. The analysis has been updated with relevant scientific literature concerning noise and high levels of exposure. In addition, potential effects to sea turtles from installation and exploration activities (e.g., seismic surveys and pile driving) can also be found in Chapter 4.3.7.2.2 of the SID, which is incorporated by reference into the PEIS.

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Earthjustice et al.-36	BOEM-2023-0046-5236	Climate change further threatens already-imperiled sea turtle species. Hawksbill sea turtles, for example, are threatened by the loss of coral reefs. As corals decline, so too does hawksbill sea turtle habitat.[200] Climate change also can affect nesting sea turtles in a variety of ways, including loss of nesting beaches[201] (due to sea level rise and construction of protective structures like sea walls), changes to nesting timing and interval, loss of nests from extreme weather events, and changes to incubation temperatures and hatchling sex ratio.[202] Climate change impacts Sargassum habitat, which is critical for juvenile sea turtles. As the climate continues to warm, Sargassum zone boundary and nearshore currents may shift; water conditions may change, shifting Sargassum abundance and distribution; and prey availability may change alongside ocean warming and acidification	Thank you for your comment. BOEM acknowledges the reasonably foreseeable impacts of sea level rise, extreme weather, changes in temperature, shifts in currents, and ocean warming to the OCS as well as impacts onshore and elsewhere throughout this PEIS. Potential impacts of these factors on sea turtles, including affects to nesting and hatchling sex ratios, are detailed in **Chapter 4.9** of the PEIS in the Other Environmental Factors subsection. Potential impacts of these factors on *Sargassum* habitat are analyzed in **Chapter 4.5** and **Appendix M.2** of the PEIS under the Other Environmental Factors subsection. The impacts of these factors on benthic communities and habitats, including corals, is discussed in **Chapter 4.4** of the PEIS. In addition, BOEM addresses these factors in Chapter 3.4 of the SID, and the influence of them on baseline conditions for each resource is discussed as part of the resource description in the SID: Benthic Communities and Habitats (Chapter 4.3.2), Pelagic Communities and Habitats, and Sea Turtles (Chapter 4.3.7). The SID is incorporated by reference into this PEIS. BOEM will continue to monitor current scientific literature on the topic of climate related factors and sea turtles.
Earthjustice et al.-37	BOEM-2023-0046-5236	BOEM's effects analysis is also insufficient for sea turtles. For example, Kemps' ridley sea turtles are already in trouble from the long-term effects of the BP oil spill, and ameliorating threats to the Gulf of Mexico Kemp's ridley is of critical importance given the species' recent declining trend.[345] Artificial light harassment contributes to sea turtle hatchling misorientation.[346] Lighting also could deter female nesters from utilizing area beaches—a significant problem given nest site fidelity.	Thank you for your comment. Potential effects to sea turtles from oil spills are addressed in **Chapters 4.9.2.2** and **4.9.2.3** of the PEIS in the Unintended Releases into the Environment subsections. The impacts of the *Deepwater Horizon* explosion, oil spill, and response have been considered in the baseline for the ongoing and reasonably foreseeable analysis on sea turtles in **Chapter 4. 9** of the PEIS. In addition, the potential impact of oil spills on sea turtles is also considered in Chapter 4.3.7.2.3 of the SID, which is incorporated by reference. Potential impacts of artificial lighting from routine activities are addressed in **Chapters 4.9.2.1** and **4.9.2.3** of the PEIS in subsections, Lighting and Visual Impacts. Potential impacts of artificial lighting from non-OCS oil- and gas-related sources are described in **Chapter 4.9** of the PEIS under the subsection Lighting and Visual Impacts. In addition, the potential impacts of artificial lighting on sea turtles are discussed in Chapters 4.7.3.2.1 and 4.3.7.2.2 of the SID, which is incorporated by reference into the PEIS.

Commercial Fisheries

Commenter	ID Number	Comment	Response
NMFS, SERO-25	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● impacts to GOM fisheries and fishing communities, including impacts to fish and invertebrate stocks, access to fishing grounds, gear entanglement, conflicts with increased non-fisheries vessel traffic, displacement of fishery efforts, safety-at-sea, and shoreside infrastructure necessary for fishery operation and resilience.	Thank you for your comments. The PEIS includes analyses of an OCS oil and gas lease sale on fish and invertebrates, commercial fisheries, land use and coastal infrastructure, and social factors (including fishing communities), as well as ongoing and reasonably foreseeable impacts to these resources. Impacts to fish and invertebrates are analyzed in **Chapter 4.6** of the PEIS and Chapter 4.3.4 of the SID, which is incorporated by reference into the PEIS. The analysis includes a discussion of gear entanglement and mitigations used to reduce these impacts. Additional language has been added within **Chapter 4.6** of the PEIS, Fishes and Invertebrates, to clarify that impact assessments include impacts to fish stocks. Impacts to commercial fisheries are discussed in **Chapter 4.10** and **Appendix M.3** of the PEIS and Chapter 4.42 of the SID, which is incorporated by reference into the PEIS. Space-use conflicts between OCS oil and gas vessels and commercial fishing vessels, safety-at-sea and a decrease in fishing fatalities over the past decade, and benefits to commercial fisheries infrastructure from OCS oil and gas industry funds used in shared ports are discussed in **Appendix M.3** of the PEIS. Commercial fishing communities are discussed in **Chapter 4.16** of the PEIS and Chapter 4.4.6 of the SID and land use and coastal infrastructure is discussed in **Chapter 4.14** of the PEIS and 4.4.1 of the SID. The PEIS also discusses measures to reduce impacts to commercial fisheries from OCS oil and gas activities. Impacts to commercial fisheries from bottom disturbance can be reduced by the National Fishing Enhancement Act of 1984 which promotes the Rigs-to-Reefs program. This program converts decommissioned oil platforms into artificial reefs, providing new habitats for marine life and enhancing fish populations. In addition, the CZMA promotes sustainable coastal development and the protection of coastal resources through state-federal partnerships. The Fishermen's Contingency Fund which provides compensation to fishermen for gear and vessel damage caused by oil and gas exploration activities. Refer to **Table M.3-4** of the PEIS for more detail on these protective measures.

Commenter	ID Number	Comment	Response
Earthjustice et al.-38	BOEM-2023-0046-5236	Climate change is impacting marine industries and tourism. Across the U.S., the seafood industry and recreational fisheries support over 1.2 million jobs.[178] Climate change has resulted in yield losses for multiple subsistence, recreation, and commercial fisheries and contributed to fishery closures, negatively impacting the fishing industry.[179] Indigenous communities may be more affected by climate change impacts to fisheries than other communities because of a higher dependence on certain fisheries for food and cultural value.[180] Climate change is rapidly warming the ocean, causing changes to some species' distribution range, resulting in increased travel to fishing grounds, shifted fish stocks across regulatory and international boundaries, and increased interactions with protected species.[181] Nearshore areas of the Chesapeake Bay and the Pacific coast have a high proportion of species near their upper thermal limit, particularly at risk from climate change.[182] Marine heat waves are also increasing in intensity and frequency and have already been attributed to climate change in every marine system in North America. [183] These heat waves directly affect productivity and behavior of fish species, resulting in shifting species distributions poleward and to deeper water. Shifts in distribution of economically important species have already been observed in Bering Sea Pacific cod and American lobster. Ocean warming and marine heat waves have also created more favorable conditions for harmful algal blooms, with widespread impacts.	Thank you for your comments. BOEM acknowledges reasonably foreseeable impacts of ocean warming to the OCS as well as impacts onshore and elsewhere throughout this PEIS. BOEM analyzed and addressed reasonably foreseeable effects of other environmental factors, including ocean warming, to all applicable resources in **Chapter 4** and **Appendix M** of the PEIS throughout the analysis and summarized in **Chapter 4.17** of the PEIS. In addition, these effects are discussed in Chapter 3.4 of the SID and the influence of them on baseline conditions for each resource is discussed as part of the resource description in the SID: Fish and Invertebrates (Chapter 4.4.3), Coastal Communities and Habitats (Chapter 4.31.), Benthic Communities and Habitats (Chapter 4.3.2), Pelagic Communities and Habitats (Chapter 4.3.3), Tourism and Recreational Resources (Chapter 4.4.5), Economic Factors (Chapter 4.4.7), Land Use and Coastal Infrastructure (Chapter 4.4.1), Commercial Fisheries (Chapter 4.4.2), Recreational Fishing (Chapter 4.4.3), Subsistence Fishing (Chapter 4.4.4), and Social Factors (Chapter 4.4.6). The SID is incorporated by reference into this PEIS. Please note that the impacts of climate to areas in the Chesapeake Bay, Pacific coast, and Bering Sea are out of scope for this PEIS.

Recreational Fishing

Commenter	ID Number	Comment	Response
NMFS, SERO-26	BOEM-2023-0046-3146	General issues to be addressed in the PEIS include: ● impacts to GOM fisheries and fishing communities, including impacts to fish and invertebrate stocks, access to fishing grounds, gear entanglement, conflicts with increased non-fisheries vessel traffic, displacement of fishery efforts, safety-at-sea, and shoreside infrastructure necessary for fishery operation and resilience.	Impacts to Gulf of America communities, inclusive of fishing communities, are further discussed in the **Chapter 4.16** of the PEIS and in greater detail in Chapter 4.4.6 of the GOM Oil and Gas SID. Access to fishing grounds is addressed in **Appendix M.4.2.1** of the PEIS, especially under **Coastal Land Use/Modification** and in Chapter 4.4.3 of the GOM Oil and Gas SID. In general, new and modified onshore infrastructure as the result of a single lease sale is expected to be low. Other types of displacement and conflicts with vessels are also discussed in **Appendix M.4.2.1** of the PEIS under Offshore Habitat Modification/Space Use and in Chapter 4.4.3 of the GOM Oil and Gas SID. A single lease sale represents, for much of the GOA history going back several decades, a continuation of routine activities which, at the scale of a lease sale, are not expected to have more than a minor adverse impact on recreational fishing activities.

Recreational Resources

Commenter	ID Number	Comment	Response
Earthjustice el al.-39	BOEM-2023-0046-5236	In addition to economic impacts on marine industries, climate change will likely have significant impacts on tourism in coastal areas. The combined impacts of sea level rise, coastal flooding, shoreline erosion, saline intrusion, and storm surge directly threaten coastal cities from impacts to infrastructure, port and transportation facilities, water resources, and cultural heritage sites. Along the Gulf of Mexico and Caribbean Sea, 30% of hotels are exposed to flooding and 66% of hotels are located on eroding beaches. Impacts to marine ecosystems can also affect tourism. By 2100, the loss of recreational benefits from coral reefs in the United States is expected to reach $140 billion.	Thank you for your comment. Impacts from the proposed action to recreational resources, which includes a consideration of tourism and tourism related activities, is discussed in **Chapter 4.12** and **Appendix M.5** of the PEIS. The effect of sea level rise, coastal flooding, shoreline erosion, saline intrusion, and storm surge as it relates to physical, biological, and social resources in the GOA is considered for each applicable resource in **Chapter 4** and **Appendix M** of the PEIS and specific impacts on recreational resources and tourism is considered in **Appendix M.5** of the PEIS. Also refer to **Chapters 4.4** and **Appendix M.5** of the PEIS for the impacts to corals from rising temperatures and ocean acidification, and the resultant impact on recreational diving, tourism, and the regional economy.

Economic Factors

Commenter	ID Number	Comment	Response
NMFS, SERO-27	BOEM-2023-0046-3146	The PEIS includes an analysis of the socioeconomic impacts of the oil and gas leasing program. In addition to the sources cited herein, please consider the NMFS Social Indicators for Coastal Communities resources,[2] the Fisheries Economics of the United States reports,[3] and the Commercial Landings Tool.[4]	Thank you for your comment. Data from the Fisheries Economics of the United States reports and the Commercial Landings Tool are included in the analysis in **Appendix M.3** of the PEIS (Commercial Fisheries).
Earthjustice et al.-40	BOEM-2023-0046-5236	**3. Coastal communities and economies.** Almost 40% of the U.S. population lives on the coast and the U.S. marine economy provides 2.3 million jobs and contributes $432 billion in gross domestic product.[169] Coastal communities are already feeling the impacts of climate change, and infrastructure and local economies are at risk from worsened coastal flooding, storms, and degraded ecosystems and fisheries. The omnipresent nature of climate change means that there is no economic sector in North America that will be unaffected.	Thank you for your comment. BOEM acknowledges the reasonably foreseeable impacts of coastal flooding and storms throughout this PEIS and considers their effects on economic factors, land use and coastal infrastructure, commercial fisheries, recreational fishing, and social factors. BOEM analyzes the impacts of reasonably foreseeable effects of other environmental factors on all resources analyzed in **Chapter 4** and **Appendix M** of the PEIS, including economic factors, land use and coastal infrastructure, commercial fisheries, recreational fishing, and social factors as part of the analysis. In addition, these effects are discussed in Chapter 3.4 of the SID and the influence of them on baseline conditions for each resource is discussed as part of the resource description in the SID: economic factors (Chapter 4.4.7), land use and coastal infrastructure (Chapter 4.4.1), commercial fisheries (Chapter 4.4.2), recreational fishing (Chapter 4.4.3), and social factors (Chapter 4.4.6). The SID is incorporated by reference into this PEIS.
Zanagee Artis-3	1/16/25 Public Meetings	It takes 7 to 10 years to develop the lease after a lease sale, a lease sale in 2025 will not benefit our allies in Europe and will not lower energy prices or costs at the pump today.	Thank you for your comment. Please refer to **Chapter 3.2** of the PEIS for information on timing of lease development. With respect to energy prices, the National OCS Program is a long-term planning tool and is not designed to respond to near-term fluctuations in global energy markets. Rather, a stated purpose of the OCS Lands Act is to meet national energy needs for the five-year period following approval of a National OCS Program. In addition, production from potential new leases sold as part of a National OCS Oil and Gas Program is not guaranteed and most of any realized production would likely not commence until approximately five to ten years after a lease is awarded. Although leasing decisions made in a National OCS Oil and Gas Program would not result in new production for several years, the developments and production would contribute to the national energy needs by contributing supply as well as benefits in terms of the balance of payments, energy security, technology, revenues, and employment.
API et al.-15	BOEM-2023-0046-3145	“Annual offshore oil and gas industry investment is projected to be substantial in coming years, averaging almost $30 billion a year between 2025 and 2040. As set forth in Table 1, a recent economic study indicates that with additional leasing opportunities, investment and spending will increase by $4.8 billion a year by 2040. Under that scenario, the industry could support an average of 55,700 more jobs and would contribute an additional $4.6 billion to U.S. GDP each year. U.S. government revenues could rise by $1.7 billion annually by 2040, strengthening federal finances and the programs that depend on them.	BOEM appreciates the detailed analysis and estimates provided in your comment. It should be noted that the API report answers different questions than what is analyzed in the PEIS. **Chapter 4.15** of the PEIS (Economic Factors) provides an economic impact analysis of OCS oil- and gas-related activities corresponding to the analyzed alternatives. In particular, BOEM provides low, mid, and high case scenarios for employment, labor income, and value added. BOEM’s estimates are derived from the Life Cycle Impacts Models, developed by BOEM, which are specifically designed to assess the economic and fiscal impacts of OCS oil- and gas-related activities, including individual lease sales. BOEM welcomes any feedback on this analysis, including discussion regarding differences in modeling assumptions or methodologies.

Social Factors

Commenter	ID Number	Comment	Response
Earthjustice et al.-41	BOEM-2023-0046-5236	1. Impacts of climate change on health and communities. The impacts of climate change are felt across all aspects of society but fall disproportionately on the most vulnerable communities.... Across the United States, a range of communities have already felt the effects of climate change, including sea level rise and increased flooding, increased intensity and severity of storms, increased wildfire activity, and deadly heatwaves. Without a rapid and deep transition away from fossil fuels, the impacts of climate change will continue to worsen and harm communities, particularly communities of color.	Thank you for your comments. BOEM acknowledges the reasonably foreseeable impacts of sea level rise, increased flooding, increased intensity and severity of storms, and temperature increases to the OCS as well as impacts onshore and elsewhere throughout this PEIS. These issues are discussed throughout the PEIS, particularly in Appendix B and within each resource section of Chapter 4 and **Appendix M**. In addition, these effects are discussed in Chapter 3.4 of the SID and the influence of them on baseline conditions for each resource is discussed as part of the resource description in the SID, with additional information on impacts to GOA communities in Chapter 4.4.6 of the GOM Oil and Gas SID, which is incorporated by reference into this PEIS. See the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025). With respect to transitioning away from fossil fuel production, E.O. 14154, *Unleashing American Energy* (January 20, 2025), states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS, in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future.
Earthjustice et al.-42	BOEM-2023-0046-5236	**2. Human health.** Global climate change has had adverse impacts not only on the natural environment, but also on human health and safety. Changes in temperature and precipitation are projected to increase health risks from air pollution and heat-related deaths, as well as increase exposure to diseases. The risks to human health as a result of climate change are only expected to increase in the future.[151] Climate change is worsening air pollution levels, leading to an increase in adverse human health effects.[152] Climate change has already lengthened the wildfire season in the United States and increased the frequency of large fires, and the frequency of wildfires are projected to continue increasing over the 21st century.[153] Wildfires are a major source of particulate matter (PM) and contribute to the formation of ozone. These air pollutants pose serious risks to human health, particularly among children, the elderly, and people with chronic illnesses [154]. Exposure to particulate matter and ozone can cause adverse respiratory and cardiovascular effects, including aggravated asthma, hospital and emergency room visits, and premature death.[155] Increased wildfire activity is also associated with increased hospital admissions, even far distances from a wildfire. Even without the adverse impacts of wildfire smoke on air pollution, climate change is expected to increase ozone levels over most of the United States and may cause a small but significant increase in PM2.5 (particulate matter less than 2.5 micrometers in diameter), increasing the incidence of adverse health effects.[157] Additionally, climate change has been linked to increases in heat-related deaths, and warming temperatures are projected to increase heat-related morbidity such as incidence of asthma....[158]	Thank you for your comments. BOEM acknowledges the reasonably foreseeable impacts of changes in temperature and precipitation and worsening air pollution levels to the OCS as well as impacts onshore and elsewhere throughout this PEIS. In addition, these factors are discussed in Chapter 3.4 of the SID, which is incorporated by reference into this PEIS. As discussed in **Chapter 4.1.2.3** under Other Environmental Factors, it is difficult to estimate future air pollution levels on criteria air pollutants such as ozone and particulate matter as wildfire emissions may change in the future from the effects of air pollution. Please refer to comment response Sean Tran-2 for more detail on wildfire emissions, air pollution, and climate-related effects to air quality. Synergistic effects of air pollution on marine and coastal systems were addressed in Chapter 3.4.6 of the GOM Oil and Gas SID (see Figure 3.4.6-1), which is incorporated by reference into this PEIS. The impacts from air pollution on coastal populations in the Gulf of America are discussed in Chapter 4. 16 of the PEIS, and further expanded in Chapters 4.1.2 and 4.4.6 of the GOM Oil and Gas SID (including health impacts). With respect to the activities contributing to air pollutants, as discussed in Chapter 4.1.2.2.1 of the SID, GHGs (except for methane) for all existing OCS oil and gas sources contribute a negligible (less than 1 percent per pollutant) amount to the total emissions in the GOA in comparison with all other existing sources. As shown in **Table 4.1-3** and **Table 4.1-7** of the PEIS, methane emissions from all existing OCS oil and gas sources contribute up to 11.4 percent. In addition, **Table 4.1-3** and **Table 4.1-7** of the PEIS shows the estimated emissions of air pollutants from Non-OCS oil- and gas-related activities are substantially higher than air pollutant emissions from OCS oil- and gas-related activities.

Earthjustice et al.-43	BOEM-2023-0046-5236	**VII. BOEM HAS A RESPONSIBILITY TO CONSIDER ONSHORE IMPACTS TO GULF COMMUNITIES.** BOEM's PEIS must include not only the direct effects of a proposed action but indirect and cumulative effects as well…. Consequently, the pollution emitted by onshore infrastructure must be captured in any assessment of proposed leasing, as both an indirect and a cumulative effect. Refining, processing, and consumption are certainly "reasonably foreseeable" results of offshore drilling that are "sufficiently likely" such that "a person of ordinary prudence would take [them] into account in reaching a decision."[436] The entire purpose of leasing is the exploitation of offshore oil and gas resources, which are wholly, or in part, destined for processing, refinement and consumption along the Gulf Coast. BOEM must consider these impacts even if they are not entirely in the agency's control. CEQ has long-standing guidance that directly addresses this scenario: > For example, data may suggest there are disproportionately high and adverse human health or environmental effects on a minority population, low-income population, or Indian tribe from the agency action. Agencies should consider these multiple, or cumulative effects, even if certain effects are not within the control or subject to the discretion of the agency proposing the action.[437] Moreover, courts have made clear that an agency must include effects that extend beyond its direct control. The key question is not "What activities does the agency regulate?" but instead "What factors can [the agency] consider when regulating in its proper sphere?"[438] Here, multiple sections of OCSLA call for BOEM to consider the environment (including the marine, coastal, and human environments) when conducting OCS leasing.[439] For decades, the federal government has committed to environmental justice, including addressing disproportionate health, environmental, and economic impacts. Executive orders from past administrations, as well as the Biden Administration, reaffirm this commitment. Executive Order ("E.O.") 12898 directs federal agencies to address the impacts of their actions on environmental justice ("EJ") communities and to promote nondiscrimination principles in federal programs.[440] President Biden declared his administration's commitment to EJ in E.O. 14,008, Tackling the Climate Crisis at Home and Abroad.[441] In 2021, President Biden named Cancer Alley one of the country's "hard hit" communities of color, and the Environmental Protection Agency announced that it would investigate a complaint alleging environmentally based civil rights violations in St. John the Baptist parish.[442] BOEM must act consistent with these pledges and ensure its PEIS includes a comprehensive analysis that accounts for cumulative impacts on Gulf communities, including historical human health risks and environmental harm, climate change, impacts on local economies, and the effects on spiritual and cultural practices. Past administrations have also established several EJ initiatives involving BOEM, including the Justice40 Initiative and the Climate and Economic Justice Screening Tool (CEJST), a mapping tool used to identify "disadvantaged communities that are marginalized by underinvestment and overburdened by pollution."[443] In addition to identifying disadvantaged communities, the CEJST also "provides socioeconomic, environmental, and climate information to	Thank you for your comment. BOEM's analyses take into consideration a broader body of relevant literature which includes indirect and reasonably foreseeable impacts, within the context of NEPA and the Proposed Action. Chapters 4.14, 4.17, and Appendix B of the PEIS and Chapters 2.5, 4.4.1, and 4.4.6 of the GOM Oil and Gas SID, which are incorporated by reference into the PEIS, discuss downstream industries in further detail, including complications with tying potential lease sale activities to effects on the onshore infrastructure network. See Chapter 4.1 of the PEIS and Chapter 2.1.2.2 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, for analyses of air pollution from onshore infrastructure. Table 4.1-3 and **Table 4.1-7** of the PEIS shows a comparison of estimated emissions from sources in the GOA, including onshore sources. Also, Chapter 4.1 of the PEIS and Chapters 2.2 and 4.4.1 of the GOM Oil and Gas SID contain additional information about onshore waste facilities. Regarding the connections between offshore and onshore activities, refineries exist within not only an onshore and offshore market context but also an international one wherein suitable oil and gas products can be imported from across the globe should future market conditions favor such actions. BOEM maintains that potential impacts that may arise from downstream support activities cannot be influenced by BOEM's decision-making given that BOEM has no regulatory authority over any onshore activities, including their location. Many other Federal and State agencies regulate onshore oil- and gas-related infrastructure through air and wastewater discharge permitting and stream and wetland permitting. Through these permitting processes, the agencies are required to consider impacts for their proposed actions. Regarding disproportionate impact, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025).

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		inform decisions that may affect these communities."[444] BOEM should continue its past efforts to fully evaluate and address environmental impacts… In the executive summary on page xxiii of the Draft PEIS, BOEM explains that, "Most of the OCS oil- and gas-related activities as a result of an OCS oil and gas lease sale are distant from human habitation and would not have any direct impacts on low-income and minority populations." The agency explains that, "Many other Federal and State agencies regulate onshore oil and gas-related infrastructure through air and wastewater discharge permitting and stream and wetland permitting, which must also consider environmental justice impacts. Therefore, BOEM has determined that a proposed oil and gas lease sale would not directly adversely affect minority and low-income populations."[445] However, BOEM's figures in section 4.16.1 Affected Environment show high percentages of minority and low income populations in the vicinity of oil and gas infrastructure and clearly demonstrate the need to address environmental justice concerns. BOEM has arbitrarily determined that there would be no directly adverse affect to minority and low-income populations as a result of a proposed oil and gas lease sale. An OCS oil and gas lease sale directly prolongs the use of pipeline infrastructure, refineries, and other oil- and gas-related infrastructure used to process oil and gas developed from OCS leases, and this continued use results in poor air quality, toxics, and greenhouse gas emissions that have significant adverse effects on the health and well-being of local communities. The proposition that EJ communities will not be impacted by oil and gas activities because they are "located onshore and distant" from the OCS misses the point—these communities will still suffer from reasonably foreseeable effects of the proposed action. Moreover, BOEM's determination undercuts the spirit and intention of recent executive orders, which call for improved consideration of the environmental effects of agency decisions on EJ communities. BOEM must not view the lease sale in isolation from these onshore impacts in its determination of impacts for environmental justice communities.	
Earthjustice et al.-44	BOEM-2023-0046-5236	**A. BOEM fails to take a "hard look" at the impacts on environmental justice communities.** BOEM must fully analyze the impacts on Gulf communities and must account for the decadeslong treatment of the Gulf region as a sacrifice zone while "other areas in the United States receive a relatively large portion of the economic benefits."[446] Importantly, within the Gulf Coast, the effects of oil and gas industrialization are not evenly distributed, with communities in Louisiana and Texas having the highest concentration of refineries, petrochemical plants, and other oil and gas infrastructure.[447] BOEM must fully consider the extent to which communities in the Gulf Coast are already heavily burdened by the oil and gas industry… In Section 4.16.4, BOEM asserts that "... at the time of a lease sale the location of which upstream facilities might be utilized to support the development of the leased areas is unknown, and so an understanding of potentially impacted communities is unknown."[448] BOEM goes on to assert that, "The proportion of Federal OCS oil- and gas-related activities' contribution to downstream infrastructure use has not yet and, most likely, may never be possible to determine as it is dependent on highly unpredictable market demands and prices," and that, "… potential environmental justice impacts that may arise from downstream support activities associated with OCS oil- and gas-related activities are so attenuated from BOEM's decisionmaking and regulatory	Thank you for your comment. BOEM analyzes the impacts of an OCS oil and gas lease sale on Social Factors in Chapter 4.16 of the PEIS and on Land Use and Coastal Infrastructure in Chapter 4.14 of the PEIS. Ongoing and reasonably foreseeable impacts to these resources are also considered in Chapter 4.16 and 4.14 of the PEIS. Additional analysis of the impacts of OCS oil-and gas-related activities are discussed in Chapter 4.4.6 (Social Factors) and 4.4.1 (Land Use and Coastal Infrastructure) of the SID, which is incorporated by reference. BOEM's analysis considers a broad body of relevant literature that includes indirect and cumulative impacts, within the context of NEPA and the Proposed Action. Chapters 4.14, 4.17, and Appendix B of the PEIS, and Chapters 2.5, 4.4.1, and 4.4.6 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, discuss downstream industries in further detail, including complications with tying potential lease sale activities to effects on the onshore infrastructure network. See Chapter 4.1 of the PEIS and Chapter 2.1.2.2 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, for analyses of air pollution from onshore infrastructure. Table 4.1-3 and **Table 4.1-7** of the PEIS compares estimated emissions from sources in the GOA, including onshore sources. Also, Chapter 4.1 of the PEIS and Chapters 2.2 and 4.4.1 of the GOM Oil and Gas SID contain additional information about onshore waste facilities. See the comment response in Earthjustice et al.-43 for the connections between offshore and onshore activities, refineries, and downstream activities. In reference to the request for additional analysis, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025).

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		authority, it is difficult to discern the specific influence that BOEM's decisions have on these downstream support activities, including their location."[449] BOEM's conclusion based on these assertions is that "a proposed lease sale would not directly adversely affect minority and low-income populations."[450] This conclusion is deeply flawed. The agency agrees that there are onshore impacts from oil- and gas-related activities in environmental justice communities, yet BOEM still views these impacts in isolation from the proposed offshore oil and gas lease sale. Although the specific facilities used to process oil and gas produced from an OCS lease sale may be unknown at the time of the lease sale, it is known that oil and gas produced from an OCS lease have a high probability of being processed in whole or in part in onshore facilities in the Gulf Coast region…. In other words, the impacts of offshore oil and gas activities do not stop at the ocean's edge…. Although where the oil and gas produced from a federal OCS lease sale will be transported, refined, or consumed is difficult to know with certainty at the time of the sale, there is a certainty that additional OCS oil- and gas-development will contribute to the existing hydrocarbon energy system which has adverse impacts and adverse cumulative impacts, particularly for environmental justice communities.	
Earthjustice et al.-45	BOEM-2023-0046-5236	**B. BOEM Should Ensure That the Final PEIS Takes a Hard Look at the Following Categories of Harms to Gulf Coast Populations.** NEPA requires BOEM to consider all foreseeable direct and indirect impacts of a proposed action.[465] In accordance with NEPA, BOEM must "take a hard look" at the following issues, and thoroughly investigate a lease sale's potentially significant environmental impacts, including those to local communities.[466] **1. Oil and gas infrastructure and waste.** Offshore oil and gas production requires an extensive amount of onshore and offshore infrastructure to store, process, and transport oil…[467] Expansion of offshore oil and gas leasing will sustain and expand these facilities, as well as their environmental and public health impacts. Expanding offshore drilling, for example, will likely require construction of new pipelines, which create the risk of spills and ruptures, destroy sensitive ecosystems and exacerbate other environmental harms to the coast such as erosion and saltwater intrusion into wetland habitats.[469] This required onshore infrastructure will likely largely end up in states with significant offshore oil and gas production, namely Louisiana and Texas.[470] Louisiana alone has almost 50,000 miles of pipelines, with the highest concentration of pipelines in the 19 parishes on or near the Gulf of Mexico.[471] Offshore, there are also approximately 8,600 miles of active pipelines on the seafloor in the Gulf of Mexico, and approximately 18,000 miles of decommissioned pipelines have been left on the seafloor in the Gulf of Mexico since the 1960s.[472] As climate change increases the severity of hurricanes and tropical storms, this offshore infrastructure becomes increasingly vulnerable to damage and spills. …..Pipelines are also susceptible to corrosion and can become exposed or moved through natural processes. Corrosion is the largest cause of pipeline	Thank you for your comment. BOEM analyzes OCS oil and gas infrastructure and potential oil spills from pipelines as part of the PEIS. Information about OCS pipeline spills is discussed in Chapters 4.2, 4.16.2, and Appendix B.3.1 of the PEIS, and additionally in Chapters 2.9, 4.2, and 4.4.6 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS. Information about non-OCS pipeline spills and other impacts to water quality from routine activities like OCS waste disposed onshore, can be found in Chapters 4.2.2 (which additionally discusses aging infrastructure), 4.16.2, and Appendix B of the PEIS, and additionally in Chapters 2.9, 4.2, and 4.4 of the GOM Oil and Gas SID. The scenario for a single proposed OCS oil and gas lease sale, ongoing activities, and the cumulative scenario which includes the installation of new pipelines, is discussed in Chapter 3.16.2 and Table 3.3-2 of the PEIS. The scenario is considered in the impact analysis for each resource, including Coastal Communities and Habitats (Chapter 4.3 of the PEIS). Discharges and Wastes from OCS oil- and gas-related activities are discussed in Appendix B.2.2 of the PEIS. The impact of discharges and wastes on water quality as a result of OCS oil and gas activity, as well as the regulations which reduce their impacts, are discussed in Chapter 4.2.2.1 of the PEIS. Additional detail on discharges and wastes from OCS oil- and gas-related activities are discussed in Chapter 2.2 if the SID, which is incorporated by reference into the PEIS. The 2024 Crescent Midstream spill was also added to Chapter 4.16, Discharges and Wastes, section of the Programmatic EIS as an example of a discharge from a non-OCS pipeline that is connected to the overall OCS oil and gas network. In reference to the information on leachate in groundwater, this is out of scope for the PEIS. This PEIS analyzes the potential impacts of a proposed OCS oil and gas lease sale and provides programmatic coverage for ongoing activities and future OCS oil and gas lease sales, including decommissioning. In reference to offshore infrastructure becoming increasing vulnerable to damage and spills from hurricanes, BOEM acknowledges that oil spills can occur as a result of hurricanes. Please refer to Appendix B.3.1.1 where technological improvements and regulations in design and safety of new and existing GOA structures to better withstand hurricane conditions, including NTL No. 2007-G26 (Design of New OCS Platforms and Related Structures for Hurricane Conditions), are discussed. In addition, please refer to Chapter 5.2.4 of the SID, which discusses emergency plans, including shutdown operations and orderly evacuations for an impending hurricane. As indicated in Chapter 4.4.1.1 of the SID, FPSOs are not vulnerable to hurricane activity because they can disconnect from their subsea wells and return to shore in advance of a hurricane.

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		failure and can cause oil and gas to leak from active pipelines and from pipelines decommissioned-in-place if the pipeline is not properly cleaned.[474] Pipelines that have been exposed or moved due to natural processes can become hazards to commercial fishing and navigation and potentially impact other oil and gas infrastructure.[475] ….Existing infrastructure already poses significant risks to the Gulf of Mexico. If more pipelines are needed as a result of expanded offshore oil and gas production, the risk of damage and leaks or spills increases, disproportionately impacting communities on and near the Gulf of Mexico. The offshore oil and gas industry also creates a significant amount of waste that ends up onshore in local communities. Offshore drilling creates a variety of waste, including oil, chemical products, toxic contaminants, and radioactive materials.[477] More than 18 billion barrels of waste fluid are produced annually from oil and gas production in the United States.[478] Some waste from offshore oil and gas production is dumped directly into the ocean, but where ocean discharge is not allowed, the waste is either injected into geologic formations or disposed of onshore.[479] In the Gulf of Mexico, nearly all the waste that cannot be disposed of in the ocean is brought onshore for disposal.[480] When waste is improperly disposed of or water percolates through it, leachate and contaminated water can reach the water table, contaminating drinking water and harming nearby residents in some instances[481]….	BOEM also acknowledges that oil spills can result from pipeline failures. Oil spills are discussed in **Appendix B.3.1.1** of the PEIS. Oil spills as a result of pipeline corrosion, exposure, and movement are discussed in Chapter 2.9.1.3 of the SID. Most pipeline damage occurs in shallow water (<200 ft; 61 m) because of the potential for increased impacts of storms on the seabed in shallow water, the relative density of pipelines, or the age and design standards of the pipeline or the platforms to which the pipelines are connected. The impacts of pipeline movement to benthic communities and habitats following hurricanes are discussed in **Chapter 4.18** of the PEIS. Onshore waste disposal facilities are discussed in **Chapter 4.14.2** of the PEIS and State and Federal agencies have their own mitigation requirements that aim to reduce and avoid pollution from oil- and gas-related waste streams (refer to **Table 4.2-2** of the PEIS). Solid-waste facilities are regulated by the USEPA or a USEPA-authorized State program. The impacts of onshore waste facilities on neighboring communities are discussed in **Chapter 4.16.2** of the PEIS. **Chapters 2.2.1.11, 2.2.1.12, 2.2.1.13** and **4.4.1** of the GOM Oil and Gas SID contain additional information about onshore waste facilities.
Earthjustice et al.-46	BOEM-2023-0046-5236	**2. Human health impacts of oil spills.** Following the BP Deepwater Horizon oil spill, numerous studies were conducted on the adverse human health impacts of exposure to an oil spill and to the dispersants used to clean up the oil. One study of U.S. Coast Guard Deepwater Horizon oil spill responders found statistically significant positive associations between crude oil exposure and coughing, shortness of breath, wheezing, headaches, light-headedness/dizziness, diarrhea, stomach pain, nausea/vomiting, and painful/burning urination.[483] The study also found that responders had higher relative risks for dermal conditions, asthma, and chronic respiratory conditions.[484] Another study found that Deepwater Horizon response workers experienced prolonged or worsening health problems seven years after their exposure to the spill, including blood disorders and respiratory and cardiac problems.[485] A study of the health impacts of exposure to oil dispersants used in the Deepwater Horizon spill response cleanup found that exposure to the dispersants was associated with burning in the nose, throat, eyes and lungs as well as tightness in the chest, both at the time of exposure and years later.[486] Although these studies looked at the human health impacts of oil spills on responders, the same oil washes up on shores, pollutes local beaches, and ends up contaminating areas where local residents live and recreate. Exposure to oil spills has been additionally linked to considerable adverse mental health effects.[487] High rates of depression and severe mental distress were found among women living in the southern coastal Louisiana parishes affected by the Deepwater Horizon oil spill, as well as increased domestic conflict.[488] People with significant community attachment to an area impacted by the spill or who were more economically impacted were also more negatively affected and experienced higher levels of stress.[489] Studies have also found that children exposed to the Deepwater Horizon oil spill were twice as likely to have mental and physical health issues as children who were not	Thank you for your comment. Additional studies from the comment have been reviewed and added by reference to Chapters 4.16.2.2 and 4.16.3, which discuss health impacts from the *Deepwater Horizon* spill.

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		exposed, and children from African American and low-income households had a higher prevalence of health effects from exposure.[490]	
Earthjustice et al.-47	BOEM-2023-0046-5236	**3. Oil refineries and petrochemicals.** Offshore oil and gas production is harmful to the communities that live near refineries, processing plants, and other oil and gas infrastructure. The production of oil and gas helps drive the production of industrial chemicals and plastics…. As plastics production increases, plastic pollution continues to harm the environment and communities where pollution accumulates. While a significant quantity of plastic pollution is from produced consumer products, the petrochemical industry also produces plastic pollution in the form of nurdles—tiny beads of pure plastic that form the building block of almost all plastic products. Given their small size and weight, and their use in the production of nearly all plastic products, nurdles are easily spilled in everyday activities of the petrochemical industry.[493]…. Microplastics like nurdles cause pernicious health and environmental harms. Microplastics can absorb and subsequently leach toxic chemicals and contaminants into the surrounding environment.[495]….	Thank you for your comment. More information about microplastics from OCS oil- and gas-related activities and non-OCS oil- and gas-related activities can be found in Chapter 4.2 of the PEIS. A reference to this discussion was also added to Chapter 4.16 of the PEIS. The potential impacts of discharges and wastes and unintended releases into the environment (trash and debris), both of which can include plastics, are discussed under each resource in Chapter 4 and **Appendix M** of the PEIS, with additional supporting analyses in Chapter 4 of the SID, which is incorporated by reference into the PEIS. An analysis of the impacts of plastics, which are produced from hydrocarbons, is out of scope for this PEIS. This PEIS analyzes the potential impacts of a proposed OCS oil and gas lease sale as well as providing programmatic coverage for ongoing activities and future OCS oil and gas lease sales, including decommissioning. In reference to the impacts of communities living near refineries, please see the analysis of the impacts of an OCS oil and gas lease sale on Social Factors in **Chapter 4.16** of the PEIS and on Land Use and Coastal Infrastructure in **Chapter 4.14** of the PEIS. Ongoing and reasonably foreseeable impacts to these resources are considered in **Chapter 4.16** and **4.14** of the PEIS. Additional analysis of the impacts of OCS oil-and gas-related activities are discussed in Chapter 4.4.6 (Social Factors) and 4.4.1 (Land Use and Coastal Infrastructure) of the SID, which is incorporated by reference. See the comment response to Earthjustice et al.-[44] for information on onshore downstream industries, onshore infrastructure, associated emissions, and onshore waste facilities. See the comment response in Earthjustice et al.-[43] for the connections between offshore and onshore activities, refineries, and downstream activities.
Earthjustice et al.-48	BOEM-2023-0046-5236	**4. Disproportionate impacts on Gulf of Mexico Communities.** Communities along the Gulf of Mexico are burdened with some of the worst impacts of the offshore oil and gas industry. Over 48% of total U.S. petroleum refining capacity and 51% of total U.S. natural gas processing plant capacity are located along the Gulf coast.[504] In particular, the petrochemical industry has disproportionately impacted Black, Indigenous, and communities of color.[505] These communities face disproportionate burdens from multiple pollution sources, including toxic air pollution, plastic pollution, and groundwater contamination. In a nationwide study mapping the spread of cancer-causing chemicals from sources of hazardous air pollutants, census tracts where a majority of residents were people of color experienced on average about 40% more cancer-causing industrial air pollution than primarily white census tracts.[506] In census tracts where the majority of residents were Black, the estimated cancer risk from toxic air pollution was found to be more than twice the risk of majority-white tracts.[507] Two areas in the Gulf of Mexico have unduly felt the harms of the oil and gas industry: "Cancer Alley," Louisiana and southeastern Texas. These two regions are highlighted to illustrate the severe impact of the offshore oil and gas industry on communities across the Gulf coast. **a) "Cancer Alley," Louisiana** "Cancer Alley," the 85-mile stretch along the Mississippi River between Baton Rouge and New Orleans, gets its name from the high concentration of petrochemical facilities and high cancer risk from toxic pollution.[508] In 2012, the average cumulative cancer risk in Cancer Alley was more than 50% higher	Thank you for your comment. BOEM analyzes the impacts of an OCS oil and gas lease sale on Social Factors in Chapter 4.16 of the PEIS and on Land Use and Coastal Infrastructure in Chapter 4.14 of the PEIS. Ongoing and reasonably foreseeable impacts to these resources are considered in Chapter 4.16 and 4.14 of the PEIS. Additional analysis of the impacts of OCS oil-and gas-related activities are discussed in Chapter 4.4.6 (Social Factors) and 4.4.1 (Land Use and Coastal Infrastructure) of the SID, which is incorporated by reference. See the comment response to Earthjustice et al.-44 for information on onshore downstream industries, onshore infrastructure, associated emissions, and onshore waste facilities. See the comment response in Earthjustice et al.-43 for the connections between offshore and onshore activities, refineries, and downstream activities. With respect to disproportionate impacts to certain communities, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025). An analysis of the impacts of the Formosa Plastics Plant is out of scope for this PEIS. This PEIS analyzes the potential impacts of a proposed OCS oil and gas lease sale as well as providing programmatic coverage for ongoing activities and future OCS oil and gas lease sales, including decommissioning. BOEM is not a consulting party nor a cooperating agency in the review and/or possible approval of the Formosa Plant and this project is outside of BOEM's regulatory mandate. The Louisiana Department of Culture, Recreation and Tourism's Division of Archaeology is the State's representative and authority concerning unmarked human remains. BOEM recommends contacting them with concerns relating to the Louisiana Unmarked Human Burial Sites Preservation Act.

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		than the average cumulative risk in the United States.[509] The burden of this toxic air pollution is felt by Black and low-income communities. President Biden has acknowledged the environmental injustices Black, Indigenous, and people of color face, and has explicitly named Cancer Alley as an area that has been disproportionately harmed.[510] Within ten miles of St. Gabriel, Louisiana, a majority-Black community, there are at least thirty large petrochemical facilities; thirteen of those are within three miles.[511]…. In St. John the Baptist Parish, the town of Reserve, a small, predominantly Black and low income community, has a cancer risk rate fifty times the national average.[517]…. Air monitoring around the parish has shown quantities of chloroprene, a likely carcinogenic chemical, dozens of times above EPA's guidance.[520]…. One study of cancer risk in residents living near the Denka plant found that cancer prevalence and non-cancer health conditions associated with chloroprene exposure were unusually high and correlated to proximity to the plant.[524]…. In St. James Parish, as of 2019, at least four new or expanded petrochemical plants had been planned.[532]…. In addition to its harmful health impacts, the Formosa plant would cause significant cultural harm to the parish. The graves of people enslaved on former plantations were found on the land that Formosa plans to develop.[537] An independent archaeologist found that there were possibly as many as five other cemeteries on the land.[538] In the efforts to block the Formosa plant from being constructed, Lavigne stated: "Our ancestors are crying out to us from their graves—they are telling us to not let industry disturb their burial sites."[539] **b) Southeastern Texas** Like Cancer Alley, southeastern Texas is heavily burdened with the toxic pollution and adverse health impacts of oil refineries and the petrochemical industry. The impacts of the industry are acutely felt in the greater Port Arthur and Houston areas, the areas with the second and third largest hot spots of cancer-causing air pollution in the country, respectively, after Cancer Alley.[543] Gulf Coast refinery and petrochemical facilities have frequently exceeded EPA limits on benzene pollution—as of December 2024, seven facilities were out of compliance….[544]	

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Earthjustice et al.-49	BOEM-2023-0046-5236	**5. BOEM fails to propose mitigation measures for environmental justice communities.** If BOEM chooses to hold a GOM OCS oil and gas lease sale, it must consider all direct, indirect, and cumulative impacts resulting from oil and gas activities in the Gulf of Mexico and should implement the highest degree of mitigation. BOEM should ensure that any oil and gas leases issued are subject to robust mitigation measures and stipulations that protect Gulf communities, marine life and ecosystems, and the climate.…[568] While BOEM acknowledges that an OCS lease sale will have some adverse impact on environmental justice communities, the agency does not propose any mitigation measures to minimize or avoid adverse impacts to environmental justice communities. Available evidence demonstrates that BOEM should, at a minimum, (1) improve methane emissions data and reporting from oil and gas sites through the incorporation of top-down measurements; (2) collaborate with impacted environmental justice communities and co-develop mitigation measures with these communities; (3) incentivize lessees to enter into community benefit agreements with environmental justice communities; (4) evaluate the agency's commonly applied post-lease mitigation measures and incorporate them as mandatory lease stipulations where appropriate; (5) require additional safeguards to prevent blowouts and catastrophic oil discharges; and (6) require lessees to decommission idle wells prior to bidding on new leases.	Thank you for your comment. To protect sensitive resources or limit activities in certain areas, BOEM may apply a series of lease stipulations, post-lease application review and mitigations, Notice to Lessees, and Information to Lessees. BOEM has developed a suite of commonly applied mitigating measures described in Chapter 6 of the SID, which is incorporated by reference into this PEIS and Pre-Lease Stipulations described in **Appendix J** of the PEIS, and Chapter 7 of the SID, which is incorporated by reference. In response to improving methane emissions data, as discussed in **Chapter 4.1.2.1** of the PEIS, there are currently no offshore air quality monitors that can be used to monitor facilities; however, BOEM, BSEE, NASA, and NOAA are actively collaborating on how to incorporate remote sensing technologies to improve monitoring of emissions, including methane, and regulatory compliance in the future. More detail on this study can be found at: https://agu.confex.com/agu/agu24/meetingapp.cgi/Paper/1674215. In response to the requests concerning environmental justice, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025). Before E.O. 14154 was signed, BOEM held virtual public meetings on the Draft PEIS. As part of that effort, BOEM posted the meeting materials and posters on the BOEM website in English, Spanish, and Vietnamese. The website and associated material can be found at this link: https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic. BOEM also had live interpreters for American Sign Language, Spanish, and Vietnamese translating during all three virtual public meetings. BOEM received verbal thanks for the translated material and live interpretation during one of the public meetings form the local Vietnamese community. In response to making post-lease mitigations mandatory, application of the commonly applied mitigating measures is more appropriate for use at the post-lease stage because plans are reviewed on a site-specific and project specific basis and only applicable mitigating measures are applied based on the plan and the site. The lease stipulations (refer to **Appendix J** of the PEIS, and Chapter 7 of the SID for detailed descriptions) are more general and can be applied to all leases, unlike the mitigating measures. That is why the mitigating measures are applied at the post-lease review stage of the staged NEPA review process. In response to safeguards to prevent blowouts and oil spills, BOEM does extensively cover requirements for pollution prevention, oil-spill regulation, and financial responsibility in Chapter 5.13 of the SID, which is incorporated into the PEIS by reference. This chapter also includes information on the Oil and Gas Production Safety Systems Rule and the Well Control and Blowout Preventer Rule. In response to the comment concerning the requirement for lessees to decommission idle wells prior to bidding on new leases, the limitation to the government's exposure to liability and prohibition of lease issuances would fall under BOEM policy. As part of BOEM's policy to mitigate the risk of unaddressed decommissioning and the negative impacts to the environment it may cause, BOEM requires companies operating in the OCS to submit proper financial assurance in securing decommissioning performance. BOEM enforces its right to secure financial assurance pursuant to regulations found in 30 CFR 556.900 et seq (see **Appendix C.3.2**). Most notably, BOEM can require that lessees provide additional financial assurance when certain regulatory factors are met. Given these regulatory and financial safeguards, the risk of non-decommissioned oil and gas infrastructure causing environmental impacts is minimized.

Earthjustice et al.-50	BOEM-2023-0046-5236	**a) BOEM Should Meaningfully Collaborate with Environmental Justice Communities and Co-Develop Mitigation Measures That Will Protect These Communities from the Impacts of Oil and Gas Development.** Communities along the Gulf Coast have had fossil fuel infrastructure that transports, stores, and processes OCS oil and gas imposed upon them. These facilities include ports, pipelines, processing facilities, and refineries, among others. Within the Gulf of Mexico, effects of this oil and gas industrialization are not evenly distributed, with environmental justice communities in Louisiana and Texas bearing the brunt of the harm.[570] The Council on Environmental Quality's (CEQ) guidance for considering environmental justice under the National Environmental Policy Act (NEPA) instructs agencies to "elicit the views of the affected populations on measures to mitigate a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian tribe and … carefully consider community views in developing and implementing mitigation strategies."[571] Mitigation measures "should reflect the needs and preferences of affected lowincome populations, minority populations, or Indian tribes to the extent practicable."[572] BOEM has previously committed to "advancing meaningful engagement with communities that may potentially be impacted by oil and gas activities" for lease sales from 2024 to 2029, and it has stated that it will consider "community-initiated discussions of potential impacts and community-informed mitigation measures."[573] Before BOEM proceeds further into the leasing process, BOEM must engage meaningfully with vulnerable Gulf communities that suffer the devastating and disproportionate impacts of offshore oil and gas production, including impacts from midstream and downstream oil and gas infrastructure associated with offshore development. Such engagement should include (1) holding in-person meetings with at least 10 to 20 impacted communities in the Gulf of Mexico; (2) collaborating with trusted community-based organizations to help the agency understand community concerns and needs; (3) conducting targeted outreach and disseminating information in a manner that will reach the intended communities; (4) providing translation and interpretation services for materials and meetings in the top languages spoken in the communities; (5) ensuring that materials are in plain language and accessible; and (6) providing incentives for participation in BOEM meetings. BOEM should identify and fully understand all potential impacts to communities as well as community concerns. In particular, BOEM should evaluate how additional OCS leasing will impact Gulf communities through further midstream and downstream oil and gas infrastructure. BOEM should take the results of this assessment into consideration when making leasing decisions for 2025. Moreover, BOEM should disclose this information to the public prior to 2025, to increase accountability and transparency into the leasing process. In collaboration with environmental justice communities, BOEM should also co-develop and adopt mitigation measures that will adequately protect communities from the health, environmental, and social consequences of additional oil and gas leasing and development in the Gulf of Mexico. Co-development of measures is necessary to help ensure that the agency is truly addressing community concerns and adhering to community priorities.	Thank you for your comment. BOEM has engaged in meaningful collaboration with the public during the development of the PEIS. BOEM has participated in meaningful collaboration through consultation with other Federal agencies, State agencies, and Tribal governments for the development of this PEIS. See Appendix G.2 through G.7 for details on this collaboration and consultation. In addition, BOEM collaborated with these same groups, as well as the public, through the development of the PEIS. See Appendix G.8.1.1 for information on the Call for Information and Area ID Memorandum, including a summary of comments received on the Call. These comments were considered in the Area ID. BOEM then conducted internal and external scoping for the PEIS. Information on scoping, as well as a summary of comments received, is addressed in Appendix G.8.2 of the PEIS. These comments were used in the development of the Draft PEIS. Appendix G.8.2.3 of the PEIS details the Cooperating Agencies on the PEIS and their points of interest. Following the publication of the Draft PEIS and during the public comment period, BOEM solicited and accepted public comment on the PEIS; held three virtual public meetings where we provided detail on the PEIS, answered questions on the PEIS, and took public testimony; and provided posters summarizing the PEIS and posted recordings of the public meetings on the website (https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic). Comments received on the Draft PEIS were addressed in the Final PEIS. In reference to working with environmental justice communities to develop mitigations for OCS oil and gas leasing, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025). Before E.O. 14154 was signed, BOEM held virtual public meetings on the Draft PEIS. As part of that effort, BOEM posted the meeting materials and posters on the BOEM website in English, Spanish, and Vietnamese. The website and associated material can be found at: https://www.boem.gov/environment/environmental-assessment/gulf-america-regional-ocs-oil-and-gas-programmatic. BOEM also had live interpreters for American Sign Language, Spanish, and Vietnamese translating during all three virtual public meetings. BOEM received verbal thanks for the translated material and live interpretation during one of the public meetings form the local Vietnamese community. Regarding how additional OCS leasing will impact Gulf of America communities through further midstream and downstream oil and gas infrastructure, Chapter 4.14.2.3 of the PEIS notes that "[a] regionwide OCS oil and gas lease sale represents only about 0.3 to 1.8 percent of the overall Cumulative OCS Oil and Gas Program production in the GOA (Table 3.3-1 of the PEIS) and no new onshore facilities or expansions of existing facilities are projected, so most of these impacts would be secondary and small and include activities like dredging and maintenance at existing facilities." Further, Chapter 3.2.4 of the PEIS adds that "BOEM projects that 0-1 new pipeline landfalls could result from a proposed GOA oil and gas lease sale; however, a new landfall has not been permitted since 2014." Given the expansive existing network of onshore oil and gas infrastructure in the Gulf region, a single OCS oil and gas lease sale is not expected to cause a notable increase in midstream and downstream infrastructure. For example, there has only been one new pipeline landfall to shore from OCS oil and gas activity since 2014.

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Earthjustice et al.-51	BOEM-2023-0046-5236	**b) BOEM Should Incentivize Lessees to Enter into Community Benefit Agreements with Environmental Justice Communities.** Community benefit agreements ("CBAs") are agreements signed by community benefit groups and developers, identifying a range of community benefits the developer agrees to provide as part of the development, in return for the community's support of the project.[574] The goal of CBAs is to ensure that measurable, local benefits will be given to a community.[575] These agreements are enforceable, legally-binding contracts for all parties that stipulate community benefits and are the direct result of substantial community input.[576] For wind leasing in California, BOEM has provided credits off the lease purchase price to bidders if they entered into qualifying CBAs.[577] Lessees receiving the Lease Area Use CBA 5% credit were required to enter in a CBA with a community, stakeholder group, or Tribal entity whose use of the geographic space of the lease area, or whose use of resources harvested from that geographic space, is expected to be impacted by the lessee's potential offshore wind development.[578] BOEM also provided a General CBA 5% credit "in exchange for an existing CBA or a commitment to enter into a new CBA with one or more communities, Tribes, or stakeholder groups that are expected to be affected by the potential impacts on the marine, coastal, and/or human environment (such as impacts on visual or cultural resources) from activities resulting from lease development that are not otherwise addressed by the Lease Area Use CBA."[579] In the recent Gulf of Mexico wind lease sale, BOEM included in lease provisions that lessees are strongly encouraged to enter into "formal agreements to monitor community impacts and implement community benefits."[580] BOEM does not make similar efforts for oil and gas leases, but could use this type of incentive system in the next oil and gas lease sale. The health and safety of Gulf communities would be most protected if BOEM chose to proceed with Alternative A (no action) and chose not to issue new additional oil and gas leases. However, if BOEM plans on issuing any such leases, the agency should ensure that vulnerable coastal communities do not face further harms from additional oil and gas leasing and that they receive health and economic benefits despite the leasing. As such, BOEM should incentivize lessees to enter into CBAs with those that use the geographic space of the lease area and those that would be otherwise affected by the impacts of development.[581] A CBA in this context cannot be equitable or beneficial—and may be harmful—if it does not include Gulf communities that bear the burdens of offshore drilling, including the midstream and downstream impacts of such drilling, regardless of whether they utilize the geographic area of the lease or not. Potential CBAs could, for example, stipulate that lessees will provide annual funding for coastal habitat restoration projects, emissions reduction programs, health services, school districts, scholarships, and more. These requirements would be consistent with the terms of other CBAs between fossil fuel infrastructure companies and communities.[582]	Thank you for your comments. In reference to creating community benefit agreements for OCS oil and gas leasing, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025). In reference to your preferred alternative, BOEM notes that your preferred alternative is Alternative A. Comments that express general opinions about oil and gas development or recommend specific decisions to be made by the Secretary will be incorporated into the administrative record and available to the decisionmaker during the deliberative process for each proposed OCS oil and gas lease sale for which this NEPA analysis applies. In reference to the comment concerning providing funds to programs and communities, BOEM recognizes the impact of offshore oil and natural gas development has on the economy and discusses the economic factors of a lease sale in **Chapters 4.15** and **4.17** of the PEIS. In addition, BOEM discusses the Gulf of Mexico Energy Security Act of 2006 and revenue sharing with states in the *Gulf of America OCS Regulatory Framework* (BOEM 2025). Revenue generated from oil and gas production offshore in the GOA is distributed among Alabama, Louisiana, Mississippi, and Texas. In 2024, Alabama received $49,830,178, Louisiana received $156,329,443, Mississippi received $51,915,113, and Texas received $95,550,266. Revenue was also directed to the Land and Water Conservation Fund for the preservation, development, and access to outdoor lands for public recreation. More information on revenue sharing with states can be found at: https://revenuedata.doi.gov/how-revenue-works/gomesa/.

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Earthjustice et al.-52	BOEM-2023-0046-5236	Finally, BOEM should consider alternatives that would avoid or minimize environmental justice impacts. The CEQ regulations provide that agencies should use the NEPA process to identify and assess alternatives that could reduce "environmental effects that disproportionately affect communities with environmental justice concerns."[71] In the Draft PEIS, BOEM acknowledges that "[i]ndirect impacts to minority and low-income populations would occur onshore and would result from the operations of the extensive infrastructure system that supports all onshore and offshore OCS oil- and gas-related activities."[72] Moreover, the significant pollution and health impacts from this onshore infrastructure on nearby communities have been well documented.[24] Yet nowhere does BOEM consider an alternative that could alleviate such effects by lowering or limiting the amount of oil and gas produced, transported, refined, and processed at these facilities.	Thank you for your comment. With respect to considering an alternative that addresses environmental justice concerns, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025). See the previous comment response in Earthjustice et al.-10 regarding DOI's implementation of NEPA Regulations as part of the analysis in this PEIS and E.O. regarding DOI's regulations and implementation of NEPA. With respect to considering an alternative that would limit the amount of oil and gas produced, transported, refined, and processed at onshore facilities, BOEM's alternatives were created to address the purpose and need of the PEIS. An alternative limiting oil and gas production would not meet the stated purpose and need of the PEIS, which is to manage the development of the OCS energy resources in an environmentally and economically responsible manner in accordance with the expeditious and orderly development of the OCS, subject to environmental safeguards, mandated by OCSLA, as amended (43 U.S.C. 1331 et seq.). BOEM maintains that potential impacts that may arise from downstream support activities cannot be influenced by BOEM's decision-making given that BOEM has no regulatory authority over any onshore activities, including their location. Many other Federal and State agencies regulate onshore oil- and gas-related infrastructure, however, through air and wastewater discharge permitting and stream and wetland permitting. Through these permitting processes, the agencies are required to consider impacts for their proposed actions, including air emissions.
Zanagee Artis-4	1/16/25 Public Meetings	Environmental justice communities in the Gulf South are already heavily overburdened by oil and gas pipelines, refineries, and petrochemical facilities. The negative direct and indirect impacts of a new lease sale in the Gulf are significant and BOEM does not adequately assess and address these impacts.	Thank you for your comment. BOEM's analyses takes into consideration a broader body of relevant literature which includes indirect, ongoing, and reasonably foreseeable impacts, within the context of NEPA and the Proposed Action. Chapters 4.14, 4.17, and Appendix B of the PEIS and Chapters 2.5, 4.4.1, and 4.4.6 of the GOM Oil and Gas SID, which are incorporated by reference into the PEIS, discuss downstream industries in further detail, including complications with tying potential lease sale activities to effects on the onshore infrastructure network. See Chapter 4.1 of the PEIS and Chapter 2.1.2.2 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, for analyses of air pollution from onshore infrastructure. **Table 4.1-3** and **Table 4.1-7** of the PEIS shows a comparison of estimated emissions from sources in the GOA, including onshore sources. Also, Chapter 4.1 of the PEIS and Chapters 2.2 and 4.4.1 of the GOM Oil and Gas SID contain additional information about onshore waste facilities. Chapter 4.14.2.3 of the PEIS notes that "[a] regionwide OCS oil and gas lease sale represents only about 0.3 to 1.8 percent of the overall Cumulative OCS Oil and Gas Program production in the GOA (Table 3.3-1 of the PEIS) and no new onshore facilities or expansions of existing facilities are projected, so most of these impacts would be secondary and small and include activities like dredging and maintenance at existing facilities." Further, Chapter 3.2.4 of the PEIS adds that "BOEM projects that 0-1 new pipeline landfalls could result from a proposed GOA oil and gas lease sale; however, a new landfall has not been permitted since 2014." Thus, a single OCS oil and gas lease sale is not expected to have a notable impact to further midstream and downstream infrastructure. Please see the comment response in Earthjustice et al.-43 for the connections between offshore and onshore activities, refineries, and downstream activities. Regarding addressing disproportionate impact of OCS oil- and gas-related activities in the PEIS, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025).

Commenter	ID Number	Comment	Response
Zanagee Artis-5	1/16/25 Public Meetings	New lease sales in the Gulf of Mexico will lock in oil and gas development on the OCS for decades to come and contribute to sustaining existing onshore oil and gas related infrastructure that are contributing to lethal health impacts to environmental justice communities.	Thank you for your comment. BOEM's analyses of Land Use and Coastal Infrastructure and Social Factors can be found in Chapters 4.14 and 4.17 of the PEIS and Chapters 4.4.1, and 4.4.6 of the GOM Oil and Gas SID, which are incorporated by reference into the PEIS. A discussion of health impacts on coastal populations can be found in Chapter 4.4.6 of the GOM Oil and Gas SID, which is incorporated by reference into this PEIS. Regarding any additional analysis of health impacts to environmental justice communities, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025).
Zanagee Artis-6	1/16/25 Public Meetings	These same environmental justice communities, low income communities, and marginalized communities in the Gulf are living on the frontlines of the climate crisis. Our global climate system has entered the La Nina climate pattern which is associated with increased hurricane activity in the Atlantic Ocean.	Thank you for your comments. BOEM acknowledges the reasonably foreseeable impacts of increased hurricane activity to the OCS as well as impacts onshore and elsewhere throughout this PEIS. The impacts from increased storm and hurricane activity on coastal populations in the Gulf of America are discussed in Chapter 4.16 of the PEIS, and further expanded in Chapter 4.4.6 of the GOM Oil and Gas SID. In addition, storms and hurricanes are discussed in Chapter 3.4.2 of the SID, which is incorporated by reference. Although the impact of storms and hurricanes is evident, connecting such impacts to climate change as a result of an OCS oil and gas lease sale is out of scope for this Supplemental EIS. See the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025).

TOPIC 5 – CUMULATIVE ANALYSIS

Commenter	ID Number	Comment	Response
Ruth Morlas-4	BOEM-2023-0046-2927	For each of the other alternatives (B, C, and D), the impact on ecosystem health (air/water quality, GHG emissions, biodiversity) ranges negligible to major adverse. However, this analysis doesn't take into consideration that cumulatively, all the "negligible adverse" impacts will add up to more than negligible - and that's only if the impact of projects is negligible (which sometimes turn out to be majorly catastrophic). We know from experience that impacts of oil/gas exploration/extraction are never negligible as they are closer to the moderate adverse estimate of impact. If oil/gas exploration/extraction as a whole, globally, had negligible impacts, we wouldn't be seeing the effects on climate that we are now seeing. Why has Los Angeles County been BURNING for almost a MONTH now? This is what happens when every project that is expected to have "negligible impacts" on the environment is approved. Why are there only approximately 57 Rice whales left in the Gulf of Mexico - on the brink of total extinction FOREVER? This is what happens when oil/gas exploration is allowed to continue in their critical habitat.	Thank you for your comment. BOEM has clarified and added detail to the presentation of ongoing activities, incremental impacts of a single OCS oil and gas lease sale, and the reasonably foreseeable cumulative impacts analysis in each resource section in **Chapter 4** and **Appendix M** and summarized in **Chapter 4.17** of the PEIS. With this clarification, impacts are discussed for the past and present conditions (baseline) and reasonably foreseeable conditions, and impact determinations are clearly shown for the ongoing activities that could occur from past lease sales as well as the incremental impacts of a proposed OCS oil and gas lease sale in relation to cumulative impacts (past, present, and reasonably foreseeable future lease sales). The additive incremental impacts resulting in higher cumulative impacts is addressed in **Chapter 4.17** of the PEIS. Here, additive impacts to resources in the GOA from IPFs such as air pollution, oil spills, noise, entanglement, vessel strikes, and economics are discussed. Also, the PEIS has been revised to more clearly show the additive impacts of OCS oil and gas leasing, which is discussed in each resource section of **Chapter 4** and **Appendix M** under the ongoing activities sections, where potential activities from past OCS oil and gas lease sales are discussed along with their impact determination. In addition, the cumulative analysis for each resource in **Chapter 4** and **Appendix M** has been revised to more clearly show the potential additive impacts of future OCS oil and gas leasing. **Chapter 4.1** of the PEIS discusses the potential impacts of a single proposed OCS oil and gas lease sale, the ongoing effects, and cumulative effects on air quality, which more clearly shows the additive effects individual IPFs and individual lease sales. With respect to wildfires in California, the severity of those wildfires is evident. Please refer to comment response Sean Tran-2 for more detail on wildfire emissions, air pollution, and climate-related effects to air quality. Impacts from OCS oil- and gas-related activities to marine mammals, including the Rice's whale are considered in **Chapters 4.8** and **4.17**. These chapters discuss the potential impacts of a single proposed OCS oil and gas lease sale, the ongoing effects, and cumulative effects on marine mammals, including the Rice's whale, and revisions more clearly show the additive effects individual IPFs and individual lease sales. With respect to Rice's whale and its habitat, BOEM's action alternatives were designed to analyze the potential effects of excluding certain sensitive areas from leasing to determine their necessity. The exclusion of the Rice's whale proposed core distribution area and proposed critical habitat area under Alternatives C and D were included in the alternatives to analyze and determine if there is a need for the exclusion areas.

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Earthjustice et al.-53	BOEM-2023-0046-5236	NEPA regulations require agencies to consider the cumulative impacts of the proposed federal agency action in conjunction with past, present, and reasonably foreseeable future actions, including all federal and non-federal activities.[362] Critically, cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. A particular action "may seem unimportant in isolation" but "have dire consequences when combined with other actions."[363] Here, BOEM turned NEPA's cumulative effects obligation on its head by focusing only on the incremental portion of a single Gulf of Mexico lease sale as compared to the existing baseline and potential future harms. This tactic avoids directly confronting the accumulated burden of industrial activity on the Gulf's residents and its natural environment. For example, in the Cumulative Impacts section of the Draft PEIS, BOEM affirms that cumulative impacts to marine mammals from routine activities and accidental events could result from "ongoing activities from previous OCS oil and gas lease sale activities" as well as from non-oil and gas activities.[364] The oil and gas related impacts include "noise, offshore habitat modification/space use, bottom disturbance unintended releases into the environment, response activities, and strikes and collisions."[365] Regardless, BOEM concludes that "the incremental contribution of a proposed OCS oil and gas lease sale to cumulative impacts on marine mammals would be negligible."[366] Similarly, BOEM determined that the effects on sea turtles from a lease sale would be negligible because "regardless of alternative, [any alternative] would represent only a small portion of activity when compared to the existing OCS Oil and Gas Program in the GOM."[367] BOEM arrives at the same conclusion, that the adverse effects of the proposed action would be either negligible or minor, under almost every single other affected resource: water quality;[368] coastal communities;[369] benthic communities;[370] pelagic communities;[371] fishes and invertebrates;[372] birds;[373] commercial fisheries;[374] recreational fishing;[375] other recreational resources;[376] cultural historical, and archeological resources;[377] land use and coastal infrastructure;[378] and social factors.[379] Accordingly, the PEIS does not assess cumulative impacts as required under NEPA. Instead, it limits its attention to the subset of effects associated only with a lease sale, as measured against the full universe of adverse impacts. The key inquiry, however, should be to assess the total accumulated harm, past, present, and future, from all of the various ecological insults catalogued by BOEM. As the D.C. Circuit has recognized, "a realistic evaluation of the total impacts … cannot isolate a proposed project[.]"[380] A NEPA analysis must aggregate effects, considering the "accumulated, or total, incremental impacts."[381] BOEM's approach in the PEIS is precisely what NEPA seeks to avoid; a series of actions that escape attention because of the belief that each is a relatively small contribution to a larger problem. But "[s]ometimes the total impact from a set of actions may be greater than the sum of the parts."[382] BOEM's "negligible" findings speak only to its assessment that the threat from another lease sale is comparatively smaller than the larger forces at work in the Gulf. It failed, however, in the straightforward task of taking a holistic look at the entirety of the potential harm.[383] Moreover, in considering cumulative impacts, BOEM must provide "some quantified or detailed information; … [g]eneral statements about possible effects and some risk do not constitute a hard look absent a justification	Thank you for your comment. BOEM's PEIS was prepared according to the NEPA statute (42 U.S.C. 4321 et seq.) and the DOI implementation of NEPA regulations (43 CFR 46) under our legal obligations under NEPA to inform decisions pursuant to OCSLA. The NEPA statute requires an analysis of reasonably foreseeable effects and the DOI implementing regulations include the analysis of cumulative effects. Therefore, both reasonably foreseeable and cumulative impacts are analyzed in this PEIS. Cumulative impacts include both ongoing activities (including past and present lease sales) and future lease sales. BOEM has clarified and added detail to the presentation of ongoing activities, incremental impacts of a single proposed OCS oil and gas lease sale, and the reasonably foreseeable cumulative impacts analysis in each resource section in **Chapter 4** and **Appendix M** and summarized in **Chapter 4.17** of the PEIS. With this clarification, impacts are discussed for the past and present conditions (baseline) and reasonably foreseeable conditions, and impact determinations are clearly shown for the ongoing activities that could occur from past lease sales as well as the incremental impacts of a proposed OCS oil and gas lease sale in relation to cumulative impacts (past, present, and reasonably foreseeable future lease sales). This presentation helps to clarify the additive effects of individual IPFs and individual lease sales. The additive incremental impacts resulting in higher cumulative impacts is addressed in **Chapter 4.17** of the PEIS. Here, additive impacts to resources on the GOA from as air pollution, oil spills, noise, entanglement, vessel strikes, and economics are discussed. Also, the PEIS has been revised to more clearly show the additive impacts of OCS oil and gas leasing, which is discussed in each resource section of **Chapter 4** and **Appendix M** under the ongoing activities sections, where potential activities from past OCS oil and gas lease sales are discussed along with their impact determination. In addition, the cumulative analysis for each resource in **Chapter 4** and **Appendix M** has been revised to more clearly show the potential additive impacts of future OCS oil and gas leasing. **Chapter 4** and **Appendix M** of this PEIS includes analysis of both the incremental impact of a single proposed lease sale and the reasonably foreseeable impacts of the OCS Oil and Gas Program, as well as the impacts of non-OCS oil- and gas-related activities in the Gulf of America. Reasonably foreseeable impacts of the OCS Oil and Gas Program address ongoing activities (including past and present OCS oil and gas lease sales) and cumulative impacts (including future OCS oil and gas lease sales).The analysis includes reasonably foreseeable aggregated activities and associated impact-producing factors, but it does not attempt to address all individual aspects of the many human activities occurring in the marine environment, which would be speculative and would not benefit the overall analysis. Analyses of past, present, and reasonably foreseeable effects are included in order to put the incremental contribution of a Proposed Action in context considering all of the other types of activities that have the potential to cause impacts similar to those analyzed for a Proposed Action, including reasonably foreseeable impacts from the overall OCS Oil and Gas Program. For the clarified analyses for the resources listed in this comment, please refer to the following chapters: marine mammals (**Chapter 4.8**), sea turtles (**Chapter 4.9**), water quality (**Chapter 4.2**), coastal communities, benthic communities, pelagic communities and habitats (**Chapter 4.5** and **Appendix M.2**), fishes and invertebrates (**Chapter 4.6**), birds (**Chapter 4.7**), commercial fisheries (**Chapter 4.10** and **Appendix M.3**), recreational fishing (**Chapter 4.11** and **Appendix M.4**), recreational resources (**Chapter 4.12** and **Appendix M.5**), cultural historical, and archeological resources (**Chapter 4.13**), land use and coastal infrastructure (**Chapter 4.14**), and social factors (**Chapter 4.16**).

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		regarding why more definitive information could not be provided."[384] As such, BOEM must detail the total, accumulated harm: effects from the leasing proposed here added to the potentially moderate effects from other OCS leasing along with the potentially major effects from other activities in the Gulf. This assessment "must be more than perfunctory; it must provide 'a useful analysis of the cumulative impacts of past, present, and future projects.'"[385] Without this information, BOEM cannot claim to have taken the "hard look" at the potential effects of leasing required to satisfy the requirements of NEPA.	
Earthjustice et al.-54	BOEM-2023-0046-5236	The PEIS also fails to analyze cumulative impacts associated with the burgeoning Gulf of Mexico carbon capture and sequestration (CCS) industry, even though buildout of this industry is reasonably foreseeable and likely to have cumulative impacts on the human environment. CCS in the Gulf of Mexico is a reasonably foreseeable activity. The federal government is pursuing CCS development in the OCS, as demonstrated by legislative action and agency research…. BOEM itself acknowledged that CCS on the OCS is "reasonably foreseeable" in its Programmatic EIS for the 2023-2028 Oil and Gas Leasing Program, which the agency released in July 2022.[393] And in the Draft PEIS, BOEM acknowledges that oil and gas leasing creates a potential space-use conflict with potential future CCS projects.[394] Yet BOEM did not consider the cumulative impacts of a new oil and gas lease sale in conjunction with reasonably foreseeable CCS activities. Recent studies indicate that offshore CCS is untested and risky. All global experience thus far has been based on just two relatively small projects in Norway, "both of which encountered unpredicted problems despite their relatively simple designs and small scales."[395] Injecting carbon dioxide under the seabed has the potential to "contaminate groundwater, cause earthquakes, and displace deposits of brine, which can be toxic."[396] All of these risks have never been confronted at scale. Monitoring for leaks and preventing or responding to hazards is also technically challenging and expensive at great depths.[397] Studies also indicate that CCS deployment will have impacts on local air quality in the Gulf.[398] Moreover, locating CCS projects in areas with intensive oil and gas drilling, like the Gulf of Mexico, presents the "single, biggest risk of CO2 leakage."[399] Available research suggests that CO2 leakages at sub-seabed geologic storage sites may have adverse impacts on marine biota.[400] Dissolved CO2 alters marine carbonate chemistry and "typically results in hypercapnia (i.e., elevated CO2 levels) and ocean acidification (i.e., decreased pH levels)."[401]…. Ocean acidification affects phytoplankton by disrupting physiological processes, such as photosynthesis, and elevated CO2 levels can "affect natural phytoplankton assemblages and shift community composition."[404] Other marine organisms also experience changes in behavior as a result of elevated CO2 levels, as studies have found that "marine gastropods showed increased avoidance behaviors in response to predators and clownfish larvae showed restrained discriminatory behaviors from olfactory cues."[405] The installation of infrastructure required for CCS will also impose significant adverse effects on nearshore and upland ecosystems and vulnerable coastal communities. CCS deployment is of particular concern for environmental justice advocates, as many have expressed that expansion of CCS will	Thank you for your comment. BOEM determined that carbon capture and sequestration in the OCS is not reasonably foreseeable given the lack of existing regulations or any specific proposed activities on which to base analysis, as discussed in **Chapter 4.0.2.2** of the Programmatic EIS. BOEM has been investigating the potential for carbon capture and sequestration in the OCS. BOEM is working with BSEE to promulgate carbon sequestration through rulemaking. Without a published rule and regulations in place, BOEM is unable to determine the potential impacts of CCS activities at this time. With respect to considering the effects of CCS on vulnerable coastal communities, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025). Thank you for your comment. Aside from the leaking wells from the Taylor Energy platform that was lost during Hurricane Ivan and is located in Mississippi Canyon Block 20, BOEM is currently unaware of any actively leaking offshore wells. However, BOEM does have a study to examine abandoned wells, i.e., NSL GM-22-01, at https://www.boem.gov/sites/default/files/documents/environment/environmental-studies/GM-22-01_1.pdf. The Taylor Energy leak has been included in the oil-spill analysis in the PEIS. More information on Taylor Energy's toppled platform is discussed in Chapter 2.9.1.1 of the SID. BOEM's analysis in this PEIS acknowledges the risks of accidental spills and events, even in light of the rigorous safety regulations in place. Accidental events are identified and described in **Appendix B.3**. Potential impacts from these activities are analyzed in each resource chapter of **Chapter 4**. BOEM acknowledges that, even with stringent standards, risk is not wholly eliminated. For example, **Appendix B.3.1.1** of the PEIS acknowledges that, even with application of these standards, certain small spills (≥1,000 bbl) may be reasonably foreseeable. BOEM and BSEE are constantly evaluating and responding to potential risks through strengthening enforcement and inspection, and continually updating regulatory requirements. To learn more about pollution prevention, oil-spill regulation, and financial responsibility, please refer to Chapter 5.13 of the SID, which is incorporated by reference into the PEIS.

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		perpetuate and reinforce environmental harms and risks to overburdened and vulnerable communities.[406] …. Pipelines have always been, and continue to be, sited and located disproportionately in communities with lower income and higher minority populations, and higher Indigenous populations."[407] Taken together, the impacts of increased CCS development and a new lease sale will have significant effects on vulnerable coastal communities. Further drilling in the Gulf, as a consequence of new lease sales may exacerbate these risks by creating more wells—and potentially more leaks—in the seafloor. BOEM must address the potential cumulative impacts of leaking abandoned wells alongside reasonably foreseeable geologic CO2 sequestration in the PEIS. The CCS industry represents a significant new circumstance likely to have reasonably foreseeable cumulative impacts on the GOM environment.[408] BOEM must discuss the impacts of CCS development in the PEIS given BOEM's plans to implement these projects in the OCS and the available scientific literature demonstrating the numerous adverse impacts CO2 leakage may have on marine species and communities. BOEM must take a hard look at the cumulative effects of CCS taken together with the impacts of new lease sales.[409]	

TOPIC 6 – CONSULTATIONS

Endangered Species Act

Commenter	ID Number	Comment	Response
Earthjustice et al.-55	BOEM-2023-0046-5236	The Draft PEIS relies on the BiOp and ITS issued by NMFS on March 13, 2020, to meet its obligation to ensure against jeopardy under section 7 of the ESA.[604] However, an action agency is in violation of section 7 when it relies on an unlawful biological opinion,[605] and despite BOEM's assertions in the Draft PEIS that the 2020 BiOp "remains valid during the pendency of NMFS work on remand,"[606] the 2020 BiOp is unlawful. On August 19, 2024, the U.S. District Court for the District of Maryland found the 2020 NMFS BiOp unlawful because it underestimated the risk and harms of oil spills to protected species, incorrectly assumed that the populations of Rice's whales and Gulf sturgeon remained the same after the Deepwater Horizon oil spill, failed to address all stressors likely to affect the Rice's whale, failed to recognize oil spill take as incidental take, and adopted an "irrational surrogate" to determine take by vessel strikes.[607] An agency cannot satisfy its substantive ESA obligations by relying on a facially flawed biological opinion.[608] As such, BOEM must ensure these failures are remedied in a new consultation and consider any relevant new information. Because the BiOp is unlawful, BOEM may not rely on it to comply with its section 7 obligations for the proposed lease sale. Indeed, Congress established the section 7 consultation process explicitly "to ensure compliance with the [ESA's] substantive provisions."[609] Therefore, without a valid biological opinion, Interior would be out of compliance with both its procedural and substantive obligations under section 7 of the ESA. Separately, section 9 of the ESA prohibits "take" of endangered species by any person, including federal agencies.[610] "Take" means to "harass, harm, pursue,	Thank you for your comment and please see **Appendix G** of the PEIS for more information on this consultation. On October 25, 2022, BOEM and BSEE requested reinitiation of the consultation with NMFS in light of updated oil-spill risk analysis and to incorporate certain previously developed and implemented mitigations, including for Rice's whales. The 2020 BiOp was in place until May 21, 2025, when it was ordered vacated by the U.S. District Court. See Sierra Club v. NMFS, 8:20-cv-3060, ECF No. 211-2 paragraphs 7-9 (Sept. 16, 2024). On May 20, 2025, NMFS published its Biological and Conference Opinion on Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement's Oil and Gas Program Activities in the Gulf of America (NMFS 2025b) and associated Attachments and Appendices (NMFS 2025a), which contain protocols BOEM applies for ESA compliance. As stated in the Protected Species Stipulation, when an operator seeks BOEM or BSEE approval of any plan, permit, or other authorization under a lease, they will be required to comply with the most recent consultations, opinions, mitigations, and Conditions of Approval (COAs) available at the time.

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		hunt, shoot, wound, kill, trap, capture, or collect."[611] Take that is authorized by a valid ITS is not prohibited under section 9.[612] Without a valid ITS, however, any take resulting from an agency action is unlawful. The invalidation of the BiOp invalidates the associated ITS. Accordingly, the lease sale, as proposed in the Draft PEIS, would cause unauthorized take in violation of section 9 of the ESA. For the same reasons, the Protective Species stipulation—Stipulation No. 4—which relies on the unlawful BiOp and ITS, is inadequate, and BOEM may not rely on the mitigation measures included within to evaluate the effects on protected species. The Rice's whale, for instance, is a critically endangered species of baleen whale whose entire known range is limited to the Gulf of Mexico. As discussed in section IV.G, oil and gas activities in the Gulf pose a series of threats to the survival and recovery of this species, including oil spills, noise, and vessel strikes. A number of these threats—including those at issue in the Proposed Action—were deemed by NMFS' most recent species Status Review, prepared in 2016, as "likely to eliminate or seriously degrade" the population.[613] As the review unanimously concluded, the whales "are at high risk of extinction as a result of their small population size and the suite of anthropogenic threats posed primarily by energy exploration, development and production, and vessel collisions. Small-scale incremental impacts over time or a single catastrophic event could result in extinction."[614] Considering their highly vulnerable status, the greatest possible safeguards should be implemented to protect the Rice's whale from further decline. Existing mitigation measures for the Rice's whale, detailed in the Protected Species lease stipulation, require lessees to comply with the reasonable and prudent measures (RPMs) and implementing terms and conditions set out in the 2020 BiOp developed in consultation with NMFS under the "ESA.[615] However, it is clear from NMFS' own analysis that these measures are insufficient to protect the Rice's whale from the impacts of oil and gas exploration and development activities in the Gulf of Mexico. For example, according to NMFS, oil and gas activities conducted in the Gulf with the reasonable and prudent alternative ("RPA") set out in the BiOp will cause an estimated 16 vessel strikes of Rice's whales over a 50-year period, with 12 of those strikes resulting in serious injury or mortality.[616] This rate of mortality is patently incompatible with the continued survival of the species.[617] As mentioned above, the District of Maryland declared the 2020 BiOp and ITS unlawful, finding that NMFS failed to provide measures to protect the Rice's whale from multiple threats and failed to explain how the provided vessel strike measures would prevent jeopardy to the species.[618] The court ordered vacatur of the biological opinion effective May 21, 2025,[619] and BOEM has reinitiated ESA consultation with NMFS.	

Magnuson-Stevens Fishery Conservation and Management Act

Commenter	ID Number	Comment	Response
NMFS, SERO-28	BOEM-2023-0046-3146	As currently described, the proposed leasing and associated oil and gas development activities will occur in areas designated as essential fish habitat (EFH) for various life stages of several species managed by the Gulf of Mexico Fishery Management Council (GMFMC) and NMFS Atlantic Highly Migratory Species (HMS) Management Division (whose purview includes the GOM). Habitat types include, depending on the species and life stage: the water column (e.g., the Gulf Stream, waters of the GOM, and all tidal waters), abiotic substrates (e.g., sandy shoals, hard bottom), and biotic features (e.g., corals, seagrasses, shellfish reefs, floating seaweed). Prior to 2022, BOEM's 5-year National Environmental Policy Act (NEPA) planning document was linked with the review and renewal of a programmatic EFH consultation for oil and gas activities in the GOM. Rather than linking it to the NEPA process, our regional offices agreed to a standalone programmatic EFH consultation which is in effect with BOEM and the Bureau of Safety and Environmental Enforcement (BSEE). Upon receipt of both BOEM's NOI and the Draft PEIS, our respective regional program offices responsible for the EFH consultation discussed the adequacy of the existing consultation and agreed no revisions or modifications are needed at this time. We advise BOEM that under separate actions, the GMFMC and HMS EFH information is currently being reviewed which might result in changes to existing EFH identifications and descriptions. However, it is currently uncertain when final action on these changes might occur. Should changes occur which affect current EFH Conservation Recommendations, NMFS will contact BOEM to revisit the existing programmatic consultation.	Thank you for your comment. See **Chapter 4.6.1** of the PEIS and Chapter 4.3.4.1 of the SID, which is incorporated by reference into the PEIS, for a description of fish and invertebrate habitats. See **Appendix G** of the PEIS for more information on the EFH consultation. This consultation covers reasonably foreseeable oil- and gas-related activities on the Gulf of America OCS. As described in your comment, the agreed upon conservation recommendations contain provisions for initiating supplemental discussions should it be determined that site-specific or activity-specific consultation, or reinitiation of consultation, is necessary. See **Appendix H** for the regional programmatic EFH consultation letters.

Other Consultations

Commenter	ID Number	Comment	Response
NMFS, SERO-29	BOEM-2023-0046-3146	The FWCA, as amended in 1964, requires all federal agencies to consult with NMFS when proposed actions might result in modifications to a natural stream or body of water. It also requires federal agencies to consider the effects that these projects would have on fish and wildlife, and must also provide for improvement of these resources. From the information provided, project activities will impact areas where aquatic resources we seek to conserve and enhance under the FWCA occur. Impacts to these resources should be described in the EIS as well as the measures to avoid and minimize those impacts.	Thank you for your comment. Though not specifically addressed in **Appendix G** of the PEIS, NMFS works with FWS to implement the Fish and Wildlife Coordination Act (FWCA) as amended in 1965. BOEM's OCS oil- and gas-related activities do not include water resources development projects (e.g., reservoirs and navigation projects). NEPA and ESA share equal presence with FWCA. BOEM considers all effects (direct and indirect) to fish and wildlife as described in **Chapter 4** and **Appendix M** of the PEIS, associated appendixes, and consultations (**Appendices G** and **H** of the PEIS). Impacts to specific habitat and fish and wildlife resources from OCS oil- and gas-related activities are discussed in the following chapters of the PEIS: **Chapter 4.2** (Water Quality), **Chapter 4.3** (Coastal Communities and Habitats), **Chapter 4.4** (Benthic Communities and Habitats), **Chapter 4.5** and **Appendix M.2** (Pelagic Communities and Habitats), **Chapter 4.6** (Fish and Invertebrates), **Chapter 4.7** (Birds), **Chapter 4.8** (Marine Mammals), and **Chapter 4.9** (Sea Turtles). As part of the NEPA process, all agencies have the opportunity to review and provide comments during scooping and public review of the Draft PEIS during the public comment period.

TOPIC 7 – MITIGATION

Commenter	ID Number	Comment	Response
NMFS, SERO-30	BOEM-2023-0046-3146	Finally, we recommend that any novel production or mitigation technologies developed by the oil and gas industry are thoroughly evaluated and permitted before their implementation to avoid unanticipated impacts to protected resources.	**Chapter 3.2.6** of the PEIS and Chapter 5.2.3.4 of the SID discuss New and Unusual Technology. BOEM reviews all submitted OCS plans and applications to identify any proposal to use new or unusual technologies (NUTs) to develop a lease. If it is determined in a NUT review that the proposed technology creates an effect on safety and environment that is greater than conventional (proven) technology, an EA will be required for the submitted plan or application.

Commenter	ID Number	Comment	Response
NMFS, SERO-31	BOEM-2023-0046-3146	Consistent with the approaches identified in the NMFS and BOEM Federal Survey Mitigation Implementation Strategy - Northeast U.S. Region,[14] a parallel survey mitigation strategy for the Southeast U.S. (GOM, Southeastern U.S. Atlantic, and U.S. Caribbean) is currently in development. Staff from the SEFSC have collaborated with BOEM over the last several months to develop a joint strategy, which will propose an approach to assess and mitigate the effects of offshore wind development on NMFS-led and NMFS Cooperative surveys in the Southeast Region and related data products. We recommend BOEM consider the development of an analogous strategy to mitigate impacts to federal fishery-independent and protected species surveys arising from oil and gas development activities.	Thank you for your comment. BOEM acknowledges that the installation of offshore energy infrastructure can potentially affect NOAA's federal survey program activities. BOEM has been collaborating with NOAA to better understand these impacts and consider strategies in minimizing their effects to the data collection programs to mitigate these potential impacts. To our knowledge, NOAA has successfully and safely implemented its federal survey program in the GOA alongside and in evolution with the oil and gas industry, which began in the 1940s. At this time, BOEM does not think there is mitigation necessary under the circumstances, given the long history of NMFS surveys and oil and gas operations managing to co-exist. For background, BOEM offers available areas for leasing. Once a lease is secured and there is a plan to commence construction or other activities, BOEM reviews those plans for structure and environmental concerns. Reviews are conducted by the Office of Leasing and Plans and the Office of Environment in BOEM, as well as by BSEE. Many of these structures have been in place for years and BOEM is unaware of any safety issues with surveys. BOEM does not regulate activities that occur around approved structures.
Earthjustice et al.-56	BOEM-2023-0046-5236	BOEM should consider in the PEIS and adopt in the ROD and future lease documents stronger measures to protect Rice's whales from vessel strikes. We recommend that BOEM require the measures currently recommended in NTL No. 2023-G01, *Expanded Rice's Whale Protection Efforts During Reinitiated Consultation with NMFS*,[620] as binding stipulations for all leases issued under the Proposed Action. Specifically, these measures would require the following actions for all vessels conducting oil and gas activities (except where otherwise specified): 1. Use trained visual observers to monitor a 500-meter vessel strike avoidance zone. 2. Document and retain records for three years on details of transit within Rice's whale habitat (defined as the entire northern Gulf of Mexico Outer Continental Shelf between the 100- and 400-meter isobaths). Documentation must include what port is used for mobilization and demobilization. 3. Observe on all vessels, regardless of size, at all times a 10-knot or less, year-round speed restriction in Rice's whale habitat (defined as above), except when compliance with such restriction would place the safety of vessel or crew, or the safety of life at sea, in doubt. To the maximum extent practicable, avoid transit through Rice's whale habitat after dusk and before dawn, and during other times of low visibility, to further reduce the risk of vessel strike of Rice's whales. 4. Maintain a minimum separation distance of 500 meters from Rice's whales. If a whale is observed but cannot be confirmed as a species other than a Rice's whale, the vessel operator should assume that the whale is a Rice's whale and take appropriate action. 5. For vessels 65 feet or greater, maintain a functioning Automatic Identification System ("AIS") that is operating at all times, as required by the U.S. Coast Guard. Moreover, to protect Rice's whales from noise impacts BOEM should require the following measures as binding stipulations for all leases issued under the Proposed Action: 1. Restrict deep-penetration seismic surveys such that noise from such surveys does not reach or exceed sound pressure levels of 140 dB (re 1 micPa (RMS)) anywhere within Rice's whale habitat. This is the threshold at which species take begins according to the standard presently applied by NMFS under the Marine Mammal Protection Act.[621] 2. Require use of the best commercially available noise-reduction technologies, such as marine vibroseis, modified airguns, and other	Thank you for your comment. As of February 20, 2025, BOEM rescinded its Notice to Lessees and Operators (NTL) 2023-G01, *Expanded Rice's Whale Protection Efforts During Reinitiated Consultation with NMFS*. The NTL contained recommendations for suggested precautionary measures by lessees and operators during the reinitiated consultation. BOEM rescinded the NTL in response to Secretary's Order 3418, "Unleashing American Energy." Information on NTLs is available at BOEM's Guidance Portal: https://www.boem.gov/about-boem/regulations-guidance/guidance-portal. However, as described in **Chapter 2.3**, BOEM considers the use of mitigation, including measures to reduce vessel strikes and overall avoidance, at all phases of energy development and planning besides that for this lease sale decision. For example, the A.3 Vessel Strike Avoidance and Injured and/or Dead Aquatic Protected Species Reporting Protocols, outlined in Attachment 3 of the 2025 NMFS BiOp, and the A.6 Vessel Transit within the Rice's Whale Area as identified in the 2020 Biological Opinion's Reasonable and Prudent Alternative (2020 RWA), outlined in Attachment 4 of the 2025 NMFS BiOp (NMFS 2025a), requires monitoring measures to prevent or substantially minimize vessel interactions with Rice's whales and require reporting. Further, the A.1 Operational National Mitigation Protocols for Geophysical Surveys outlined in Attachment 1 of the 2025 NMFS BiOp (NMFS 2025a) requires measures that prevent or substantially reduce marine mammal noise exposure from seismic surveys by requiring visual and acoustic monitoring, and seismic survey protocols. BOEM's and BSEE's review of plans, permits, and/or authorizations at the post-lease stage includes review of any planned transits through Rice's whale habitat. At this time, critical habitat is still at the proposed stage for Rice's whales. Should critical habitat be designated, the Bureaus will consult with NMFS and take appropriate action to comply with the ESA and ensure that take is considered and authorized (as appropriate) and to implement any measures necessary ensure the post-lease actions do not result in jeopardy to the species or adverse modification of the designated critical habitat.

Commenter	ID Number	Comment	Response
		alternatives, for all deep-penetration seismic surveys taking place in the northern Gulf of Mexico. Sources and operational standards meeting the criterion "best commercially available technology" will be determined by BOEM. 3. Require that all industry vessels transiting through Rice's whale habitat receive a quiet-vessel notation from an IACS-member ship-classification society.	
Earthjustice et al.-57	BOEM-2023-0046-5236	**c) BOEM Should Evaluate Its Commonly Applied Post-Lease Mitigation Measures and Incorporate Them into Lease Stipulations as Appropriate.** BOEM's final multisale environmental impact statement for its 2017 to 2022 oil and gas lease sales contained a list of "commonly-applied" or "standard" mitigation measures that the agency could apply to permits and approvals at the post-lease stage.[583] These mitigations relate broadly to air quality, archaeological resources, artificial reef material, Flower Garden Banks National Marine Sanctuary, topographic features, hydrogen sulfide, hard bottoms/pinnacles, drilling hazards, and more.[584] BOEM notes that "[m]any of these mitigating measures have been adopted and incorporated into regulations and/or guidelines governing OCS oil and gas exploration, development, and production activities."[585] BOEM should take a close look at its entire list of commonly applied mitigation measures and determine which of the measures should be mandatory lease stipulations for all oil and gas operations. While mitigation measures at the post-lease stage can mitigate harms from oil and gas operations, there is considerable risk of inconsistency in application because BOEM does not uniformly apply these measures to all oil and operations. Incorporating protective mitigation measures into all lease stipulations at the beginning of the leasing process, and making them mandatory, will better accomplish BOEM's goal of ensuring that oil and gas operations are always conducted in an environmentally sound manner.[586] In particular, we recommend that BOEM evaluate and incorporate many of the post-lease commonly applied mitigation measures that relate to air quality—including the use of ultra-low sulfur content fuel, performance of stack testing to verify emission limits of engines, production curtailment during sulfur recovery unit shutdown, and more—into lease stipulations.[587] BOEM should also incorporate the measures regarding anchoring approval into lease stipulations in order to protect reef materials.[588] BOEM should also incorporate the "zero discharge" and other practices to mitigate harm to chemosynthetic communities, as well as the measures to protect the Flower Garden Banks National Marine Sanctuary, topographic features, and hard bottoms, pinnacles, and potentially sensitive biological features.[589] We also recommend making the pipeline corrosion inspection requirements mandatory in lease stipulations.[590] Some of the requirements outlined for these mitigation measures are already part of current lease stipulations (for example, some of the topographic features mitigations), and incorporation of more of these post-lease measures into the lease stipulations, as appropriate, will lead to more uniform and transparent mitigation.	Thank you for your comment. See Earthjustice et al.-4 for the comment response describing BOEM's OCS Oil and Gas Program Planning and Decision Process and rationale for preparing this Programmatic EIS at this stage in the process. This staged analysis also provides for a more informed lease sale decision, which in turn allows for future site-specific reviews that can be tiered to in additional NEPA documents, thereby streamlining the NEPA process for the region. To minimize the environmental harm potentially caused by OCS oil- and gas-related activities authorized by BOEM, BOEM has developed a suite of commonly applied mitigating measures, or Conditions of Approval (COA). Post-lease COA have been implemented for over 40 years in the GOA region and are discussed in **Chapter 2.3.2** of the PEIS. Chapter 5 of the GOM Oil and Gas SID discusses BOEM and BSEE's rigorous post-lease processes and Chapter 6 of the GOM Oil and Gas SID describes over 120 standard mitigations that may be required by BOEM or BSEE as a result of plan and permit review processes for the Gulf of America OCS region. Compliance with all regulatory requirements, including post-lease COAs and their mitigating effects, is considered part of the proposed action. Application of the commonly applied mitigating measures are more appropriate for use at the post-lease stage because plans are reviewed on a site-specific and project specific basis and only applicable mitigating measures are applied based on the plan and the site, including mitigating measures for air quality, anchoring, and zero-discharge. Due to the site-specific and project-specific nature of each plan, it is not appropriate to uniformly apply all lease stipulations and 120 standard mitigation measures to every lease and every submitted plan. Commonly applied or standard mitigations are applied as needed dependent upon the results of reviews (environmental, hazards, etc.) which are triggered by individual submitted activities (plans, applications, etc.). For example, anchor distancing is only appropriate where activities would occur within certain distances of sensitive biological features. Zero-discharge requirements are very specific and would only be applicable on a plan where drilling would occur closer to a feature than BOEM distancing requirements allow and would be followed up by surveys to show that no discharge occurred and the sensitive biological feature was not touched or harmed. The use of ultra-low sulfur content fuel, performance of stack testing to verify emission limits of engines, production curtailment during sulfur recovery unit shutdown, and pipeline corrosion inspection requirements would only be applied if found to be necessary by following an Air Quality review in a Site Specific/Activity Specific environmental review. The lease stipulations (refer to **Appendix J** of the PEIS, and Chapter 7 of the SID for detailed descriptions) are more general and can be applied at the lease-sale stage, unlike the mitigating measures. That is why the mitigating measures are applied at the post-lease review stage of the staged NEPA review process.

Commenter	ID Number	Comment	Response
Earthjustice et al.-58	BOEM-2023-0046-5236	**d) Available Evidence Demonstrates the Need for BOEM to Include as Stipulations Additional Safeguards to Prevent Blowouts and Catastrophic Oil Discharges.** ….Although the final Well Control Rule improved standards for operations using blowout preventers, significant gaps remain. BOEM should include several additional mitigation measures as lease stipulations that require operators to implement additional safeguards to help prevent another similar catastrophe in the Gulf of Mexico. First, BOEM should stipulate that all lessees must have the capability to deploy the full range of Source Control and Containment Equipment ("SCCE") to control or contain a blowout. BSEE regulations currently require drilling operations to have access to SCCE generally but do not require that operations have access to specified types of SCCE.[592] The mitigation measure should require drilling operations to have access to all eight types of SCCE listed as voluntary in BSEE regulations.[593] Increasing the amount of mandatory SCCE equipment would provide necessary protections for worker safety and the environment. Well control cooperatives were set up after the BP Deepwater Horizon spill, and oil and gas companies can join these cooperatives to access the full suite of well control equipment for an annual fee. Second, BOEM should stipulate that operators must have cement evaluation logs for all offshore wells. Cement failure was a root cause of the Deepwater Horizon blowout, yet BSEE generally relies on industry volunteering to run cement evaluation logs. Cement evaluation logs are critical to ensuring correct cement placement and verifying cement repairs. They should therefore be required for all offshore wells, and, in particular, for complex wells or wells in environmentally sensitive locations. Third, BOEM should prohibit the use of a blowout preventer that is under investigation by BSEE. If a component failure or other issue is serious enough to warrant a BSEE-required investigation, it is serious enough to halt use of that same blowout preventer during that investigation until corrective actions are made and the blowout preventer has been verified fit for service.	Thank you for your comment. Specific requirements for Source Control and Containment Equipment, cement evaluation logs, and blow-out preventers (BOPs) are more appropriate for the post-lease stage because plans are reviewed on a site-specific and project specific basis and only applicable requirements need be submitted based on the plan and the site. As described below, BSEE requires specific information to be submitted along with an application for a permit to drill. Well and reservoir specific details are collected prior to submitting the application, and would not be available at the lease sale stage, or appropriate for every lease. Therefore, creating additional lease stipulations for Source Control and Containment Equipment, cement evaluation logs, and BOPs are not appropriate at the leasing stage or to be applied to every lease. In fact, based on BSEE's clear regulations, no additional stipulations are required. 30 CFR 250.462 details the source control, containment, and collocated equipment requirements. For drilling operations using a subsea BOP or surface BOP on a floating facility, operators must have the ability to control or contain a blowout event at the sea floor. Required source control and containment capabilities for each specific drilling operation are based on case-specific scenarios of a reservoir and shut in ability for that reservoir. The SCCE supporting equipment needed would be based on the shut-in abilities and individual reservoir. They may include the eight SCCE supporting equipment listed, but are not limited to those pieces of equipment. Source control and containment capabilities are approved by BSEE prior to approving an application to drill. With respect to cement evaluation logs, requirements are outlined in 30 CFR 250.420. It should be noted that BSEE regulations on cement were strengthened following the *Deepwater Horizon* incident. Applicants must have a registered professional engineer involved in the casing and cementing design process. This engineer must sign a certification, which is to be submitted with the application for a permit to drill, that certifies that the casing and cementing design is appropriate for the purpose for which it is intended under expected wellbore conditions, and is sufficient to satisfy specific tests and requirements. Therefore, all offshore permit applications require certification of the casing and cementing design process. The BSEE District Manager also has authority to require any additional logs based off the cement job if it is warranted and BSEE engineers ensure that the cement modeling is correct, which shows the cement quality and coverage of a casing/liner string. With respect to BOPs under investigation by BSEE, it is unclear what is being referred to here regarding a BOP that is under a BSEE required investigation. However, if a BOP was the focus of an incident investigation and deemed not fit for use or its fitness was in question, BSEE would prevent its use until an investigation was complete with remedial action. Per 250.734(b) and 738(b), Requirements to Repair BOPs, BSEE will not allow a BOP in need of repair/replacement that is a part of an investigation to be used.
API, et al.-16	BOEM-2023-0046-3145	The DPEIS contains references in some instances to the potential future application of additional protective measures. For example, it says that "additional BOEM additional protective measures for benthic communities and habitats would be considered at the site-specific stage" (4-64, footnote to Table 4.4-3) and makes similar statements for fishes and invertebrates (4-93, footnote to Table 4.6-3), marine mammals (4-121, footnote to Table 4.8-3), and sea turtles (4.137, footnote to Table 4.9-3). The Associations note that there are already substantial protections in place in these contexts, including in existing lease stipulations and safeguards applied by industry, such that additional protective measures should not be necessary.	The additional protective measures referenced in the footnotes of tables in **Chapter 4** and **Appendix M** are post-lease conditions of approval (COA). These COA have been implemented for over 40 years in the Gulf of America region and are discussed in **Chapter 2.3.2** of the PEIS. Chapter 5 of the GOM Oil and Gas SID discusses BOEM and BSEE's rigorous post-lease processes and Chapter 6 of the GOM Oil and Gas SID describes over 120 standard mitigations that may be required by BOEM or BSEE as a result of plan and permit review processes for the Gulf of America OCS region. Compliance with all regulatory requirements, including post-lease COAs and their mitigating effects, is considered part of the proposed action.

TOPIC 8 – OIL SPILLS

Commenter	ID Number	Comment	Response
API, et al.-17	BOEM-2023-0046- 3145	In characterizing oil spill risks, the DPEIS gives short shrift to the comprehensive and dedicated safeguards to avoid, minimize, and mitigate any environmental impacts from OCS oil and gas activities. The oil and gas industry continuously strives to enhance the safety of offshore operations, including focusing on its ability to: prevent spills from occurring; intervene to halt any spill that does occur; and respond to spills with the most effective mitigation measures possible.[13] There are extensive environmental safeguards in place for offshore operations in the form of regulations and regulatory oversight of safety and spill prevention equipment, systems, programs, operational practices, and a highly trained and skilled workforce. This overall comprehensive system of regulations, federal oversight, equipment, programs, best practices, and trained staff underpins safe and environmentally protective operations and promotes the safe and responsible development of energy sources that help fuel the American economy and meet domestic energy needs.	Thank you for your comment. BOEM appreciates the efforts of the offshore oil and gas industry to prevent and mitigate environmental impacts from OCS oil and gas activities. BOEM does extensively cover pollution prevention, oil-spill regulation, and financial responsibility in **Appendix B.3.2** of the PEIS and Chapter 5.13 of the SID, which is incorporated into the PEIS by reference.
Earthjustice et al.-59	BOEM-2023-0046-5236	**A. BOEM Inadequately Uses Historical Data to Predict Oil Spills and Fails to Account for Critical Variables.** BOEM uses historical oil spill data from pipelines, platforms, and crude tankers up to 2015, ignoring all spills in the last decade,[411] and despite its ability to access more current data.[412] Past trends, however, do not reflect the risk associated with oil and gas development in the GOM today or in the future. Especially when BOEM estimates that the amount of oil production will increase a result of the proposed lease sale.[413] In fact, the Draft PEIS itself recognizes that "OCS oil production has increased overall though highly volatile,"[414] and that the level of activity may vary based on many factors, including "economic conditions, technological advancements, political events, and historical production trends."[415]	Oil-spill events cannot be predicted but the probability of occurrence can be estimated using historical spill rates and projected volumes of oil production and transportation. BOEM uses the Oil Spill Risk Analysis (OSRA) model to estimate the probabilities of future oil spills and their estimated trajectories (Ji and Schiff 2023). The model uses the most recent historical oil-spill occurrence rates (ABS Consulting Inc. 2016) combined with the aforementioned projected oil production and transportation volumes. Therefore, BOEM is using the most recent available historic date paired with OSRA modeling that uses projected oil production and transportation to estimate future oil spills. BOEM uses decades of historical data on previous oil spills combined with oceanographic data to reliably estimate probabilities of oil spills occurring over the long-term oil and gas production in the GOA. These results are used by subject-matter experts for identifying risks posed to different environmental resources and are considered in impact analyses, which are discussed extensively in **Chapter 4** and **Appendix M** of the PEIS.
Earthjustice et al.-60	BOEM-2023-0046-5236	The OSRA, on which the Draft PEIS relies, does not consider critical variables, like transportation distance, water depth, or climate change.[416] Instead, it oversimplifies by calculating the probability of an oil spill "as the ratio of the number of historical spills to the volume of oil produced or transported."[417] This approach fails to account for most risk factors that affect the probability of a spill occurrence. The attached report by Susan Lubetkin, Ph.D., was prepared to critique the oil spill modeling in BOEM's national OCS program and discusses inappropriate methodology for calculating oil spill risks.[418] Dr. Lubetkin's report discusses how an oil spill risk analysis should account for the distance that a given volume of oil must be transported.[419] The OSRA, which BOEM relies on in the Draft PEIS, fails to account for distance despite the fact that offshore oil and gas operations continue to move further offshore. The Draft PEIS's analyses on impacts on species and the environment resulting from oil spills arbitrarily relies on an oil spill analysis that fails to consider key variables and forthcoming changes in the landscape of offshore drilling. As a result, BOEM's analysis is arbitrary and capricious under the APA.[420]	Thank you for your comment and further interest in the OSRA model. This is a 2D surface model that estimates the probability of an oil spill occurring and the probability of that spill contacting a resource (the conditional probability) that has been identified with geospatial coordinates on a 2D plane, over decades-long analysis periods. Analyzing the variables discussed in the most recent OSRA report (Ji and Schiff 2023) allows for broad applicability to the different impact analyses considered by BOEM subject matter experts in their assessments. BOEM also stresses that the OSRA model estimations are not the only information and data analyzed by subject matter experts for their impact assessments. It is worth emphasizing that the OSRA model is specifically designed to have relevance to BOEM's lease sale scenarios. The variables that are considered must be simple to define and be quantified. In this case, historical spills and historical production volumes are well documented and easy to integrate into probability estimates. BOEM acknowledges that there are numerous potential exposure variables that can be used as inputs for an oil spill model. An exposure variable would be a variable related to oil production or transportation that has an established, and precise, statistical relationship to spill occurrence. For example, "oil handled" has long been used as an exposure variable for estimating spill rates (e.g., Anderson and LaBelle 1994; Ji and Schiff 2023; Smith et al. 1982). Regarding transportation, ABS Consulting Inc. (2016) examined potential alternative exposure variables and did not identify the distance that a given volume of oil must be transported as an effective exposure variable. However, oil transportation is in fact considered in the OSRA model, but not in terms of distance from shore. Rather it is considered in terms the volume of oil handled during transportation across tankers, barges, and pipelines.

Commenter	ID Number	Comment	Response
Earthjustice et al.-61	BOEM-2023-0046-5236	**B. BOEM Fails to Account for Small and Catastrophic Spills.** The OSRA model does not consider the probability of small spills (smaller than 1,000 bbl) or catastrophic spills (greater than 1 million bbl), but only looks at the probability of oil spills greater or equal to 1,000 bbl, ignoring important data to determine the probability of accidental oil spills.[421] NEPA requires consideration of "all foreseeable direct and indirect impacts."[422] The regulations explain that "reasonably foreseeable" "includes effects that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the effects is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason."[423] However, the Draft PEIS erroneously asserts that a "catastrophic event of a magnitude similar to the *Deepwater Horizon* explosion, oil spill, and response is not reasonably foreseeable,"[424] and thus, does not consider the potential impacts of such an event in its analysis. The Draft PEIS also fails to identify the largest reasonably foreseeable spill under each alternative, and in turn, falls short of NEPA's requirements to assess the reasonably foreseeable impacts.[425] BOEM's failure to consider the effects of catastrophic and small oil spills fails to account for the reasonably foreseeable effects of the action.[426] For catastrophic events—those with low probability but a high degree of harm—a NEPA analysis must determine the likelihood of occurrence and evaluate the potential impacts.[427] Indeed, *Deepwater Horizon* is not the only event that has spilled more than 10,000 bbl. BOEM's own reports have shown that in 2017, there was a 16,152 bbl spill in the OCS caused by damage to a pipeline segment.[428] That same historical data showed that, in addition to *Deepwater Horizon*, there have been three "very large drilling-related blowouts" that have resulted in spills greater than or equal to 10,000 bbl.[429] Those spills released 53,000 bbl, 65,000 bbl, and 80,000 bbl into the Gulf of Mexico.[430] Additionally, there are two other historic catastrophic spills in the Gulf that must be accounted for: *Ixtoc*, which spilled more than 3.4 million barrels of crude oil into the Gulf and was the world's first massive offshore oil spill,[431] and Taylor Energy, which is the longest-running spill in U.S. history.[432] Clean up efforts from the Taylor Energy well site captured more than 1 million gallons of oil (equivalent to 23,000 bbls) over the span of three years, and more than 5 million gallons (119,000 bbls) may have released into Gulf waters over the past nearly two decades.[433] This list of events demonstrates that catastrophic spills are not unforeseeable, as BOEM asserts, but likely to happen again.	Thank you for your comment. As discussed in **Appendix B.3.1.1** of the PEIS and Ji and Schiff (2023), oil spills <1,000 bbl are not analyzed in the OSRA model for two reasons: (1) the data on spills <1,000 bbl has the potential for greater error owing to the difficulty in estimating and consistently reporting small volumes spills, and (2) Spills <1,000 bbl are unlikely to persist long enough in the environment for adequate trajectory simulations since physical and chemical processes (e.g., weathering) begin affecting the oil once it spills into an ocean environment. However, spills < 1,000 bbls are addressed in the NEPA analysis for each proposed action without the use of trajectory modeling. The Ji and Schiff (2023) OSRA report does include modeling for spills >10,000 bbl; however, catastrophic spills specifically are too infrequent for reliable modeling with OSRA (Ji et al. 2014). Please note that BOEM has analyzed a low-probability catastrophic event in the *Gulf of Mexico Catastrophic Spill Event Analysis: High-Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on Gulf of Mexico Outer Continental Shelf* in conjunction with its analysis of potential effects. A low-probability catastrophic spill is, by definition, not reasonably foreseeable. It should be noted that the Council on Environmental Quality (CEQ) issued an interim final rule to remove the existing implementing regulations for NEPA, in response to E.O. 14154, "Unleashing American Energy." Among other things, E.O. 14154 rescinds E.O. 11991, "Relating to Protection and Enhancement of Environmental Quality," which amended E.O. 11514, *Protection and Enhancement of Environmental Quality,* and directed CEQ to promulgate regulations for implementing NEPA and required Federal agencies to comply with those regulations. However, BOEM's PEIS was prepared according to the NEPA statute (42 U.S.C. 4321 et seq.) and the DOI implementation of NEPA regulations (43 CFR 46) under our legal obligations under NEPA to inform decisions pursuant to OCSLA. Although a catastrophic analysis is not required in the NEPA statute or DOI implementing regulations, BOEM references the *Gulf of Mexico Catastrophic Spill Event Analysis: High-Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on Gulf of Mexico Outer Continental Shelf* in this response. BOEM determined that, because a catastrophic event like the *Deepwater Horizon* explosion, oil spill, and response is not considered a reasonably foreseeable event resulting from a Proposed Action, the analysis should not be overly emphasized in this PEIS in order to avoid confusion over whether it is or is not part of a Proposed Action. This is consistent with CEQ regulations, which do not require analysis of worst-case scenarios. The key to managing the risk of such an event is to implement a rigorous regulatory regime to ensure that post-lease drilling activities are conducted in a safe manner. It is at this stage that detailed information regarding a specific Proposed Action is available for review, including reservoir characteristics, infrastructure designs, and features, to ensure safety and reduce environmental risk. For a detailed analysis of reasonably foreseeable impacts associated with a low-probability catastrophic spill, such as the *Deepwater Horizon* explosion and oil spill, see the *Gulf of Mexico Catastrophic Spill Event Analysis: High-Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on Gulf of Mexico Outer Continental Shelf*. Additionally, the work of Ji et al. (2014) defined a reasonable range of potentially catastrophic spill sizes and applied extreme value theory to historical spill data to describe the statistical likelihood of the occurrence of a catastrophic oil spill. Ji et al. (2014) provides a robust statistical analysis by using both extreme value statistical methods and complementary risk assessment methods to characterize the potential frequency of a catastrophic spill event. Regarding the 2017 spill of 16,152 bbl, BOEM has acknowledged the spill and included it in the analysis, as discussed in **Appendix B.3.1.1**. In reference to the *Ixtoc* spill, it was not in OCS Federal waters. The Taylor Energy spill, per the methodology used in 2016 report on oil-spill occurrence rates (ABS Consulting Inc. 2016), is not considered a single spill. Please note that although catastrophic oil spills are rare, the specific spills noted above are still considered in the baseline for impact analyses in **Chapter 4** and **Appendix M**.

Commenter	ID Number	Comment	Response
Earthjustice et al.-62	BOEM-2023-0046-5236	**A. BOEM did not Consider the Full Impacts of Increased Deep- and Ultra-Deep-Water Activity.** Offshore drilling has moved into ultra-deep waters, approximately 5,000 ft deep, and the trend favoring deeper waters continues.[77] Indeed, BOEM recognizes in the Draft PEIS that it expects deepwater facilities to yield most of the oil production in the GOM.[78] Recently, operators have pursued ultra-deepwater drilling to extreme depths using new technologies.[79] This trend is concerning, since the likelihood of well blowouts and uncontrolled oil spills increases "exponentially" with depth,[80] making deepwater and ultra-deepwater drilling particularly risky. BOEM must consider the risks and potential impacts associated with increased deepwater and ultra-deepwater drilling. The likelihood of an oil spill is higher from deepwater and ultra-deepwater drilling than from drilling in shallower waters…. Various factors—including increased reservoir pressure and temperature when drilling in deeper water, unstable rock and sediment, and increased stresses on pipeline infrastructure when drilling in deeper water—can increase the risk of blowouts.[83] This risk is not hypothetical. In October 2020, as hurricane Zeta approached Transocean's Deepwater Asgard, the well experienced a "kick"—an eruption of oil, gas, or other fluids from deep underground that can lead to a blowout.[84] Company officials directed the Deepwater Asgard to remain attached to the well, resulting in damage to the rig, a BSEE safety alert, and a lawsuit by workers on the platform.[85]…. BOEM needs to analyze the dangers of ultra-deepwater and deepwater offshore oil and gas activities and evaluate their potential to harm the marine ecosystem and wildlife. Ultra-deepwater drilling in the GOM threatens sensitive deep-sea ecosystems and marine life, including endangered species. Among the species at risk are the endangered Kemp's ridley sea turtles, which rely on the Gulf's waters for feeding and nesting. The critically endangered Rice's whale inhabits the waters of the GOM along the continental shelf break. The fragile deep-sea coral communities, which provide essential and delicate deep-sea habitats, will be harmed and were severely damaged by the BP oil spill.[98] The disturbance and potential oil spills from drilling can devastate these delicate deep-sea ecosystems, leading to long-term impacts on biodiversity. Increased drilling in deep and ultra-deep waters is reasonably foreseeable and BOEM must take full consideration of its effects in the PEIS. Despite technological advancements that have pushed drilling into deeper waters, regulatory frameworks have not kept pace with the risks, necessitating stricter oversight and more robust safety measures.	Thank you for your comment. BOEM's routine oil and gas operations analysis in the PEIS is inclusive of all types of oil and gas development including deepwater and ultra-deepwater extraction. Therefore, these types of wells have been included in analysis in the PEIS. For more information on routine OCS oil and gas activities, see **Chapter 3** and **Appendix B** of the PEIS and Chapters 1 and 2 of the GOM Oil and Gas SID, which are incorporated by reference into this PEIS. Please note that the issuance of a lease does not conclude the environmental analysis of planned OCS oil- and gas-related activities. Each plan throughout the exploration, production, and decommissioning process receives a site-specific environmental analysis pursuant to NEPA and the OCSLA's pyramidal structure, going from larger scale to site-specific. See Chapter 1.3 of the GOM Oil and Gas SID, which is incorporated by reference into this PEIS, for a description of BOEM's staged decision-making process. It is at the post-lease stage that detailed information regarding a specific proposed action is available for review, including reservoir characteristics, infrastructure designs, and features to ensure safety and reduce environmental risk. A specific high-pressure and high-temperature (HPHT) project would be reviewed at the post-lease review stage of the process. The key to managing the risk of an oil spill or blowout is to implement a rigorous regulatory regime to ensure that post-lease drilling activities are conducted in a safe manner. For more information on BOEM's post-lease processes, including environmental reviews and evaluation of worst-case discharge scenarios for financial assurance, please refer to **Chapter 2.3.2** of the PEIS and Chapter 5 of the GOM Oil and Gas SID, which is incorporated by reference into this PEIS. BSEE has specific guidance and reviews for deepwater wells with HPHT conditions in the GOA. BSEE published the final rule for Oil and Gas and Sulfur Operations in the Outer Continental Shelf – High Pressure High Temperature Updates on August 30, 2024 and effective October 29, 2024 (89 FR 71076). The rule adds requirements for new or unusual technology, including equipment used in HPHT environments; revises and reorganizes the information submission requirements for a project's Conceptual Plans and Deepwater Operations Plan (DWOP); and requires independent third parties to review certain information prior to submission to BSEE. Due to the use of new technology, BSEE conducts stepwise, detailed evaluations of HPHT applications according to BSEE's guidelines for HPHT development. In addition, the oil and gas industry has evolved to mitigate the potential risks during the drilling of HPHT wells in the ultra-deepwater zone. For instance, several years ago, the operators joined with service companies to initiate the "20K" project to research and manufacture the equipment to meet the needs of HPHT wells. Since the 20K Project's initiation, several operators have made investments and developed HPHT wells using proven industry-led technology to withstand 20,000 psi wells (Chevron 2024; McCulley 2013; Shell 2023; Whiteside 2024). Meanwhile, BSEE constantly reviews the DWOP to ensure the drilling system and operational equipment can withstand the HPHT environment. For more information on the high pressure and high temperature operations, refer to BOEM's *HPHT Production in the Gulf of Mexico* technical report, which is incorporated by reference into this PEIS. This report can be found at https://www.boem.gov/sites/default/files/documents/about-boem/HPHT-Production-in-the-GOM.pdf. The report describes new technology, how it is reviewed, how HPHT wells are permitted, and safeguards in place to mitigate risk. Specific guidance for HPHT projects can be found in NTL 2019-G02, NTL 2019-G03, and NTL 2019-G04 which are on BSEE's website at https://www.bsee.gov/guidance-and-regulations/guidance/notice-to-lessees. To date, operators have announced 39 HPHT wells drilled across 8 discovered fields, including exploration wells, producing wells, and water injection wells. No spills or blowouts were reported during the drilling phase. In reference to the *Deepwater Asgard* incident, although this was a deepwater well, it was not a HPHT well. In reference to analyzing deepwater offshore oil and gas activities impacts on resources in the GOA, please refer to the following chapters of the PEIS for BOEM's analysis of the impacts of oil spills on sea turtles, including Kemp's ridley sea turtle (**Chapter 4.9**), marine mammals, including Rice's whale (**Chapter 4.8**), and benthic communities and habitats, including deep-sea coral communities (**Chapter 4.4**).
Zanagee Artis-7	1/16/25 Public Meetings	Every oil spill in our waters started with a lease sale and any new lease sale is one too many.	BOEM acknowledges that, even with stringent standards, risk is not wholly eliminated. For example, **Appendix B.3.1.1** of the PEIS acknowledges that, even with application of these standards, certain small spills (≥1,000 bbl) may be reasonably foreseeable. BOEM and BSEE are constantly evaluating and responding to potential risks through strengthening enforcement and inspection, and continually updating regulatory requirements. To learn more about pollution prevention, oil-spill regulation, and financial responsibility, please refer to Chapter 5.13 of the SID, which is incorporated by reference into the PEIS.

TOPIC 9 – GENERAL FEEDBACK ON THE DRAFT GOA OIL AND GAS PROGRAMMATIC EIS AND ASSOCIATED LEASING

Support

Commenter	ID Number	Comment	Response
Form Letter 1-2	BOEM-2023-0046- 0028	We need to expedite the completion of the Programmatic Environmental Impact Statement to ensure a lease sale can take place in 2025.	Thank you for your comment. BOEM's current schedule allows for a proposed OCS oil and gas lease sale to occur in late 2025.
API et al.-18	BOEM-2023-0046-3145	Oil and natural gas are critical to U.S. Energy needs and sound energy policy. Without the opportunity to obtain substantial acreage through new leases, companies will be enticed to turn their attention and investment dollars to prospects in other parts of the country or the world, where volumes are unlikely to compete with the comparative efficiencies and environmental advantages of U.S. offshore production that should continue to play a large role in meeting future demand. The opportunity for a successful national energy policy and the billions of dollars of multi-year investments needed to realize additional offshore production depends on duly holding robust OCS lease sales and the expeditious implementation of the 2024-2029 GOM OCS Leasing Program.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America.
Andy Radford-4	1/14/25 Public Meeting	I'm Andy Radford, a Senior Policy Advisor with the American Petroleum Institute. The API is a national trade association representing nearly 600 members, and they have significant interest in ensuring that the limited leasing options available in the 2024 to 2029 five-year program are realized, and then that the environmental analysis that support these plans sales are robust and accurate. Future opportunities for offshore oil and gas leasing are crucial, so the United States can continue to capitalize on years of successful and beneficial exploration, development, and production of domestic OCS oil and natural gas resources. The decisions made regarding future leasing will have short- and long-term implications for our nation's energy and national security, prospects for job creation and government revenue generation. And given the recent announcement of the withdrawal of nearly the entire U.S. from future leasing and development opportunities. The importance of holding this and future lease sales cannot be understated.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. In reference to the statement about the withdrawal of areas of the OCS from oil and gas leasing, please note that the areas identified in the Gulf of America Area ID memo are not within the areas withdrawn from OCS oil and gas leasing by former President Biden.
API et al.-19	BOEM-2023-0046-3145	"The President has issued two Executive Orders (EOs) highlighting the importance of increasing national energy production, including through increased OCS leasing. The first executive order, titled "Unleashing American Energy," finds that it is "in the national interest to unleash America's affordable and reliable energy and natural resources," and declares that it is "the policy of the United States. . . to encourage energy exploration and production on federal lands and waters, including the Outer Continental Shelf, in order to meet the needs of our citizens and solidify the United States as an energy leader long into the future." Executive Order No. ___, sec. 1, 2(a) (January 20, 2025). The EO directs that the heads of all agencies review all agency actions to identify those that impose an "undue burden" on the use of domestic energy resources and develop action plans to "suspend, revise or rescind" those actions. Section 3(a), 3(b). A second executive order, titled "Declaring a National Energy Emergency," finds that the "energy . . . identification, leasing, development, production, transportation, refining and generation capacity of the United States are all far too inadequate to meet our Nation's needs" and that "the integrity and expansion of our Nation's energy infrastructure – from coast to coast – is an immediate and pressing priority for the protection of the United States' national and economic security." Executive Order No. ___., sec. 1 (January 20, 2025). One of its provisions directs heads of agencies to "identify and exercise any lawful emergency authorities available to them, as well as all other lawful authorities they possess," to facilitate the "identification, leasing, siting, production, transportation, refining and generation of domestic energy resources, including, but not limited to, on Federal lands." Section 2(a) (emphasis added)....."	Thank you for your comment. BOEM is complying with the two E.O.s discussed in the comment. In addition, BOEM will comply with Secretary's Order 3417, "Addressing the National Energy Emergency" (February 3, 2025).

Commenter	ID Number	Comment	Response
API et al.-20	BOEM-2023-0046-3145	"The U.S. is now a global leader in both emissions improvements and energy production, thanks to the innovation and vitality of the U.S. oil and gas industry. We believe it is critically important to bring proper attention to the enormous benefits derived from continued oil and gas exploration and development on the OCS. It is just as critical that we highlight that significant curtailment of new offshore oil and gas leasing would effectively reduce our domestic energy supply but would not significantly reduce our demand for energy. Curtailment of leasing likely would result in the need for more oil and gas from countries with less stringent environmental standards and generate more GHG emissions than those associated with GOM deepwater production….The DPEIS explains that ongoing exploration and development in the GOM OCS contributes to national energy needs "by contributing supply as well as benefits in terms of the balance of payments, energy security, technology, revenues, and employment." Id.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. BOEM acknowledges the efforts of the offshore oil and gas industry and the benefits provided to the GOA region. For a detailed analysis of the economics associated with OCS oil and gas leasing, please refer to **Chapter 4.15** of the PEIS. In reference to the statement about the withdrawal of areas of the OCS from oil and gas leasing, please note that the areas identified in the Gulf of America Area ID memo are not within the areas withdrawn from OCS oil and gas leasing by former President Biden. In addition, leasing is not expected to be curtailed based on E.O. 14154 "Unleashing American Energy" (January 20, 2025), which states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS, in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future.
API et al.-21	BOEM-2023-0046-3145	Oil and gas activities contribute billions of dollars to federal and state governments every year, which support important programs like education, infrastructure, and conservation efforts. In 2023 alone, DOI disbursed nearly $12 billion generated from energy production on federal lands and waters to the U.S. Treasury and state governments. In fiscal year 2024, the industry paid more than $660 million in bonus bids and lease rentals, and more than $16 billion in total revenue. The Land and Water Conservation Fund, which is funded almost entirely by offshore oil and gas revenues, receives $900 million a year to support outdoor recreation and conservation efforts nationwide. Congress has also provided for up to $1.9 billion a year of revenues received from energy production on public lands, including oil and gas leasing, to be used to address critical deferred maintenance projects and improve transportation and recreation infrastructure in national parks, national wildlife refuges and recreation areas, and Bureau of Indian Education schools.	Thank you for your comment. BOEM recognizes the impact of offshore oil and natural gas development has on the economy and discusses the economic factors of a lease sale in **Chapter 4.15** of the PEIS. In addition, BOEM discusses the Gulf of Mexico Energy Security Act of 2006 and revenue sharing with states in the *Gulf of America OCS Regulatory Framework* (BOEM 2025). More information on revenue sharing with states can be found at: https://revenuedata.doi.gov/how-revenue-works/gomesa/.
API et al.-22	BOEM-2023-0046-3145	The ability of U.S. producers to provide more oil and gas supplies to the world market has not only created global environmental benefits, but also changed geopolitical dynamics for the better, resulting in greater energy security for the U.S. and its allies. Given the current global circumstances, seldom has domestic energy security been more essential. To achieve this, policymakers must put in place policies, including prompt development of the 2024-2029 GOM OCS Leasing Program, that support energy investment, create new access, and keep regulation from unnecessarily restricting energy growth. The GOM OCS has been the backbone of U.S. energy production for years; it currently provides 1.9 million of barrels of oil equivalent per day, amounting to 14% of total U.S. crude oil production. Regular and predictable lease sales and permit and plan reviews and approvals provide the industry the necessary confidence to make the long-term investments required for offshore development, particularly given the magnitude of the investments required for deepwater projects. As technology improves, additional infrastructure becomes available, and economic conditions change, OCS exploration and development trends will continue, so long as sufficient acreage is made available through lease sales. Because of this evolution, it is important to allow innovative companies the opportunity to pursue new leases to safely test groundbreaking geologic concepts and to employ advancements in drilling and production technology. A continuous stream of new discoveries is needed to replace depleting reserves and help maintain or increase production levels. Unduly restricting areas for new leasing would impede the opportunity to fully utilize newer technologies that are safer, more reliable, more environmentally friendly, and more energy efficient, and would instead focus efforts on older reservoirs that will likely require more energy to extract and process production as they near depletion.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. BOEM's PEIS was prepared under our legal obligations under NEPA to inform decisions pursuant to the Outer Continental Shelf Lands Act. By analyzing the lease sales proposed in the National OCS Oil and Gas Program at a regional level, BOEM provides the Secretary of the Interior with a robust analysis as the background for the decisionmaker to decide which OCS areas to offer for sale and under which conditions, which will be documented in the Record of Decision at a later time. The Secretary retains the discretion at the lease sale stage to determine whether, when, and under what terms, a lease sale should be held and the precise acreage to be offered. With reference to the acreage available for lease, all alternatives analyzed in this PEIS are under consideration as part of BOEM's robust environmental review process. The alternative will be selected by the Assistant Secretary of Lands and Minerals Management (as the delegated authority). They will also sign the Record of Decision and decide whether to hold a lease sale. In reference to safely testing advancements to drilling and production technology, please refer to **Chapter 3.2.6** of the PEIS and Chapter 5.2.3.4 of the SID, which discuss New and Unusual Technology (NUT). BOEM reviews all submitted OCS plans and applications to identify any proposal to use NUTs to develop a lease. If it is determined in a NUT review that the proposed technology creates an effect on safety and environment that is greater than conventional (proven) technology, an EA will be required for the submitted plan or application.

Commenter	ID Number	Comment	Response
Karen Palmertree-1	1/15/25 Public Meeting	My name is Karen Palmertree…. With Louisiana having natural resources of oil and gas readily available, we welcome the opportunity to share with the nation. I urge you to open up leasing in the Gulf for not only me, but my grandchildren homeless men that are in need of income to support themselves and their family, and our country, that has to secure oil independence so we are not at the mercy of bad actors n outside countries. Thank you.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America.
Barbara Houk-1	1/15/25 Public Meeting	Hello, I'm Barbara Houk. I'm a retired physician, I'm a lifelong learner…. \ The people of the United States have enjoyed a cleaner environment. However, within my lifetime I have seen our country go from energy exporter to energy dependent. Then again, energy exporter. And currently we are energy dependent. Being energy dependent affects all aspects of the United Sates economy. Proper regulation is the common denominator. I urge you, the B-O-E-M commission to continue releasing permits for offshore drilling. The continuing production of offshore drilling provides a positive impact on the quality of life of the people of the United States. Thank you for listening to me. \	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. BOEM and BSEE are constantly evaluating and responding to potential risks through strengthening enforcement and inspection, and continually updating regulatory requirements. To learn more about regulations for OCS oil and gas leasing, please refer to Chapter 5 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS.
Mark Corson-1	1/15/25 Public Meeting	My name is Mark Corson. I live in Ohio. I live in Bay Village, Ohio, on the shores of Lake Erie…. The USA needs a strong source of royalties and taxes. The oil and gas industry provides good, high paying, skilled careers. The Gulf of Mexico is a major source of oil and gas for the USA. When I worked for Shell, a major focus was on the exploration of production of oil and gas in the Gulf of Mexico…. I am aware of the very long lead time and the billions of dollars to develop a new field. It can take up to ten years and billions of dollars in upfront investments. I urge the Bureau of Ocean Energy Management to approve leases in the Gulf of Mexico. Thank you.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America.
Darrel Tanner-1	1/15/25 Public Meeting	Yes, I'm Darrel Tanner. I'm 65 years old and I am an Army veteran. For the past 25 years, I have proudly called Louisiana home…. I have always had a great appreciation for the work the regulatory bodies, such as the Bureau do in overseeing and ensuring that the gas industry operates in a safe and responsible manner. Regulation is essential to maintaining environmental safety, and I fully support continued efforts to ensure that the production and transportation of natural gas are done in a way that minimizes risk and protects our environment. As a veteran, I recognize the crucial role that natural gas and energy production play in our economy and national security. Our country's energy independence is essential not just for our economic growth, but for our strategic position on the global stage. If we are to remain strong and self-reliant, we must continue to invest in domestic energy production. Without it, we will become over – overly reliant on foreign nations, some of whom are not our best interests at heart. The energy industry is the backbone of much of the economy. Oil and gas production creates jobs, stimulates local economies and empowers the industries that drive energy and growth. Domestic production, in particular, is vital. American oil and gas can be produced right here at home, ensuring that our energy supply remains safe and reliable. This not only helps stabilize our economy, but also reduces the risk of being caught in an energy crisis caused by economic international instability. For the future of our country I urge the condition to continue supporting and allowing drilling activities, as this is essential for the long term prosperity and security of our nation.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. BOEM and BSEE are constantly evaluating and responding to potential risks through strengthening enforcement and inspection, and continually updating regulatory requirements. To learn more about regulations for OCS oil and gas leasing, please refer to Chapter 5 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS. In addition, the economic impacts of OCS oil and gas leasing in the Gulf of America are detailed in **Chapter 4.15** of the PEIS.

Commenter	ID Number	Comment	Response
Jim Dill-1	1/16/25 Public Meeting	Good evening. My name is Jim Dill and I'm a citizen from Lafayette Louisiana…. Here in South Louisiana the oil industry touches every aspect of our lives. Many of my friends and family work in the oil industry today. Many more formerly worked in the industry…. The price of fuel obviously hits my personal pocketbook and that of my children. It is not only the cost of fueling our cars or cooling our homes it drives the cost of our food all of the things that we need to live. Remember virtually everything that you touch on a daily basis comes on a truck. From the food that you eat to the clothes that you wear and the medicine that you give your children. It all spends time on a truck. Like many other parents, grandparents and probably yourselves I believe that our energy independence is critical to our national security and economy so that the generations that will follow us will be safe and secure. As one who spends a good bit of time on our Gulf waters, I will say that I am impressed at how well they have been protected and preserved by those charged with their care, including you at BOEM. It is my sincere request that you increase drilling lease sales in the Gulf of Mexico. My friends and family rely upon those jobs to support themselves and their families. There is no place in the world that can explore and produce fossil fuels more safely and efficiently than we can here in Louisiana and in the United States. In my opinion forcing production to other countries is more detrimental to our global environment than producing it here. We are the leaders in environmental protection and innovation. Let the American way be the example for the rest of the world to follow. Producing it here allows us to secure our own safety, our economy, and make sure that the generation that follows us can survive and thrive. Thank you.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. BOEM and BSEE are constantly evaluating and responding to potential risks through strengthening enforcement and inspection, and continually updating regulatory requirements. To learn more about regulations for OCS oil and gas leasing, please refer to Chapter 5 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS. In addition, the economic impacts of OCS oil and gas leasing in the Gulf of America are detailed in **Chapter 4.15** of the PEIS.
Steve Epstein-1	1/16/25 Public Meeting	My name is Steve Epstein and I've been a New Mexico resident for most of my adult life…. I have personally witnessed the impact the oil and gas industry has on the economy of New Mexico. New Mexico is the second highest oil producer in the United States….. The miracle of oil and gas production should be embraced by the Gulf states as well. The United States must maintain energy independence to avoid depending on nations that are adversarial to our interests. Oil and gas production keeps our energy costs low…. Oil and gas extraction has proven to be much cleaner and safer with oil spills becoming minimal risk. It is imperative that more oil and gas leases in the Gulf of Mexico be approved to start on exploration and projects sooner in order to maintain our energy independence. Also, more oil and gas extracted will allow the United States for exports to supply our allies with better and cleaner energy. Developing nations would also benefit from our oil and gas exports. In conclusion I urge the Bureau of Ocean Energy Management to approve more leases for oil and gas production in the Gulf of Mexico to maintain our energy independence and prevent increase in energy prices. Thank you.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America.

Commenter	ID Number	Comment	Response
Annie Cook-1	1/16/25 Public Meeting	Hello, my name is Annie Cook. I've been a resident of New Mexico since 1971 when I moved here from Kansas…. I appreciate the work the Bureau of Ocean Energy Management does to protect our environment from possibly harmful industrial processes. Today I'd like to discuss the urgent need to increase the number of sales leases for drilling in the Gulf of Mexico. I've outlined several reasons why I feel we must increase the sales leases in a mindful way which preserves not only our beautiful coastlines but our marine environments as well. An important issue for me is national, national security. As a supplier of oil and gas for our allies in Europe and Asia increasing the number of allowed sales leases will not only increase our defense capabilities but it will help our allies reduce their reliance on Russian gas while we increase our strategic oil reserves which are essential for the defense of our country…. In conclusion it is vitally important that we increase the number of sales leases in the Gulf of Mexico in order to assure our national security and the security of our allied nations as well. Thank you for your consideration of this issue.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America.
Vivian Funkhouser-1	1/16/25 Public Meeting	Good evening, folks. I'm Vivian Funkhouser. I'm a retired corporate executive and current small business owner…. My interest to see this industry grow are not only from my own financial and social reasons but more importantly for the bigger picture for our nation. This is all about clean energy investments and energy independence not just for Pennsylvania citizens but for all the citizens across our nation. And in my social circles this topic has come up and my colleagues and friends do welcome more gas and oil drilling. We realize there are a lot of things that go into these projects and pulling the trigger requires a lot of considerations. I appreciated the evaluation that I saw in the slides, not the least of which are regulatory and environmental that you also highlighted. Despite the hurdles We do hope that brings additional leases for drilling to the USA especially in the Gulf of Mexico. Such investments lead to an improved economy and help us all achieve our goal of being energy independent at an affordable cost. ….As we say, the call to action is to stop evaluating and assessing and simply to start drilling. Let's get those leases going. That's what Americans want. And the risk benefit analysis shows that there are more benefits than risks for the United States. So, let's get moving by continuing with the offshore project leases in the Gulf of Mexico. Thank you.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. In addition, the economic impacts of OCS oil and gas leasing in the Gulf of America are detailed in **Chapter 4.15** of the PEIS.

Commenter	ID Number	Comment	Response
Roger Sutton-1	1/16/25 Public Meeting	Good evening. My name is Roger Sutton, a resident of Pennsylvania and I am a father of three grown children…. The Bureau of Ocean Energy Management provides overseeing of our Gulf leases and make sure that the service is safe and secure energy for the present and the future. I am requesting the release of more gas and oil leases in the Gulf of Mexico. This decision will provide not only reasonably priced energy for retired citizens like myself on fixed incomes, it will stimulate the economy with good paying jobs not to mention keeping our national security safe. This decision to release more leases not only has a direct effect for the present but will provide a better future for our children. We need to be energy leaders because we will do a safer job environmentally than relying on foreign countries with lower safety standards. These reasons are why I'm asking you to release the oil and gas leases from our present for our present and future. Thank you.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. In addition, the economic impacts of OCS oil and gas leasing in the Gulf of America are detailed in **Chapter 4.15** of the PEIS.
Willian Aucoin-1	1/16/25 Public Meeting	Hello. My name is William Aucoin and I'm a proud Cajun, born, raised and still living in the heart of South Louisiana…. The oil and gas industry has fueled our past, our present and will continue to fuel our future. It's not just an economic engine but the foundation of which so many industries and technologies are built. When we look at our world today it's clear that we're deeply dependent on oil and gas. It's not just a luxury, it's a necessity. From the fibers in our clothing to plastics in medical devices like my continuous glucose monitor and the components that make up the devices we use every day, petroleum is an area of everything. These are not just conveniences. These are critical components of modern life. So, it's not just about wanting more oil and gas exploration, it's about needing it for ourselves and for the generations that follow. That's why I'm here today to ask for your support in promoting more oil and gas exploration. We need to continue to invest in and explore new sources of energy not just to keep our economy strong but to ensure our nation's energy independence and security. If we work together, we can set an example for the world demonstrating that it's possible to produce energy in a safe efficient and environmentally responsible way. It's important that we all recognize the critical role this industry plays, and I hope we can count on your help to keep it strong for years to come. I urge you to continue issuing leases for drilling in the Gulf of Mexico. Thank you all for taking the time to listen to my comment.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. In addition, the economic impacts of OCS oil and gas leasing in the Gulf of America are detailed in **Chapter 4.15** of the PEIS.
Peggy Lough-1	1/16/25 Public Meeting	Hello. My name is Peggy Lough, and I thank you for your time and efforts with this Bureau….We value the economic advantages of oil and gas to keep prices as low as possible and that is why I strongly support drilling in Colorado as well as in the Gulf of Mexico…. I urge you please continue to grant oil and gas leases in the Gulf of Mexico and extend the time frame that these leases can be applied for. I know you are tasked with also keeping the environment safe. Thank you for your work to keep these leases productive in a safe way that benefits all Americans that have fought so hard to earn them. Thank you very much for that comment.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America.

Commenter	ID Number	Comment	Response
John Lough-1	1/16/25 Public Meeting	Thank you again for this opportunity for you to hear my thoughts concerning the issue of oil and gas drilling in the Gulf of Mexico. My name is John Lough…. Like others living in a rural community, we feel there is a fair solution between protecting the environment and protecting our economy. In that respect, for the past several years, we have been watching and partaking in the discussions with our state government concerning the oil and gas industry in Colorado…. … I believe we can ensure that oil and gas production in the Gulf of Mexico can be done safely while realizing it is at the heart of solving economic issues at the federal level as well. So, as you evaluate drilling requests and their impact on the environment and evaluate their positive impact on our way of life, I urge you to continue to issue and renew oil and gas offshore leases in the Gulf of Mexico. Thank you very much for your time.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. BOEM and BSEE are constantly evaluating and responding to potential risks through strengthening enforcement and inspection, and continually updating regulatory requirements. To learn more about regulations for OCS oil and gas leasing, please refer to Chapter 5 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS.
Dianne James-1	1/16/25 Public Meeting	Hi, I'm Dianne James from Louisiana…. We support offshore drilling due to the impact on American families and small business success. Everyone should care about oil and gas drilling in the Gulf. It has far reaching effects on our economy, our jobs, our community in the United States. Lastly, I urge the Commission to allow the drilling to continue in the Gulf. It's common sense to me. It has a positive impact by increasing funds for education and it helps to lower the prices for businesses and families. Thank you.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. In addition, the economic impacts of OCS oil and gas leasing in the Gulf of America are detailed in **Chapter 4.15** of the PEIS.

Commenter	ID Number	Comment	Response
Jerry Laye-1	1/16/25 Public Meeting	Hello. My name is Jerry Laye. I'm 83 years old. I've been proud to call Louisiana my home for 47 years. I grew up in West Virginia where coal was king. The entire community and economy revolved around the energy industry. It's from these roots that I have gained an understanding of how deeply energy, particularly oil and gas, impacts our way of life. I am a retired chemical engineer and college educator with over 65 years of experience in global energy sector. Over the course of my career, I've been seeing the evolution of energy production use and technology. I've worked with professionals from all over the world. What I've learned and what I firmly believe is that the oil and gas industry is foundational to our modern world. It's not just the energy we consume it's the bedrock on which our economies, our societies and our daily lives are built. One point I would like to emphasize that all sectors of society benefit from the safe and environmentally responsible production of oil and gas energy. When we talk about energy sector jobs, like exploration drilling and production, we should also talk about the livelihood of those that depend on the goods and services that this industry supports and needs. Economic studies show that for every highly paid industry worker there are typically 5 to 10 additional people gainfully employed in supporting sectors. These include food, clothing, housing, healthcare, communications, and public services. Public services includes such as teachers, firefighters, police officers, public utility workers, and administrators. All of these are integral to the functioning of a modern society. They rely on the economic health that come from the thriving energy industry. These are the jobs and services that families depend on every day. In summary the production and use of oil and gas energy are not only essential to maintaining our current lifestyle, they are critical to the ongoing stability and growth of the national economy. The oil and gas industry has made significant investments in training and ensuring the safety of its workforce as well as in minimizing its environmental footprint. These efforts are proof of the commitment the industry has to both people and the planet. I urge the Commission to carefully consider the consequences that may result from undue restrictions. Thank you.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. In addition, the economic impacts of OCS oil and gas leasing in the Gulf of America are detailed in **Chapter 4.15** of the PEIS.

Commenter	ID Number	Comment	Response
Mike DeMetz-1	1/16/25 Public Meeting	….My name is Mike DeMetz, and I am a health, safety, and environmental advisor in the deepwater Gulf of Mexico on what is called a Spar Production facility. I've been involved in the oil and gas industry for the last 40 plus years both on land and offshore domestically and internationally…. I think all of us are interested in clean energy and the Gulf of Mexico operators at least in the deepwater where the majors operate do a very good job of providing that. It's vitally important that the Gulf of Mexico be opened up for exploration. A typical well in the deepwater Gulf of Mexico produces 15 to 20,000 barrels of oil and 5 to 10,000,000 cubic feet of natural gas per day. These wells tend to produce 7 to 10 or more years at these volumes. As opposed to land wells that produce 100 to 200 barrels a day and 2 to 3,000,000 cubic feet of natural gas per day for about 2 or 3 years…. … the deepwater Gulf of Mexico is much more prolific. When viewing the roles of all personnel, providing thousands of well-paying jobs contribute significantly to the national economy and local economies. I would like to urge this commission to issue more leases for exploration throughout the entire Gulf of Mexico including that portion of the eastern Gulf that has historically been closed off to exploration. Thank you very much.	Thank you for your comment. We note that you support OCS oil and gas leasing in the Gulf of America. For the activity scenario, including OCS oil and gas production estimates, please refer to **Chapter 3.3** of the PEIS. With respect for the request to open the portion of the Eastern Gulf of America that has been historically closed to OCS oil and gas production, this area of the OCS designated by section 104(a) of the Gulf of Mexico Energy Security Act of 2006, Public Law 109–432, was withdrawn from OCS oil and gas leasing by President Trump on September 8, 2020 through a Presidential Memorandum, which expires June 30, 2032. Therefore, leasing can not occur in this area at this time.

Oppose

Commenter	ID Number	Comment	Response
Sean Tran-4	1/16/25 Public Meeting	New oil and gas leasing is no longer necessary. The fossil fuel industry is already extremely well positioned to pursue offshore development. Companies are currently in possession of more than 2200 active leases spanning more than 12 million acres of offshore territory in the Gulf. Yet only about 20% of these active leases have started producing oil and gas, leaving almost 10 million acres available for industry to develop for many years. The oil and gas industry does not need more of our ocean.	Thank you for your comment. With respect to new OCS oil and gas leasing, E.O. 14154, “Unleashing American Energy” (January 20, 2025), states that it is the policy of the United States to encourage energy exploration and production on Federal lands and waters, including on the OCS, in order to meet the needs of our citizens and solidify the United States as a global energy leader long into the future. In reference to the timeline of the beginning of development and production for OCS oil and gas leases, please refer to **Chapter 3.2** of the PEIS, for information on timing of lease development. OCS production on a lease may take many years to begin, and peak production may not occur until some point in the future. It could take 10 years from obtaining a lease to first production of a well.

TOPIC 10 – DECOMMISSIONING

Commenter	ID Number	Comment	Response
CBD - 3	BOEM-2023-0046-3142	BOEM's DPEIS fails to comply with NEPA and OCSLA because it does not take a hard look at the proliferation of defunct oil and gas infrastructure in the Gulf and it fails to consider the harm to economic and social values caused by billions of dollars in potential federal liability for decommissioning of orphaned infrastructure. Specifically, BOEM's analysis fails to consider how a lease sale—particularly one authorizing leases in deepwater—will exacerbate the harmful economic and societal impacts of oil and gas infrastructure that is idle,[7] orphaned,[8] or otherwise overdue for decommissioning.	Thank you for your comment. New information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3** and **4**, **Appendix B**, and **Appendix C** of the PEIS. BOEM enforces its right to secure financial assurance for decommissioning pursuant to regulations found in 30 CFR 556.900 et seq. (see **Appendix C.3.2**). The regulations outline the criteria for BOEM to require supplemental financial assurance under certain circumstances. In 2016, BSEE amended its regulations addressing decommissioning expenditure reporting to include decommissioning expenditure summaries for right-of-way and lease term pipelines, and in 2017, BSEE issued Notice to Lessees and Operators No. 2017-N02, *Reporting Requirements for Decommissioning Expenditures on the OCS*, regarding submission of certified decommissioning cost expenditure summaries following permanent plugging of any well, removal of any platform or other facility, clearance and verification of any site, and decommissioning of pipeline segments. The information is used to improve estimates of future decommissioning costs, which BOEM can apply to set necessary financial assurance levels to minimize the possibility that the taxpayers, through the government, will incur the costs of decommissioning when financial assurance amounts are insufficient or require more financial assurance than necessary to cover future decommissioning liabilities (see **Appendix C.3.2**). Additionally, pursuant to DOI regulations, predecessor lessees are jointly and severally liable for meeting decommissioning liabilities. Moreover, financial assurance can be used to cover decommissioning costs. Given these regulatory and financial safeguards, the risks of federal liability for OCS oil and gas operations are not expected to notably increase as a result of the proposed action.
CBD - 4	BOEM-2023-0046-3142	According to a 2024 GAO report, "[n]early half of the approximately 8,000 wells and 1,600 platforms remaining offshore are approaching or past the end of their useful life," and over 75% of end-of-lease and idle infrastructure in the Gulf was overdue for decommissioning as of 2023, representing over 2,700 wells and 500 platforms.[36] Troublingly, the number of overdue wells could nearly double by 2030.[37] The GAO further found the following: • For Gulf leases that ended between 2010 and 2022, "industry operators missed BSEE's deadline to decommission within 1 year for more than 40 percent of wells (about 4,700 of 10,600) and 50 percent of platforms (about 1,300 of 2,300) . . . . Of these, nearly 2,000 wells (19 percent) and 400 platforms (17 percent) remained to be decommissioned as of June 2023."[38] • For leases that ended in any year, "more than 1,700 end-of-lease wells and nearly 400 end-of-lease platforms in the Gulf of Mexico were overdue for decommissioning as of June 2023 and considered delinquent by BSEE. This backlog of overdue infrastructure represents more than 75 percent of the almost 2,300 wells and 500 platforms due for decommissioning because their leases ended."[39] • "Within the backlog of 1,700 overdue end-of-lease wells, . . . operators had not temporarily plugged more than 700 as of June 2023—meaning, they had not taken interim steps to install long-term barriers to prevent leaks before decommissioning. Moreover, some of the backlog had been overdue for extended periods of time—nearly 1,300 of the 1,700 wells and more than 300 of the 400 platforms are on leases that ended more than 2 years prior."[40] A 2021 GAO report also found that 97% of decommissioned pipelines in the Gulf—a staggering 18,000 miles—remain on the seafloor.[41] Though BSEE's regulations mandate removal of pipelines unless it waives the requirement,[42] the exception has plainly swallowed the rule.	Thank you for your comment. **Appendix C** of the Programmatic EIS acknowledges the findings and recommendations of the GAO reports. The oversight of industry decommissioning activities spans multiple BSEE organizational units, in close coordination with BOEM. BOEM and BSEE are continually implementing process and regulatory improvements to drive timely decommissioning performance and enhance environmental stewardship. As noted previously, new information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3** and **4**, **Appendix B**, and **Appendix C** of the PEIS. It is also important to note that only 1-23 new production structures (including subsea) located in deepwater (>200m) would be expected from a single proposed lease sale over the 40-year analysis period. The numbers noted in the comment are cumulative over multiple lease sales over many decades. The impact of decommissioning this infrastructure is addressed in **Chapters 3** and **4**, **Appendix B**, and **Appendix C** of the PEIS**.** While there is a potential that infrastructure would not be timely decommissioned or become orphaned, the analysis presumes, as is reasonable, that the infrastructure will be decommissioned according to the regulations. Moreover, wells and platforms are being decommissioned, in accordance with BOEM and BSEE regulations, at much higher rates than installations over the past decade. The updated historical data and trends provided in **Chapter 3** and **Appendix C** of the PEIS highlight the drastic decommissioning of wells and platforms over the last 20 years. In 2000, there were approximately 4,000 platforms in the GOA. By the end of 2024, the number of structures in the GOA dramatically decreased to roughly 1,400 platforms (see **Figure C-1**). In 2000, there were approximately 16,000 active or non-decommissioned wells compared to less than 5,000 by the end of 2024 (see **Figure C-2**). Operators may request an extension of the regulatory one-year deadline to decommission, which BSEE has authority to grant due to any individual or combination of the factors as discussed in **Appendix C.1**. Regarding idle structures, BSEE developed NTL No. 2018-G03 to clarify when the Bureau may deem infrastructure "no longer useful for operations" and "not capable of oil, gas, and sulphur production in paying quantities" and the associated timeframes for decommissioning work. The NTL also includes guidance for the submittal of supporting documentation for review and concurrence. Operators are required to perform pollution and safety system inspections throughout the life of all platforms, including idle platforms. Safety and environmental-compliance inspections are maintained on idle infrastructure, prior to and after issuance of BSEE orders as outlined in **Appendix C.3**. The focus of these safety and environmental-compliance inspections are the same as that for active facilities. Even when BSEE concurs that a well may be useful and is capable of

Commenter	ID Number	Comment	Response
		BOEM's DPEIS acknowledges the GAO's findings and states that the U.S. Department of the Interior (DOI) is working to implement the report's policy recommendations designed to limit the growing scale of the decommissioning crisis.[43] Efforts include strengthening BSEE's enforcement and oversight of decommissioning and updating regulations pertaining to decommissioning, financial assurances, and operator qualification.[44] The DPEIS also recognizes that "[a]s of September 2024, there are over 950 idle wells and 175 idle facilities identified by BSEE on the Gulf of Mexico OCS," and states that this infrastructure is subject to safety and environmental compliance inspections.[45] It further states that "[a]pproximately 1,350 platforms (i.e., caissons, well-protector structures, and jacketed and floating facilities) remain on the OCS, with more than 60 percent of these facilities being more than 25 years old."[46] However, the DPEIS fails to include any analysis of how new lease sales will exacerbate the ongoing decommissioning crisis and what mitigation measures BOEM will take to prevent the proliferation of idle, end-of-lease, and orphaned infrastructure. Nor does it predict how much infrastructure could become idle as a result of the Proposed Action (and for how long), or how much of it is likely to become orphaned. For example, BOEM anticipates that under the Proposed Action, between 948 and 1,281 production structures located in deepwater (>200m) will require decommissioning.[47] This number represents a significant expansion of deepwater decommissioning obligations: between 1989 and 2017, only 23 structures were decommissioned in depths greater than 122m.[48] Because deepwater infrastructure is the most complicated and costly to decommission,[49] BOEM should consider the strong likelihood that some portion of this infrastructure will become orphaned.[50] Additionally, the DPEIS assumes that decommissioning-in-place of most pipelines will continue, yet it fails to predict and analyze the permanent impacts of thousands of miles of pipeline littering the seafloor.[51] Thus, BOEM's DPEIS fails to take the requisite hard look at the impacts of a lease sale by failing to consider the growing scale of infrastructure that is idle, orphaned, or otherwise overdue for decommissioning and how the Proposed Action will intensify and prolong this problem. Moreover, BOEM failed to consider an alternative—other than the no-action alternative—that would prohibit the issuance of leases to any company with extant overdue decommissioning obligations.	producing in paying quantities, companies are informed that they may still be required to ensure the well is secured and that producing zones are isolated to prevent potential safety and environmental impacts. Regarding pipelines, BSEE currently uses surveys conducted under NTL No. 2022-G01 to support pipeline planning and permit reviews. This NTL clarifies requirements regarding pipeline pre-installation surveys, pipeline maintenance and monitoring, pipeline burial during installation, and pipeline removal during decommissioning. When determining whether to allow pipeline decommissioning-in-place (DIP), BSEE takes into consideration factors like navigation and commercial fishing operations, other uses of the OCS, and potentially adverse environmental or archeological effects prior to approving any and all applications for either DIP or removal. Furthermore, if BSEE determines a pipeline previously approved and DIP could now interfere with other uses of the OCS, or cause undue or serious harm or damage to the human, marine, or coastal environment, BSEE reserves the right to mandate its removal in accordance with 30 CFR 250.Q. BSEE recently awarded a study that seeks to improve BSEE and BOEM's oversight of pipeline subsea infrastructure by assessing the potential environmental impacts from pipelines and pipeline subsea infrastructure (including DIP) on the coastal and marine waters, and the associated ecosystems and sensitive habitat/species of the Gulf of America OCS. The study focuses on the contamination risk from residual potentially-hazardous materials within pipelines and associated equipment (e.g., scale, paraffin, chemicals, NORM), after decommissioning requirements and/or seawater flushing is complete, as per the current regulations in 30 CFR 250.Q. A sampling plan was developed, and collection efforts and subsequent laboratory assessments are expected over a two-year period. Once the final report is prepared, the research findings will be made available to BOEM to assist with future NEPA analyses that support BSEE's pipeline permitting program, and for assessing if future policy or regulatory modifications are warranted. See the comment response CBD-1 for details on BOEM's policy to mitigate the risk of unaddressed decommissioning.

Commenter	ID Number	Comment	Response
CBD - 5	BOEM-2023-0046-3142	The DPEIS also fails to comply with the financial mandates of OCLSA, which direct BOEM to manage the OCS "in a manner which considers *economic*, *social*, and environmental values of the renewable and nonrenewable resources contained in the outer Continental Shelf."[52] Specifically, BOEM's analysis fails to consider the increasing number of operator bankruptcies, the potential federal exposure to billions of dollars in decommissioning liability, and the major shortfall in financial assurances to cover that liability. These factors, which can result from the proliferation of defunct oil and gas infrastructure that is not decommissioned in a timely manner, threaten to cause significant harm to the nation's economic and social values and will only be exacerbated by the Proposed Action. Indeed, as the DOI's Office of Inspector General (OIG) recently admonished, "it is critical for DOI leadership to have clear and accurate information on the financial and programmatic impact that bankruptcies have on the oil and gas program in order to effectively and efficiently manage these programs and make policy decisions."[53] The DPEIS fails to consider this critical information. BOEM and BSEE are currently exposed to *billions* of dollars in potential decommissioning liability, which will only increase if BOEM allows drilling to expand in the Gulf, particularly into ever-deeper waters. The DPEIS fails to quantify how much new decommissioning liability the Proposed Action will generate or how much of it is likely to be covered by financial assurances. It also fails to consider how the Proposed Action will compound taxpayer liability over time because of the growing number of industry bankruptcies. Though the DPEIS identifies various impact-producing economic factors—including "socioeconomic changes and drivers, unintended releases into the environment, response activities, strikes and collisions, and climate change"—it fails to acknowledge or analyze the economic impact of delayed decommissioning and operator defaults.[86] Thus, BOEM's DPEIS fails to comply with OCSLA because it has failed to consider the negative impacts that delayed decommissioning will have on economic and social values, including federal decommissioning liability resulting from operator bankruptcies, the major shortfall in financial assurances, and the administrative burdens placed on the DOI in pursuing decommissioning performance through the bankruptcy process and joint and several liability.	Thank you for your comment. New information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3 and 4**, **Appendix B**, and **Appendix C** of the PEIS. BOEM enforces its right to secure financial assurance for decommissioning pursuant to regulations found in 30 CFR 556.900 et seq. (see **Appendix C.3.2**). The regulations outline criteria for BOEM to require supplemental financial assurance when certain regulatory factors are met. Additionally, pursuant to DOI regulations, predecessor lessees are jointly and severally liable for meeting decommissioning liabilities. Moreover, financial assurance can be used to cover costs of decommissioning. See the response to CBD-3 for additional information regarding financial assurance. Given these regulatory and financial safeguards, the risks of federal liability for OCS oil and gas operations are not expected to notably increase as a result of the proposed action.
CBD - 6	BOEM-2023-0046-3142	BOEM's DPEIS also fails to comply with NEPA because it does not take a hard look at the numerous foreseeable cumulative environmental impacts of delayed decommissioning that will result from the Proposed Action, including of idle, orphaned, and overdue infrastructure. As the DPEIS acknowledges: Deteriorated facilities increase safety risks to industry personnel and even BSEE inspectors due to degraded boat landings, gratings, ladder wells, and handrails needed to access and traverse platforms. Firefighting and other safety equipment on idle facilities may not function when needed, and the risk of vessel collisions may also increase if lighting and other navigational aids are not maintained on idle platforms. Similarly, deteriorated tanks, piping, storage units, and other equipment may lead to a loss of integrity and leaking of hydrocarbons and other contaminants into coastal and marine waters, which may lead to acute and chronic impacts to seabirds, fish, and other marine protected species in the vicinity of the structure. Storm-toppled wells and facilities may introduce broad environmental hazards due to hydrocarbon and contaminant leaks from the damaged wells and submerged tanks, piping, and equipment. There are also increased safety	As noted previously, BOEM and BSEE agree that analysis regarding existing infrastructure on the OCS is necessary. Accordingly, new information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3** and **4**, **Appendix B**, and **Appendix C** of the PEIS. BSEE typically adds high risk facilities to its Increased Oversight List. This ensures that the district offices are visually inspecting these facilities at a higher frequency than normal. BSEE had regulatory changes in April 2023 to ensure that facilities that were relinquished back to predecessors through bankruptcy are properly maintained and monitored, which includes testing of safety valves and sensors, draining of vessels have properly maintained Nav-aid systems and fog horns, and performing pollution inspections designed to reduce spills and leaks. BSEE's regulatory oversight of offshore oil and gas operators and activities includes both preparations and reporting requirements for hurricanes, tropical storms, and severe weather, which can be found at: https://www.bsee.gov/reporting-and-prevention/hurricane. Also, if BSEE determines a pipeline previously approved and DIP could now interfere with other uses of the OCS, or cause undue or serious harm or damage to the human, marine, or coastal environment, BSEE reserves the right to mandate its removal in accordance with 30 CFR 250.Q. Historic trends indicate that unintended releases and obstructions with other ocean users have been minimal. Since 2000, the total number of platforms and wells have significantly declined. Over 7,000 structures have been decommissioned and removed through 2024, leaving an active inventory of 1,360 structures (i.e., caissons, well-protector structures, and jacketed and floating facilities) remaining on the Gulf of America OCS as of March 31, 2025. In 2000, there

Commenter	ID Number	Comment	Response
		risks due to potential impacts to other OCS users from unmarked seabed obstructions and the need for extremely dangerous diving and lifting operations required to gain access to the well conductors for plugging and abandoning activities and to remove the toppled platform decks and jackets, production equipment, and extensive debris fields. Storm systems also have the capacity to unbury and shift pipelines dozens to hundreds of feet outside of their prior routes and several feet up into the water column, making them more susceptible to snagging by anchored vessels and commercial trawlers. These snagged pipelines result in unnecessary space-use conflicts and may lead to potential hydrocarbon leaks and injury to crews.[87] Despite this powerful summation of the environmental impacts of idle and orphaned infrastructure—and the acknowledgement of the GAO's 2024 and 2021 reports related to decommissioning shortfalls—the DPEIS fails to analyze how these impacts will be exacerbated by the known flaws in federal policy, lax enforcement of decommissioning deadlines, and the industry's ability to evade decommissioning responsibilities. For example, the DPEIS fails to evaluate the impacts of oil spills and water pollution caused by delayed and overdue decommissioning. The presence of aging infrastructure increases the likelihood of oil leaks and spills, which can contaminate the surrounding waters and shorelines.[88] Studies have shown that 30% of offshore oil wells in the Gulf experienced well casing damage in the first five years after drilling, and damage increased over time to 50 percent after 20 years.[89] Researchers have also reported that 43% of producing, shut-in, and temporarily abandoned wells in the Gulf have sustained casing pressure, which can indicate well barrier or well integrity failure.[90] Another study covering 1996 to 2010 found that the likelihood of a reported incident, including a spill, increases with the age of the infrastructure and with the depth of water.[91] Aging pipelines are also subject to various kinds of corrosion, fatigue, corrosion fatigue, and damage from maritime activities—all of which can cause pipelines to leak, burst, or collapse.[92] Subsea pipeline corrosion accelerates over time, and can act synergistically with fatigue stress to increase the rate of crack propagation.[93] One offshore pipeline study found that after 20 years, the annual probability of pipeline failure increases rapidly, with values in the range of 0.1 to 1.0, which equates to a probability of failure of 10 to 100 percent per year.[94] All of these factors significantly increase the risk of an oil spill.	were approximately 16,000 active or non-decommissioned wells. By the end of 2024, however, this number substantially dropped to approximately 5,325 active or non-decommissioned wells (**Figure C.2-1**), with reasonably foreseeable decommissioning rates expected to continue outpacing installations. The removal of infrastructure to date has substantially reduced the potential environmental and safety risks associated with BOEM's ongoing oil and gas program in the GOA. BSEE recently awarded a study that seeks to improve BSEE and BOEM's oversight of pipeline subsea infrastructure by assessing the potential environmental impacts from pipelines and pipeline subsea infrastructure (including those DIP) on the coastal and marine waters, and the associated ecosystems and sensitive habitat/species of the Gulf of America OCS. The study focuses on the contamination risk from residual potentially-hazardous materials within pipelines and associated equipment (e.g., scale, paraffin, chemicals, NORM), after decommissioning requirements and/or seawater flushing is complete, as per the current regulations in 30 CFR 250.Q. A sampling plan was developed, and collection efforts and subsequent laboratory assessments are expected over a two-year period. Once the final report is prepared, the research findings will be made available to BOEM to assist with future NEPA analyses that support BSEE's pipeline permitting program, and for assessing if future policy or regulatory modifications are warranted.

Commenter	ID Number	Comment	Response
CBD - 7	BOEM-2023-0046-3142	Methane leaks from deteriorating infrastructure are also a significant concern. A 2022 study found that some shallow water Gulf platforms are methane super-emitters, with persistence and loss rates that tend to be much higher than rates associated with onshore production.95 Moreover, lower-producing wells had higher methane loss rates.[96] A 2020 aerial survey measuring methane emissions from Gulf platforms also found that the largest multiplatform shallow water facilities—including some with older platforms—had disproportionately high methane emissions, and noted that in the onshore context, infrastructure age combined with poor maintenance is linked to high emission rates.[97] These facilities accounted for nearly 40% of all Gulf emissions, yet consisted of <1% of total platforms, and were analogous to the highest emitting onshore basins.[98] Another study found that 65% (28 out of 43) decommissioned offshore wells leaked gas into the water column and represented a major source of methane in the sea.[99] Thus, defunct oil and gas infrastructure has the potential to cause significant climate impacts from methane emissions. Subsea releases may also impact aquatic life.	The potential for methane release is analyzed in **Chapter 4**. As discussed in **Chapter 4.1.2.1** of the Programmatic EIS, the potential causes for the underestimates of methane emissions from shallow-water facilities could be unintended releases of methane (i.e., accidental events) or undetected leaks, noncompliance issues, mis-quantification of releases (e.g., flare efficiencies used to calculate methane emissions in the emission inventories), or misreporting. While literature indicates that the *Year 2017 Emissions Inventory Study* may underestimate methane emissions, the reasons as to why, and to what extent, are unclear. BOEM continues to work closely with BSEE to ascertain the extent and causes of underreported methane emissions and possible implications to future emissions inventory estimates. There are currently no offshore air quality monitors that can be used to monitor facilities; however, BOEM, BSEE, NASA, and NOAA are actively collaborating on how to incorporate remote sensing technologies to improve monitoring of emissions, including methane. If any decommissioned wells were leaking, most of the methane is likely to either dissolve in the water column, be metabolized by bacteria, or stabilize as gas hydrates (Crespo-Medina et al. 2014; Rogener et al. 2018; Römer et al. 2019; Valentine et al. 2010; Vielstädte et al. 2015). Particularly for deepwater, it is unlikely that low-level chronic leaks of methane from decommissioned wellheads would reach the surface. Aside from the leaking wells from the Taylor Energy platform that was toppled during Hurricane Ivan, BOEM is currently unaware of any notable actively leaking offshore wells; however, there is no requirement for air quality monitoring data on decommissioned oil and gas wells in the GOA. In response, BOEM has a study underway to examine decommissioned wells to determine if any leaks could be substantial enough to emit air pollution at the sea surface, affect water quality, or have any other potentially notable environmental effects, i.e., NSL GM-22-01, at https://www.boem.gov/sites/default/files/documents/environment/environmental-studies/GM-22-01_1.pdf. BOEM has considered the potential risk that methane leakage from abandoned oil and gas wells in the Gulf of America OCS may pose to marine life. Although research is limited, risks to marine organisms could arise from the chemical interactions of methane upon entering the water column, including microbial degradation that leads to localized oxygen depletion (Kessler et al. 2011). However, factors like water depth, pressure, currents, wave action, dissolution, and biodegradation are likely to significantly decrease methane concentrations, thereby reducing the likelihood of acute and secondary effects on exposed marine life. Additionally, the GOA has numerous natural methane seeps, and many marine organisms have evolved adaptations to cope with elevated methane levels over time. While localized effects on marine organisms are possible, the combined influence of environmental factors that lower methane concentrations reduce the likelihood of impacts on individuals, localized communities, and populations.

Commenter	ID Number	Comment	Response
CBD - 8	BOEM-2023-0046-3142	It is particularly important to consider these impacts as climate change drives increasingly powerful and frequent hurricanes in the Gulf. Hurricanes are known to topple platforms, drag pipelines, and destroy oil storage tanks, which may trigger oil spills or create navigational obstructions. In 2004, for example, a mudslide triggered by Hurricane Ivan destroyed an oil platform and over two dozen wells, causing the longest-running oil spill in U.S. history and requiring BOEM to plug damaged seafloor wells following protracted legal proceedings.[100] Likewise, in 2005, hurricanes Katrina and Rita destroyed 113 offshore platforms, damaged 457 pipelines, and led to six oil spills of 1,000 barrels or more.[101] Indeed, Katrina dragged nine miles of a 22-mile pipeline as far as 4,000 feet out of place[102] (which raises the question of who is monitoring the 18,000 miles of pipeline that have been decommissioned in place and the many additional miles that will be added as a result of the proposed action). Deteriorated idle infrastructure is particularly susceptible to hurricane damage and expensive to clean up. As the GAO explained in 2015, “postponing decommissioning can be costly because the longer a structure is present in the Gulf the greater the likelihood it will be damaged by a hurricane.”[103] Additionally, “decommissioning a storm-damaged structure may cost 15 times or more the cost of decommissioning an undamaged structure,” as the salvage work involved is dangerous, difficult, and time-consuming.[104] Thus, climate change-driven hurricanes have the potential to deepen the decommissioning crisis by damaging infrastructure, driving up removal costs, and pushing weaker operators into bankruptcy.	The potential effects of hurricanes, including the current trends for hurricanes, are analyzed in **Chapter 4, Appendix M**, and **Appendix B**. BSEE's regulatory oversight of offshore oil and gas operators and activities also includes preparation, inspection, and reporting requirements for hurricanes, tropical storms, and severe weather, which can be found at https://www.bsee.gov/reporting-and-prevention/hurricane. The preparation, inspection, and reporting requirements apply to platforms and pipelines. These requirements help ensure that potential effects from hurricanes are minimized and that any actual effects are quickly detected and addressed. Currently, most platforms that were downed due to hurricanes have been fully removed from the seafloor. Furthermore, BSEE typically adds high risk facilities to its Increased Oversight List to ensure there is oversight of any facility or pipeline infrastructure that is not being properly maintained and monitored. This ensures that the district offices are visually inspecting these facilities at a higher frequency than normal. BSEE also had recent regulatory changes in April 2023 to ensure that facilities that were relinquished back to predecessors through bankruptcy are properly maintained and monitored, which includes testing of safety valves and sensors, draining of vessels have properly maintained Nav-aid systems and fog horns, and performing pollution inspection, which are designed to reduce spills and leaks. When determining whether to allow pipeline DIP, BSEE takes into consideration factors like navigation and commercial fishing operations, other uses of the OCS, and potentially adverse environmental or archeological effects prior to approving any and all applications for either DIP or removal. In the GOA, for example, BSEE has determined that all pipelines installed in water depths <200 ft (61 m) must be buried. This is to reduce the movement of pipelines by high currents and storms, protect the pipeline from the external damage that could result from anchors and fishing gear, reduce the risk of fishing gear becoming snagged, and minimize interference with other uses of the OCS. Furthermore, when a pipeline is allowed to be DIP, there are conditions such that if the pipeline later becomes an obstruction, then liable parties must address the obstruction. If the obstruction cannot be resolved, BSEE reserves the right to mandate its removal in accordance with 30 CFR 250.Q. As a result of this and other practices, trends suggest that unintended releases and obstructions with other ocean users have been minimal. BSEE recently awarded a study that seeks to improve BSEE and BOEM’s oversight of pipeline subsea infrastructure by assessing the potential environmental impacts from pipelines and pipeline subsea infrastructure (including those DIP) on the coastal and marine waters, and the associated ecosystems and sensitive habitat/species of the Gulf of America OCS. The study focuses on the contamination risk from residual potentially-hazardous materials within pipelines and associated equipment (e.g., scale, paraffin, chemicals, NORM), after decommissioning requirements and/or seawater flushing is complete, as per the current regulations in 30 CFR 250.Q. A sampling plan was developed, and collection efforts and subsequent laboratory assessments are expected over a two-year period. Once the final report is prepared, the research findings will be made available to BOEM to assist with future NEPA analyses that support BSEE’s pipeline permitting program, and for assessing if future policy or regulatory modifications are warranted.
CBD - 9	BOEM-2023-0046-3142	Additionally, as detailed in the broader comments submitted by the Center and other groups, BOEM’s DPEIS must also provide a substantive analysis of the following impacts: (1) impacts associated with operators’ failure to comply with decommissioning deadlines; (2) impacts associated with the decommissioning in place of disused pipeline; (3) impacts related to forecasted growth in offshore decommissioning in shallow waters of the Gulf of Mexico; (4) potential impacts related to the decommissioning of deepwater wells; (5) impacts related to explosive severance; and (6) impacts of regulatory and enforcement failures.	See the responses to comments CBD 3-8 and Earthjustice 63-70 for information on how each of the six topics summarized in this comment were addressed.

Earthjustice et al. - 63	BOEM-2023-0046-5236	BOEM's Draft PEIS addresses decommissioning of offshore oil and gas infrastructure, but fails to adequately analyze well-known concerns, including but not limited to regulatory shortcomings, enforcement failures, and noncompliance with decommissioning deadlines. Continued decommissioning challenges are not only reasonably foreseeable, they are very likely to become worse as the Bureau of Safety and Environmental Enforcement ("BSEE") "anticipates an increase in its workload due to accelerating trends in the volume of shallow water infrastructure in the Gulf of Mexico coming due for decommissioning."[99] BOEM's PEIS must fully consider the effects of these challenges. The Draft PEIS fails to do so. In January 2024, the Government Accountability Office (GAO) published a report concluding that the BSEE "does not effectively ensure that industry operators meet decommissioning deadlines for offshore wells and platforms at the end of their useful lives."[100] GAO found that shortcomings in enforcement contributed to "widespread decommissioning delays that have grown into a substantial backlog,"[101] and calculated that "as of June 2023, more than 75 percent of end-of-lease and idle infrastructure in the Gulf of Mexico was overdue according to BSEE's deadlines."[102] For many delinquent wells, operators had failed to install temporary plugs, "meaning that operators had not taken interim steps to install long-term barriers to leakage" of hydrocarbons.[103] The GAO found that BSEE's enforcement tools—including civil penalties, suspensions of operations, and operator disqualification—were ineffective and that federal regulators were often reluctant to use them.[104] The 2024 GAO report did not focus on offshore oil and gas pipelines—but a 2021 GAO report did. The 2021 report found that BSEE authorized operators to leave 97% of pipelines on the seafloor, which at the time amounted to nearly 18,000 miles of discarded pipeline.[105] This is known as "decommissioning in place" and is allowed under regulations, but only if the Regional Supervisor determines certain requirements are met.[106] The 2021 report noted that in approving applications BSEE did "not thoroughly account for safety and environmental risks" when deciding whether to approve operators' applications to leave discarded pipeline on the ocean floor, and did not "fully consider" if such pipelines were hazards to navigation or fishing operations, if they unduly interfered with other ocean uses, or if they had adverse environmental impacts.[107] Under BSEE regulations, all of these factors should have been considered.[108] The 2021 GAO report recommended that the Department of the Interior update its pipeline regulations to address safety and environmental risks associated with decommissioning.[109] To date, the agency has not done so.[110] BOEM's Draft PEIS describes offshore oil and gas decommissioning activities in some detail in Appendix J, and addresses some specific decommissioning-related issues in scattered portions of the body of the Draft PEIS. Both the main Draft PEIS and Appendix J reference the 2024 and 2021 GAO reports, but at no point does the Draft PEIS substantively address or analyze impacts that could flow from decommissioning delays, regulatory and enforcement failures, noncompliance with regulations, and other challenges highlighted by GAO. For instance, when the Draft PEIS lists the phases of offshore oil and gas development, it skips straight from "operation/production" to "decommissioning," ignoring the fact that operators frequently miss decommissioning deadlines, causing OCS infrastructure to sit idle for extended periods of time.[111] Instead of ignoring this reality, the PEIS should analyze risks and potential impacts associated with delinquent infrastructure. BOEM's PEIS must offer a substantive analysis of the issues and challenges raised by the GAO reports.	Thank you for your comment. New information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3** and **4**, **Appendix B**, and **Appendix C** of the Programmatic EIS. **Appendix C** of the Programmatic EIS acknowledges the findings and recommendations of the GAO reports. The oversight of industry decommissioning activities spans multiple BSEE organizational units, in close coordination with BOEM. BOEM and BSEE are continually implementing process and regulatory improvements to drive timely decommissioning performance and enhance environmental stewardship. The decommissioning of platforms and wells, in accordance with BOEM and BSEE regulations, are at much higher rates than installations. The updated historical data and trends provided in **Chapter 3** and **Appendix C** of the Programmatic EIS highlight the drastic decommissioning of wells and platforms in the last 20 years and steadily declining spatial footprint of cumulative OCS oil and gas structures and unplugged wells in the GOA. Operators may request an extension of the regulatory one-year deadline to decommission, which BSEE has authority to grant due to any individual or combination of the factors as discussed in **Appendix C.1**. Regarding idle structures, BSEE developed NTL No. 2018-G03 to clarify when the Bureau may deem infrastructure "no longer useful for operations" and "not capable of oil, gas, and sulphur production in paying quantities" and the associated timeframes for decommissioning. The NTL also includes guidance for the submittal of supporting documentation for review and concurrence. Even when idle, operators are still required to perform pollution and safety system inspections throughout the life of the platforms. Even when BSEE concurs that a well may be useful and is capable of producing in paying quantities, companies are informed that they may still be required to ensure the well is secured and that producing zones are isolated to prevent potential safety and environmental impacts. Regarding pipelines, BSEE currently uses surveys conducted under NTL No. 2022-G01 to support pipeline planning and permit reviews. This NTL clarifies requirements regarding pipeline pre-installation surveys, pipeline maintenance and monitoring, pipeline burial during installation, and pipeline removal during decommissioning. When determining whether to allow pipeline DIP, BSEE takes into consideration factors like navigation and commercial fishing operations, other uses of the OCS, and potentially adverse environmental or archeological effects prior to approving any and all applications for either DIP or removal. Furthermore, if BSEE determines a pipeline previously approved and DIP could now interfere with other uses of the OCS, or cause undue or serious harm or damage to the human, marine, or coastal environment, BSEE reserves the right to mandate its removal in accordance with 30 CFR 250.Q. BSEE recently awarded a study that seeks to improve BSEE and BOEM's oversight of pipeline subsea infrastructure by assessing the potential environmental impacts from pipelines and pipeline subsea infrastructure (including DIP) on the coastal and marine waters, and the associated ecosystems and sensitive habitat/species of the Gulf of America OCS. The study focuses on the contamination risk from residual potentially-hazardous materials within pipelines and associated equipment (e.g., scale, paraffin, chemicals, NORM), after decommissioning requirements and/or seawater flushing is complete, as per the current regulations in 30 CFR 250. Q. A sampling plan was developed, and collection efforts and subsequent laboratory assessments are expected over a two-year period. Once the final report is prepared, the research findings will be made available to BOEM to assist with future NEPA analyses that support BSEE's pipeline permitting program, and for assessing if future policy or regulatory modifications are warranted.

Commenter	ID Number	Comment	Response
Earthjustice et al. - 64	BOEM-2023-0046-5236	1. **Impacts associated with operators' failure to comply with decommissioning deadlines.** This includes both regulatory deadlines for decommissioning of infrastructure on expired or otherwise terminated leases, as well as agency deadlines for idle infrastructure located on active leases. Analysis should consider the potential for infrastructure to be damaged by increasingly powerful storms and the potential for subsequent environmental damage. It should also consider the potential for hydrocarbon leaks from delinquent wells that have not been temporarily or permanently plugged. BOEM should acknowledge any information gaps that may result from the lack of long-term monitoring designed to identify leaks from plugged wells.	New information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3** and **4**, **Appendix B**, and **Appendix C** of the PEIS. BSEE continues to perform inspections on infrastructure that has missed regulatory decommissioning deadlines. If violations occur, BSEE takes appropriate enforcement action. While there is a potential that infrastructure will not be timely decommissioned or become orphaned, the analysis presumes, as is reasonable, that the infrastructure will be decommissioned according to the regulations. The potential effects of hurricanes, including the current trends for hurricanes, are analyzed in **Chapter 4, Appendix M,** and **Appendix B**. BSEE's regulatory oversight of offshore oil and gas operators and activities also includes preparation, inspection, and reporting requirements for hurricanes, tropical storms, and severe weather, which can be found at https://www.bsee.gov/reporting-and-prevention/hurricane. The preparation, inspection, and reporting requirements apply to platforms and pipelines. These requirements help ensure that potential effects from hurricanes are minimized and that any actual effects are quickly detected and addressed. Currently, most platforms that were downed due to hurricanes have been fully removed from the seafloor. In the GOA, BSEE has determined that all pipelines installed in water depths <200 ft (61 m) must be buried. This is to reduce the movement of pipelines by high currents and storms, protect the pipeline from the external damage that could result from anchors and fishing gear, reduce the risk of fishing gear becoming snagged, and minimize interference with other uses of the OCS. Furthermore, when a pipeline is allowed to be DIP, there are conditions such that if the pipeline later becomes an obstruction, then liable parties must address the obstruction. As a result of this and other practices, historic trends suggest that unintended releases and obstructions with other ocean users have been minimal. The potential for methane release is analyzed in **Chapter 4**. See CBD-7 for additional relevant information.
Earthjustice et al. - 65	BOEM-2023-0046-5236	**2.Impacts associated with the decommissioning in place of disused pipeline.** The Draft PEIS acknowledges "there would be permanent impacts associated with decommissioning in-place subsea infrastructure,"112 but fails to analyze those impacts. The PEIS should not assume disused pipeline will largely be decommissioned in place. Instead, it should analyze carefully the impacts, including cumulative impacts, of discarding tens of thousands of miles of pipeline on the ocean floor. It should analyze the potential for hydrocarbon leaks from discarded pipeline and should acknowledge any information gaps that may result from the lack of monitoring requirements. The PEIS should also more fully analyze impacts related to the obstruction of other uses of the ocean and ocean resources, including development of offshore wind resources and access to significant sediment resource areas.	BSEE recently awarded a study that seeks to improve BSEE and BOEM's oversight of pipeline subsea infrastructure by assessing the potential environmental impacts from pipelines and pipeline subsea infrastructure (including DIP) on the coastal and marine waters, and the associated ecosystems and sensitive habitat/species of the Gulf of America OCS. The study focuses on the contamination risk from residual potentially-hazardous materials within pipelines and associated equipment (e.g., scale, paraffin, chemicals, NORM), after decommissioning requirements and/or seawater flushing is complete, as per the current regulations in 30 CFR 250. Q. A sampling plan was developed, and collection efforts and subsequent laboratory assessments are expected over a two-year period. Once the final report is prepared, the research findings will be made available to BOEM to inform future NEPA analyses that support BSEE's pipeline permitting program, and for assessing if future policy or regulatory modifications are warranted. Once the findings and conclusions have been reviewed, BSEE will make a final determination on whether pending DIP applications will need to be revised to decommissioned by removal. The Programmatic EIS considered space-use concerns (see **Chapter 4.0.2.2**, **Chapter 3.6.2**, and **Appendix B.4**). BOEM uses Information to Lessees and NTLs to mitigate space-use conflicts between BOEM program areas, military activities, and other ocean users. For example, BOEM's NTL No. 2009-G04 states that bottom disturbing activities (including surface or near-surface emplacement of platforms, wells, drilling rigs, pipelines, umbilicals, and cables) must avoid, to the maximum extent practicable, significant OCS sediment resources. As of October 2016, BSEE typically requires decommissioned pipelines be removed in SSRAs. Furthermore, pipeline-related infrastructure (e.g., manifolds and end terminations) in water depths less than 600 ft (182 m) are typically removed and obstructions cleared given the potential for obstruction or interference with other uses of the OCS, like commercial trawling fisheries. BSEE continues to expect that all pipeline-related infrastructure in such shallower water will be removed, and obstructions cleared, as presumptively required by the 30 CFR 250.Q regulations. Both conventional energy leases and renewable energy leases give BOEM the right to lease within an already leased area provided the activity does not unreasonably interfere with the original lease holder's use of its lease. The marine spatial planning model used to identify the most current WEA options included oil and gas infrastructure distancing so that the WEA options are in areas with little oil and gas activity or commercial interest (https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/GOM-WEA-Modeling-Report-Combined.pdf).

Commenter	ID Number	Comment	Response
Earthjustice et al. - 66	BOEM-2023-0046-5236	In addition, under Unavoidable Adverse Impacts (4.18), BOEM explains that "certain allowances can be granted on a case-by-case basis to decommission in place" if the equipment is determined "not to be an obstruction."[113] However, in the Decommissioning Appendix (J.3), BOEM points out that "[s]torm systems also have the capacity to unbury and shift pipelines dozens to hundreds of feet outside of their prior routes and several feet up into the water column, making them more susceptible to snagging by anchored vessels and commercial trawlers. These snagged pipelines result in unnecessary space-use conflicts and may lead to potential hydrocarbon leaks and injury to crews."[114] If storms routinely move buried decommissioned-in-place pipelines, then the Regional Field Operations Regional Supervisor is not able to credibly predict whether a pipeline length truly will be an obstruction. OCSLA's leasing program was crafted to sustain an equilibrium of activity (as new infrastructure is installed, old infrastructure is removed), but the GAO has revealed that there has been an accumulation on the OCS obstructing other commercial uses and endangering American mariners. If any new pipelines are allowed to be decommissioned in place under the new leasing program, BOEM must survey previously abandoned in place pipelines to ascertain the frequency and extent of pipeline movement and obstruction and understand the true impact.	See the response to Earthjustice-65. In addition, before approval, all proposed pipeline routes are reviewed by BSEE to ensure bottom-disturbing activities (from the pipeline itself or from the anchors of lay barges and support vessels) are sufficiently distanced to avoid encroaching on any biologically sensitive areas and archaeological features, or creating any obstruction with other ocean uses. BSEE's regulatory oversight of offshore oil and gas operators and activities also includes preparation, inspection, and reporting requirements for hurricanes, tropical storms, and severe weather, which can be found at https://www.bsee.gov/reporting-and-prevention/hurricane. The preparation, inspection, and reporting requirements apply to platforms and pipelines. These requirements help ensure that potential effects from hurricanes are minimized and that any actual effects are quickly detected and addressed. In the GOA, BSEE has determined that all pipelines installed in water depths <200 ft (61 m) must be buried. This is to reduce the movement of pipelines by high currents and storms, protect the pipeline from the external damage that could result from anchors and fishing gear, reduce the risk of fishing gear becoming snagged, and minimize interference with the operations of other users of the OCS. Furthermore, when a pipeline is allowed to be DIP, there are conditions such that if the pipeline later becomes an obstruction, then liable parties must address the obstruction. As a result of this and other practices, historic trends suggest that obstructions with other ocean users have been minimal. For example, based on NOAA Contingency Fund data from 2015-2024, a total of 107 initial claims were filed. Of those, only 66 (an average of 6-7 claims per year across the entire Gulf of America OCS) received presumption of causation correlated to oil and gas infrastructure as determined through NOAA's independent review. To mitigate those presumed effects, all 66 claimants were compensated for lost or damaged gear (Fritz 2025).
Earthjustice et al. - 67	BOEM-2023-0046-5236	**3.Impacts related to forecasted growth in offshore decommissioning in shallow waters of the Gulf of Mexico.** As noted above, BSEE "anticipates an increase in its workload due to accelerating trends in the volume of shallow water infrastructure in the Gulf of Mexico coming due for decommissioning."[115] Many times, older wells and associated infrastructure are owned by relatively small companies that lack the financial resources of major oil companies.[116] These shallow-water wells "are increasingly marginal in value, raising the risk that they will be abandoned by their current operators."[117] BOEM's PEIS should analyze whether or to what extent the growing need for offshore decommissioning will impact operators' ability or willingness to comply with decommissioning deadlines in the future. BOEM should also analyze how various segments of the industry—and U.S. taxpayers—may be affected as decommissioning liabilities come due. These impacts are reasonably foreseeable, and the PEIS should consider them.	Thank you for your comment. New information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3 and 4**, **Appendix B**, and **Appendix C** of the PEIS. BOEM enforces its right to secure financial assurance for decommissioning pursuant to regulations found in 30 CFR 556.900 et seq. (see **Appendix C.3.2**) The current regulations outline the criteria for BOEM to require supplemental financial assurance. In 2016, BSEE amended its regulations addressing decommissioning expenditure reporting to include decommissioning expenditure summaries for right-of-way and lease-term pipelines, and in 2017, BSEE issued Notice to Lessees and Operators No. 2017-N02, *Reporting Requirements for Decommissioning Expenditures on the OCS*, regarding submission of certified decommissioning cost expenditure summaries following permanent plugging of any well, removal of any platform or other facility, clearance and verification of any site, and decommissioning of pipeline segments. The information is used to improve estimates of future decommissioning costs, which BOEM can apply to set necessary financial assurance levels to minimize the possibility that the taxpayers, through the government, will incur the costs of decommissioning when financial assurance amounts are insufficient or require more financial assurance than necessary to cover future decommissioning liabilities. Additionally, pursuant to DOI regulations, predecessor lessees are jointly and severally liable for meeting decommissioning liabilities. Moreover, financial assurance can be used to cover costs of decommissioning. Given these regulatory and financial safeguards, the risks of Federal liability for OCS oil and gas operations are not expected to notably increase as a result of the proposed action.

Commenter	ID Number	Comment	Response
Earthjustice et al. - 68	BOEM-2023-0046-5236	**4. Potential impacts related to the decommissioning of deepwater wells.** Oil wells in deeper waters—greater than 1,000 feet of water—present special challenges. While deepwater wells are generally newer than their shallow-water counterparts, they are also bigger, deeper, and more complex than shallow-water wells.[119] The PEIS should include a more robust analysis of the challenges and potential impacts associated with decommissioning deepwater wells.	Well decommissioning, including deepwater well decommissioning, is discussed in **Chapters 3** and **4**, **Appendix B**, **Appendix C**, and **Appendix J**. BSEE has well defined permit processes for all phases of development, including decommissioning. BSEE oversees operator compliance with regulatory guidance and documents all alternate compliance and departure approvals. A deepwater operations plan (DWOP) provides BSEE with information specific to deepwater equipment issues and demonstrates how a proposed deepwater project would be developed in an acceptable manner as mandated in the OCSLA, as amended, and BSEE's operating regulations at 30 CFR 250.B. A DWOP outlines the design, fabrication, and installation and abandonment of facilities, wells, subsea structures, pipelines and umbilicals of the proposed development or production system and its components, as well as structural aspects of the facility (i.e., fixed, floating, or subsea); station-keeping (includes mooring system); wellbore, completion, and riser systems; safety systems; product removal or offtake systems; and hazards and operability of the production system. The DWOP provides BSEE with information to validate that the operator has designed and built sufficient safeguards into the production system to prevent the occurrence of significant safety or environmental incidents. While a DWOP is conceptual and does not approve any actual activities, it provides a timely and flexible approach to establishing guidance on the regulatory requirements and keeping pace with evolving deepwater operations and subsea technology. Any actual activities must also be reviewed and approved by BSEE in an associated EP, DPP, or DOCD before they can commence. BSEE reviews deepwater development activities from a total system perspective, emphasizing operational safety, environmental protection, and conservation of natural resources. BSEE also published the final rule for Oil and Gas and Sulfur Operations in the Outer Continental Shelf – High Pressure High Temperature Updates on August 30, 2024 and effective October 29, 2024 (89 FR 71076 2024). The rule adds requirements for new or unusual technology, including equipment used in high-pressure high-temperature (HPHT) environments; revises and reorganizes the information submission requirements for a project's Conceptual Plans and DWOP; and requires independent third parties to review certain information prior to submission to BSEE. Due to the use of new technology, BSEE conducts stepwise, detailed evaluations of HPHT applications. Meanwhile, BSEE constantly reviews the DWOP to ensure the drilling system and operational equipment remains adequate to sustain the HPHT conditions. Applications for Permit to Modify proposing deepwater well decommissioning are managed under the BSEE NEPA Compliance process, which relies on 30 CFR 550.281(b) to ensure that activities in the application conform to those proposed in the associated and approved DWOP.
Earthjustice et al. - 69	BOEM-2023-0046-5236	**5. Impacts related to explosive severance.** The Draft PEIS notes that decommissioning techniques that employ explosives generate impulsive noise that can harass, injure, or kill ocean life including fish, marine mammals, sea turtles, and other pelagic organisms.[120] The PEIS should analyze these potential impacts more fully and should consider alternatives that prohibit or restrict the use of explosive severance in decommissioning activities.	New information and analysis about the possible impacts from explosive severance methods has been added throughout **Chapters 3**, **4**, **Appendix C** and elsewhere in the Final Programmatic EIS. The use of explosive severance has decreased in recent years and platforms are more often removed via mechanical cutting. Where practicable, mechanical severance avoids the potential harm caused by the use of explosives to fish, marine mammals, and other aquatic life. Furthermore, mitigating measures like the Protected Species Stipulation, as well as any additional MMPA or ESA consultation requirements that are imposed, would minimize the potential effects from explosive severance methods. Additionally, subsequent NEPA analysis, in the form of an EA or EIS, is completed for all structure removals that propose explosive severance methods and/or site clearance trawling.

Commenter	ID Number	Comment	Response
Earthjustice et al. - 70	BOEM-2023-0046-5236	**6. Impacts of regulatory and enforcement failures.** The PEIS should acknowledge and analyze the effect of regulatory and enforcement failures related to decommissioning. The GAO highlighted these failures in its reports. Although the PEIS notes federal regulators are working to address GAO's various recommendations, it gives no indication that the recommended actions will be finalized and implemented any time soon. In light of identified problems with federal regulators' enforcement tools (and federal regulators' unwillingness to use enforcement tools), the PEIS should discuss whether or to what extent BOEM and BSEE expect to increase their enforcement of decommissioning deadlines and requirements, and whether or to what extent BOEM and BSEE expect OCS operators to increase their compliance with agency guidance and regulations. The PEIS should analyze these issues in light of the growing backlog of delinquent and idle OCS infrastructure and the potential for growing safety, environmental, and financial risks.	Thank you for your comment. New information and analysis of OCS oil and gas infrastructure that is due for decommissioning has been added to **Chapters 3** and **4**, **Appendix B**, and **Appendix C** of this Programmatic EIS. **Appendix C** of the Programmatic EIS acknowledges the findings and recommendations of the GAO report. The oversight of industry decommissioning activities spans multiple BSEE organizational units, in close coordination with BOEM. BOEM and BSEE are continually implementing process and regulatory improvements to drive timely decommissioning performance and enhance environmental stewardship. As discussed in earlier responses, given the regulatory and financial safeguards in place, the risks of federal liability for OCS oil and gas operations are not expected to increase as a result of the proposed action. Contrary to this comment, the backlog of delinquent and idle OCS infrastructure has steadily declined over the past decade. Since peaking in the early 2000s, platforms and wells are being decommissioned, in accordance with BOEM and BSEE regulations, at much higher rates than installations. The updated historical data and trends provided in **Chapter 3** and **Appendix C** of the Programmatic EIS highlight the drastic decommissioning of wells and platforms in the last 20 years. The removal of infrastructure to date has substantially reduced the potential environmental and safety risks associated with BOEM's ongoing oil and gas program in the GOA, and reasonably foreseeable decommissioning rates are expected to continue outpacing installations. Regarding idle structures, BSEE developed NTL No. 2018-G03 to clarify when the Bureau may deem infrastructure "no longer useful for operations" and "not capable of oil, gas, and sulphur production in paying quantities" and the associated timeframes for decommissioning work. The NTL also includes guidance for the submittal of supporting documentation for review and concurrence. When idle, operators are still required to perform pollution and safety system inspections throughout the life of the platforms. Even when BSEE concurs that a well may be useful and is capable of producing in paying quantities, companies are informed that they may still be required to ensure the well is secured and that producing zones are isolated to prevent potential safety and environmental impacts. Regarding pipelines, BSEE currently uses surveys conducted under NTL No. 2022-G01 to support pipeline planning and permit reviews. This NTL clarifies requirements regarding pipeline pre-installation surveys, pipeline maintenance and monitoring, pipeline burial during installation, and pipeline removal during decommissioning. When determining whether to allow pipeline DIP, BSEE takes into consideration factors like navigation and commercial fishing operations, other uses of the OCS, and potentially adverse environmental or archeological effects prior to approving any and all applications for either DIP or removal. Furthermore, if BSEE determines a pipeline previously approved and decommissioned-in-place could now interfere with other uses of the OCS, or cause undue or serious harm or damage to the human, marine, or coastal environment, BSEE reserves the right to mandate its removal in accordance with 30 CFR 250.Q.

Commenter	ID Number	Comment	Response
Earthjustice et al. - 71	BOEM-2023-0046-5236	**e) Available Evidence Demonstrates the Need for BOEM to Require Lessees to Decommission Idle Wells Prior to Bidding on New Leases.** Poorly decommissioned, orphaned, and abandoned wells harm the marine environment and contribute to climate change. Such wells are at a high risk of leaking or spilling oil into the ocean.[594] BOEM explains in Section 4.0.1.7 Human Environment, "Communities in the GOM region depend on the ocean economy for employment and income."[595] Oil spills and leaks from these wells pose threats to the ocean economy. These wells can also emit methane—a climate pollutant that, as noted above, has eighty times the warming power of carbon dioxide in the short term.[596] Lessees are required by law and the terms of their leases to decommission offshore wells, yet thousands of idle wells remain unplugged in federal waters.[597] To prevent and mitigate further environmental harm from abandoned wells, BOEM should stipulate that historic or current owners of abandoned or idle wells in federal waters that require decommissioning are not eligible for new leases. Companies who have not fulfilled their decommissioning obligations in the past should not be awarded new leases until their prior commitments have been met.	This Programmatic EIS analyzes the potential impacts of a proposed OCS oil and gas lease sale and provides programmatic NEPA coverage for ongoing activities and future OCS oil and gas lease sales, including decommissioning. BOEM and BSEE are continually implementing process and regulatory improvements to drive timely decommissioning performance and enhance environmental stewardship. Idle OCS infrastructure has steadily declined over the past decade as platforms and wells are being decommissioned, in accordance with BOEM and BSEE regulations, at much higher rates than installations. As of September 2024, there were approximately 950 idle wells and 175 idle platforms identified by BSEE on the Gulf of America OCS. Updated decommissioning data and trends are provided in **Chapter 3** and **Appendix C** of the Programmatic EIS. Additional analyses of the potential risk for effects from idle wells has also been added throughout **Chapter 4** and **Appendix M**. The removal of infrastructure to date has substantially reduced the potential environmental and safety risks associated with BOEM's ongoing oil and gas program in the GOAR, and reasonably foreseeable decommissioning rates are expected to continue outpacing installations. Furthermore, safety and environmental-compliance inspections are maintained on idle infrastructure, prior to and after issuance of BSEE orders as outlined in **Appendix C.3**. The focus of these safety and environmental-compliance inspections are the same as that for active facilities. BOEM enforces its right to secure financial assurance for decommissioning activities pursuant to regulations found in 30 CFR 556.900 et seq. (see **Appendix C.3.2**). The regulations outline the criteria for BOEM to require supplemental financial assurance as described in earlier responses and **Appendix C**. Given these regulatory and financial safeguards, the environmental impacts from non-decommissioned infrastructure are not expected to notably increase as a result of a single proposed OCS oil and gas lease sale.

TOPIC 11 – OUT OF SCOPE

General

Commenter	ID Number	Comment	Response
Ruth Morlas-5	BOEM-2023-0046-2927	…why has designation of their critical habitat been delayed into 2025 for the new administration to deal with? Critical habitat designation for Rice whales should have happened in December of last year….	Thank you for your comment. NOAA Fisheries is the Federal agency responsible for the rule to designate critical habitat for the Rice's whale, not BOEM. BOEM is unable to answer questions about the timeline of another agency's Final Rule.

Commenter	ID Number	Comment	Response
Ruth Morlas-6	BOEM-2023-0046-2927	Please consider our global ecosystem as a whole, not just in the GOM. This draft EIS also states that environmental justice impacts would be minor beneficial to moderate adverse for low-income and minority populations in the analysis area - but what about for the most vulnerable populations outside the analysis area?....	Thank you for your comment. When considering the affected environment and resources affected within that environment, NEPA requires an analysis of resources that are directly or indirectly affected by the proposed action. BOEM analyzed the physical, biological, and social resources within the Gulf of America region, as they would be affected by the proposed action. The air quality and water quality impacts from OCS oil- and gas-related activities are discussed in **Chapters 4.1.2** and **4.2.2** of the PEIS. In addition, greenhouse gas emissions from OCS oil- and gas-related activities are analyzed in **Appendix K** and summarized in **Chapter 4.0.2.1** of the PEIS. The effects of these physical impacts from OCS oil- and gas-related activities on coastal communities is detailed in **Chapter 4.16** of the PEIS, social factors. Making a connection between OCS oil- and gas-related activities in the GOA and vulnerable populations around the country and world would be difficult to analyze; however, BOEM did analyze the impacts of OCS oil- and gas-related activities in the GOA region. The following information details why it is difficult to analyze the impacts of OCS oil-and gas-related activities in the GOA to the rest of the country. Chapters 4.14, 4.17, and Appendix B of the PEIS and Chapters 2.5, 4.4.1, and 4.4.6 of the GOM Oil and Gas SID, which are incorporated by reference into the PEIS, discuss downstream industries in further detail, including complications with tying potential lease sale activities to effects on the onshore infrastructure network. Please refer to Chapter 4.1 of the PEIS and Chapter 2.1.2.2 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, for analyses of air pollution from onshore infrastructure. Table 4.1-3 and **Table 4.1-7** of the PEIS shows a comparison of estimated emissions from sources in the GOA, including onshore sources. Also, Chapter 4.1 of the PEIS and Chapters 2.2 and 4.4.1 of the GOM Oil and Gas SID contain additional information about onshore waste facilities. See the comment response in Earthjustice et al.-43 for the connections between offshore and onshore activities, refineries, and downstream activities. In reference to analyzing climate change, please refer to each resource analysis in **Chapter 4** and **Appendix M** and **Chapter 4.17** of the PEIS, where other reasonably effects such as ocean acidification, air and water temperature increases, sea level rise, and increased storms, are considered. In addition, see Chapter 3.4 of the SID, where climate change is considered, and incorporated by reference into this PEIS. With specific reference to environmental justice communities, please refer to the comment response for Earthjustice et al.-10 for BOEM's compliance with the requirements of NEPA following the publication of E.O. 14154, "Unleashing American Energy" (Jan. 20, 2025), and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (Jan. 21, 2025).

TOPIC 12 – EPA COMMENTS ON THE DRAFT GOA OIL AND GAS PROGRAMMATIC EIS

No Action Alternative

Commenter	ID Number	Comment	Response
EPA-1	GHG	EPA appreciates BOEM's responsiveness on the framing of the No Action Alternative in previous NEPA analyses, as described in Section H.2.1 Analysis Framing. The No Action Alternative used in this PEIS – which does not include any emissions from the proposed action – allows for clear and transparent disclosure of the project's impacts.	Thank you for your comment. BOEM is glad this was clear in the analysis.

GHG Quantification and Presentation

Commenter	ID Number	Comment	Response
EPA-2	GHG	Domestic and foreign emissions are analyzed separately in the Draft PEIS, but domestic emissions are often characterized as "total" emissions or similar. Since BOEM is able to estimate foreign emissions, the EPA recommends, for clarity, that total GHG emissions be presented as the sum of foreign and domestic emission in the Final PEIS.	Thank you for your comment. The term "Total Proposed Action Emissions" is used in tables and text that are clearly labeled as applying to "GHG Emissions from Domestically Produced or Consumed Energy". BOEM presents the emissions from foreign energy markets separately because foreign energy market simulations using MarketSim are necessarily more simplistic given limited information available for foreign markets when compared to that available for the U.S. domestic energy markets. BOEM uses MarketSim's current assumptions to estimate shifts in foreign oil markets in response to OCS leasing decisions but acknowledges that the foreign analysis is less detailed than the domestic analysis. Thus, BOEM does not add them together as there are components to the foreign GHG emissions analysis which BOEM is currently unable to quantify. In summary, the two components are not "apples-to-apples" comparisons and thus are not summed together.
EPA-3	GHG	The analysis uses multiple different time horizons, with sometimes limited acknowledgement or justification. In particular, while much of the analysis uses a 40-year analysis period (2024-2063), the GHG emissions are quantified over a shorter 2025 to 2061 horizon. It does not appear that this divergence is acknowledged or explained in the Draft PEIS with the GHG emissions horizon only being illustrated in a supplemental workbook referenced in Appendix H. The EPA recommends that, to the extent possible, time horizons be aligned and where that is not possible, a clear distinction and explanation for the divergence be provided.	Thank you for your comment. BOEM's GHG modeling uses the detailed E&D Scenarios at the low, mid-, and high activity levels. The period of activity and production is different depending on the activity level; shorter for lower activity and longer for higher activity. This translates into the annual GHG emissions estimates the commenter refers to in the supplemental workbook. **Activity Level / Activity or Production** **Low Activity:** Start Year 2027; End Year 2046; Total Years (inclusive of start year) 20 **Low Production:** Start Year 2028; End Year 2046; Total Years (inclusive of start year) 19 **Mid Activity:** Start Year 2026; End Year 2056; Total Years (inclusive of start year) 31 **Mid Production:** Start Year 2028; End Year 2056; Total Years (inclusive of start year) 29 **High Activity:** Start Year 2026; End Year 2061; Total Years (inclusive of start year) 36 **High Production:** Start Year 2028; End Year 2061; Total Years (inclusive of start year) 34 This does not contradict the PEIS, because the reference to a 40-year analysis period is not meant to be a specific, but rather a general time reference that can accommodate the low, mid-, and high activity levels' periods of activity. All three activity levels cover the full amount of time, but note that in some years there is no activity. Thus, in those years without activity, no GHG emissions are expected.

Water

Commenter	ID Number	Comment	Response
EPA-4	WQ	EPA recommends BOEM review the applicable state Clean Water Act (CWA) 303(d) Lists of Impaired Waters to enhance the disclosure of potential impacts to coastal or tidal waters near the proposed project's coastal boundaries. We recommend BOEM address any impacts to coastal land use and/or modification that may modify or degrade coastal and submerged aquatic vegetation habitats and ensure affected vegetation returns to a natural and/or sustainable level. Individual leases or actions associated with the PEIS may require a CWA Section 404 permit, including an Approved Jurisdictional Determination and the full analysis pertaining to the CWA 404(b)(1) Guidelines. These actions may also require compensatory mitigation. EPA recommends clarifying the extent of permanent impacts from construction and distinguishing those that would require additional permits, as well as potential mechanisms for mitigation.	Thank you for your comment. BOEM addresses the potential impacts from an OCS oil and gas lease sale to water quality (**Chapter 4.2**), coastal communities and habitats (**Chapter 4.3**), and land use and coastal infrastructure (**Chapter 4.14**) in the PEIS. Impacts to water quality, coastal communities and habitats, and land use and coastal infrastructure are also addressed in Chapters 4.2, 4.3.1, and 4.4.1 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS. BOEM addresses Section 303 and Section 404 of the CWA in Chapter 3.8 of the *Gulf of America OCS Regulatory Framework* (BOEM 2025), which is incorporated by reference into the PEIS. Applicable portions of Section 404 of the CWA are also addressed in Chapters 2.2.2.6 and 4.3.1.2.2 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS. Very little coastal construction, if any, would be expected as a result of an OCS oil and gas lease sale. **Chapter 3.2.4** of the PEIS discusses potential pipeline landfalls. BOEM projects that the majority of new pipelines constructed as a result of a proposed action would connect to the existing pipeline infrastructure offshore or in State waters. BOEM projects that 0-1 new pipeline landfalls could result from a proposed GOA oil and gas lease sale; however, a new landfall has not been permitted since 2014. **Chapter 4.14.2.4** and **Appendix B.2.5** of the PEIS discusses coastal infrastructure and indicates that coastal infrastructure that supports offshore OCS oil- and gas-related activities is well established in the GOA region, and new or expanded infrastructure is not anticipated to support routine activities as a result of a single proposed OCS oil and gas lease sale. In addition, State and Federal permitting agencies discourage the placement and expansion of facilities in wetlands and require mitigation of impacts. BOEM would like to clarify that at the pre-lease NEPA stage, we are not analyzing specific projects or plans. This Programmatic EIS is a regional NEPA analysis that analyzes a proposed Federal action to hold an oil and gas lease sale offered in Federal OCS waters. The area of analysis for this PEIS is the green portion of the GOA shown in **Figure 1.1-2** in **Chapter 1** of the PEIS. It includes the Western Planning Area, Central Planning Area, and a portion of the Eastern Planning Area in the GOA. To address specific impacts to each specific Impaired Waterbody under Section 303 of the CWA within the area of analysis would not be appropriate at the pre-lease stage in this PEIS. However, should a specific project identify proposed activity near coastal or tidal waters, such as a pipeline landfall, it would be addressed at the post-lease stage through a site- and project-specific analysis. Ensuring that submerged aquatic vegetation habitats return to a natural and/or sustainable level is out of scope for this PEIS. However, there are several existing regulatory programs and requirements that reduce or minimize the environmental effects of impact producing factors that affect coastal communities and habitats in the GOA. Regulatory requirements enforced by BOEM, BSEE, and other agencies that can reduce impacts to coastal communities and habitats are included in **Table 4.3-2** of the PEIS and further described in the *Gulf of America OCS Regulatory Framework* (BOEM 2025), which is incorporated by reference into the PEIS. Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with all regulatory requirements. The impact analysis in the PEIS factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations. Application for a Section 404 CWA permit would occur at the post-lease stage where site- and project-specific plans are reviewed. State Coastal Zone programs and USACE Regulatory Districts along the Gulf coastal areas would be responsible for analyzing any unavoidable impacts to wetlands or special aquatic sites (SAVs, seagrass, coral reef complexes, etc.) and would then assess appropriate compensatory mitigation on a case-by-case basis for any CWA permits which require 404 mitigation in state waters. In addition, CWA 303 (d) requires that states identify impaired waters for EPA to include in a prioritized list. Section 303 (d) allows for EPA to assist states to develop and establish Total Max Daily Loads (TMDLs), as they deal with runoff loads into coastal waters and potential effects. Any proposed activity in these waters would also be coordinated through state Coastal Zone programs and USACE CWA permits.

Offshore Permitting

Commenter	ID Number	Comment	Response
EPA-5	WQ	In the Draft PEIS, BOEM discusses produced water, well treatment workover and completion fluids, and vessel discharges. EPA recommends BOEM discuss all discharges listed in the GMG290000 National Pollutant Discharge Elimination System (NPDES) General Permit, which includes drilling muds and cuttings, produced sands, bilge ballast and fire water, cooling water, deck drainage, domestic and sanitary wastes, and minor or miscellaneous discharge.	Thank you for your comment. BOEM addresses Impact Producing Factors, including discharges and wastes in **Appendix B.2.2** of the PEIS. That chapter includes produced waters (**Appendix B.2.2.1**); well treatment, workover, and completion fluids (**Appendix B.2.2.2**); drilling muds and cuttings (**Appendix B.2.2.3**); and vessel discharges (**Appendix B.2.2.4**). The other discharges listed in the comment are discussed in **Chapter 4.2.2.1** of the PEIS and detailed in Appendix B.2.2 and Chapter 2.2.1 of the GOM Oil and Gas SID, which is incorporated by reference.

Hazardous Waste

Commenter	ID Number	Comment	Response
EPA-6	Hazardous Waste	EPA recommends the PEIS analyze potential reasonably foreseeable environmental effects of hazardous waste from the proposed action and alternatives and estimated hazardous waste amounts and types produced from each alternative.	Thank you for your comment. Hazardous waste is discussed in **Appendix B.2.2** of the PEIS. The Resource Conservation and Recovery Act (RCRA), which is under the authority of the USEPA, regulates the management of hazardous and non-hazardous waste, ensuring safe handling, treatment, and disposal from both onshore and offshore operations. Exploration and production wastes generated directly from offshore oil and gas activities are typically exempt from hazardous waste regulations under RCRA. This exemption is due to their distinct characteristics, the specialized regulatory frameworks that govern them, and the industry's established practices. Exploration and production waste and any hazardous waste must be assessed to determine if they fall under RCRA or NPDES jurisdiction. See Chapters 4.4.1.1 (Waste Disposal Facilities), 5.1.1, and 5.11 of the GOM Oil and Gas SID and BOEM's *Gulf of America OCS Regulatory Framework* (BOEM 2025), which are both incorporated by reference into the PEIS, for more information about the CWA, RCRA, and BOEM and BSEE's approval processes and compliance programs pertaining to OCS oil- and gas-related discharges and wastes.

General

Commenter	ID Number	Comment	Response
EPA-7	Categorical Exclusions and Tiering	Categorical Exclusions: Throughout the Draft PEIS, including the Purpose and Need Section, BOEM indicated that the Draft PEIS, among other things, was to help inform extraordinary circumstance reviews to ensure categorical exclusions are used appropriately. Recognizing this purpose, the Draft PEIS could be more specific as to how extraordinary circumstances reviews will help BOEM determine when categorical exclusions are applied appropriately to the project activities. BOEM's regulations, at 43 C.F.R. § 46.215(a) – (l), provide 12 circumstances where extraordinary circumstances exist. For greater clarity, the Final PEIS could identify or explain what potential type of actions in this proposal would appropriately fit into a categorical exclusion. Tiering: The Draft PEIS states that the impact analysis of the GOA Oil and Gas PEIS will be used for tiering purposes for associated site- and activity OCS oil- and gas-related activity approvals. Tiering refers to an approach where federal agencies first consider the broad, general impacts of a proposed program, plan, policy, or large scope project – or at the early stage of a phased proposal – and then conduct subsequent, narrower, decision focused reviews. Because the Draft PEIS generally refers to tiering, the Final PEIS could provide more detail about when an oil and gas lease sale could rely on the PEIS or tiered for a site-specific NEPA analysis, as well as how BOEM would implement tiering decisions based on established program criteria. For example, if an extraordinary circumstance is identified in a future GOA oil and gas lease sale, BOEM could engage in a tiered, site-specific NEPA review.	BOEM's OCS Oil and Gas Program Planning and Decision Process is described in Chapter 1.3 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS. In addition, the use of this PEIS and how it is used to inform a decision for an OCS oil and gas lease sale is described in **Chapter 1** of the PEIS. Post-lease activities and NEPA are described in **Chapter 1.4** of this PEIS and Chapter 5 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS. For more detail on the staged decision-making process in OCSLA, please refer to the information provided at the beginning of these comment responses. For more detail on extraordinary circumstances and categorical exclusion reviews, including the potential type of actions that would appropriately fit into a categorical exclusion, see Chapters 5.2.1 and 5.2.2 of the GOM Oil and Gas SID, which is incorporated by reference into this document. In response to the final sentence of the comment, an extraordinary circumstance would not be identified at the lease sale stage, it would be identified as part of a submitted plan and be reviewed at the post-lease stage in a site-specific and plan-specific manner. However, as the comment indicates, BOEM would review that extraordinary circumstance in a tiered, site-specific NEPA review at the post-lease stage.

Commenter	ID Number	Comment	Response
EPA-8	Site Specific Analysis	EPA also recommends that future NEPA reviews tiered from the PEIS evaluate all reasonably foreseeable potential impacts, including impacts that are downstream or indirect, which may include socioeconomic and health impacts. Site-specific impacts may include those from pipelines, oil and gas receiving shore infrastructure, ports, servicing operations, initial construction and deployment, exploration, and other related activities that have a reasonably close causal relationship to the actions subject to future NEPA reviews and are currently not identified in the Draft PEIS.	This PEIS analyzes potential environmental impacts that could result if exploration, development, production, and decommissioning activities eventually occur, and also includes reasonably foreseeable impacts on GOA resources. All plans for OCS oil- and gas-related activities (e.g., exploration and development plans) go through rigorous BOEM review and approval to ensure compliance with established laws and regulations before any project-specific activities can begin on a lease. See **Chapter 3.2** of the PEIS for descriptions of these post-lease activities. The information requested in the comment is included in the PEIS and its supporting documents. For example, each resource section in **Chapter 4** and **Appendix M** of the PEIS evaluates reasonably foreseeable potential impacts to that resource. **Chapters 4.15** and **4.16** of the PEIS analyze the economic and social factors impacts of an OCS oil and gas lease sale. The impacts on coastal populations in the GOA are further expanded in Chapters 4.1.2 and 4.4.6 of the GOM Oil and Gas SID (including health impacts). **Chapter 3**, **Appendix B**, and **Chapter 4.14** of the PEIS address pipelines, oil and gas receiving shore infrastructure, ports, servicing operations, initial construction and deployment, and exploration in great detail. In addition, Chapters 1.3.3, 2.0, and 4.4.1 of the GOM Oil and Gas SID, which is incorporated by reference into the PEIS, discusses these topics in detail.

Table L-2. Names Associated with Each Form Letter.

Form Letter	Number of Signatures on Letter
Form Letter 1 (BOEM-2023-0046- 0028)	5,197

Table L-3. Signatory Organizations on Letters.

Organization Letter	Signatory Organizations on Letter
Earthjustice et al. (BOEM-2023-0046-0027)	Earthjustice, Natural Resources Defense Council (NRDC), Sierra Club, Bayou City Waterkeeper, Friends of the Earth US, Ocean Defense Initiative, Center for Biological Diversity (CBD), Oceana, Zero Hour, North Gulfport Community Land Conservancy, and The Ocean Foundation
API et al. (BOEM-2023-0046-3145)	American Petroleum Institute (API), EnerGeo Alliance, Independent Petroleum Association of America (IPAA), Louisiana Mid-Continental Oil and Gas Association (LMOGA), National Ocean Industries Association (NOIA), and Offshore Operators Committee (OOC)
Earthjustice et al. (BOEM-2023-0046-5236)	Earthjustice, Natural Resources Defense Council (NRDC), Sierra Club Environmental Law Program, Surfrider Foundation, Zero Hour, Healthy Gulf, Bayou City Waterkeeper, North Gulfport Community Land Conservancy, Center for Biological Diversity (CBD), Ocean Conservancy, Oceana, Inc., Friends of the Earth, Turtle Island Restoration Network

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APPENDIX M

ASSESSMENT OF RESOURCES WITH NEGLIGIBLE TO MINOR IMPACTS

M ASSESSMENT OF RESOURCES WITH NEGLIGIBLE TO MINOR IMPACTS

M.1 INTRODUCTION

In this Programmatic EIS, BOEM evaluated the potential IPFs from OCS oil- and gas-related activities expected to take place after a single, representative OCS oil and gas lease sale for all resources listed in **Table 2.4-2**. BOEM identified four resources through its impacts analysis in this Programmatic EIS whose impacts from all IPFs were determined to reach a level of minor or less. This appendix was prepared to assist BOEM in focusing and streamlining the GOA Oil and Gas Programmatic EIS on the important impacts of the proposed action. It provides the detailed assessments of those resources with impacts classified as minor or less from implementation of the Proposed Action. **Chapter 4.0.3** of this Programmatic EIS provides the assessment methodology and **Tables 4.0-3** and **4.0-4** provide impact determination definitions. However, the four resources detailed in this appendix could be within the scope of analysis for future actions if new information or circumstances arise (i.e., future lease sales, post lease development).

M.2 PELAGIC COMMUNITIES AND HABITATS

The pelagic zone (i.e., habitat) encompasses the entire water column from the sea surface down to the seafloor. For a detailed description of the pelagic zone within the GOA, see Chapter 4.3.3.1 of the GOM Oil and Gas SID. The analysis in this chapter focuses on planktonic (i.e., phytoplankton, zooplankton, ichthyoplankton) and *Sargassum* (*S. natans* and *S. fluitans*) communities. For the purposes of this chapter, plankton refers to phytoplankton, zooplankton, and ichthyoplankton combined unless otherwise specified. Information on the larger biota that inhabit or use pelagic habitats is provided in **Chapters 4.6-4.9**. Further, information about coastal communities and habitats and benthic communities and habitats, including protected corals, is provided in **Chapters 4.3 and 4.4**, respectively. A description of how climate-related factors are influencing the pelagic zone is provided in Chapter 3.4 of the GOM Oil and Gas SID.

M.2.1 Affected Environment

A brief overview of pelagic communities and habitats is provided below; see Chapter 3.3 of the Biological Environmental Background Report (BOEM 2021) and Chapter 4.3.3.1 of the GOM Oil and Gas SID for more details. Plankton are plants (phytoplankton) and animals (zooplankton) that drift with the currents (i.e., unable to swim against a current) throughout all depths of the GOA; they form the base of the pelagic food chain. Plankton can be planktonik either for their entire life cycle (i.e., holoplankton) or only temporarily (i.e., meroplankton) during the early stages of their life. An essential component of temporary zooplankton is ichthyoplankton (i.e., fish eggs, larvae, and small juveniles) (Rowe 2017). They are predators of the lower tropic planktonic organisms (e.g., dinoflagellates and copepods) and important prey for larger marine organisms (BOEM 2021). Ichthyoplankton are predominantly located within the upper water column, with their distribution influenced by fish spawning locations and oceanographic processes (e.g., currents and temperature) (Rowe 2017).

A unique floating habitat ubiquitous in the epipelagic zone of the GOA is *Sargassum*. *Sargassum* are pelagic species of free-floating, brown macroalgae that generally occur as large mats, or "floating islands." These mats can be up to dozens of meters long as well as in diameter. *Sargassum* mats are not rigidly attached structures; thus, they can be broken up naturally by wave action as well as washed ashore (i.e., beached). *Sargassum* provides a dynamic structural habitat in the surface waters of the GOA where there is a lack of natural structural habitat due to the depths and distance from shore. This habitat provides for life functions of numerous species and can act as a vehicle for dispersal of some of its inhabitants, providing them with substratum, predator protection, and concentration of food within the pelagic zone (Gulf of Mexico Fishery Management Council 2004). For example, *Sargassum* is vital to several fish species as both nursery habitat and adult feeding grounds and is considered EFH in the GOA and South Atlantic (South Atlantic Fishery Management Council 2002). In addition, *Sargassum* habitat has been identified as potential foraging grounds for some marine mammals, particularly in frontal zones (Laffoley et al. 2011; Witherington et al. 2012), and is also designated as critical habitat by NMFS for the loggerhead (79 FR 39856) and proposed critical habitat for green sea turtles (88 FR 46572). Pelagic seabirds (e.g., masked boobies, bridled terns, and black terns) also use *Sargassum* mats as foraging grounds and roosting sites (Haney 1986; Moser and Lee 2012).

M.2.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact pelagic communities and habitats. Non-OCS oil- and gas-related activities also have the potential to impact pelagic communities and habitats (**Table M.2-1**). These IPFs and their potential to affect pelagic communities and habitats are discussed below and in greater detail in Chapter 4.3.3.2 of the GOM Oil and Gas SID and Chapter 4.3 of the Biological Environmental Background Report (BOEM 2021). Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapters 4.3.3.2.1 and 4.3.3.2.2 of the GOM Oil and Gas SID.

Table M.2-1. Impact-Producing Factors with the Potential to Impact Pelagic Communities and Habitats.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Air Emissions and Pollution	Unintended Releases into the Environment	Air Emissions and Pollution
Discharges and Wastes	Response Activities	Discharges and Wastes
Bottom Disturbance	Strikes and Collisions	Bottom Disturbance
Noise	-	Noise
Lighting and Visual Impacts	-	Lighting and Visual Impacts
Offshore Habitat Modification/ Space Use	-	Offshore Habitat Modification/ Space Use
-	-	Strikes and Collisions
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

Several existing regulatory programs and protective measures enforced by BOEM, BSEE, and other agencies reduce or minimize the environmental effects of these IPFs to pelagic communities and habitats in the GOA. The regulatory requirements listed in **Table M.2-2** all reduce impacts to pelagic communities and habitats by regulating discharges and wastes and air emissions and pollution. Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with regulatory requirements. Therefore, this analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

Table M.2-2. Existing Regulatory Requirements and Protective Measures That Reduce the Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Post-lease Water Quality Review	BOEM, BSEE	Discharges and Wastes	Chapter 5.1.1 of the GOM Oil and Gas SID, **Chapters 3.4.2 and 4.2** of this Programmatic EIS
Air quality reviews of all site-specific plans for compliance with NAAQS through OCSLA[2]	BOEM, BSEE	Air Emissions and Pollution	Chapters 5.6 and 6 of the GOM Oil and Gas SID, 30 CFR part 550, 30 CFR part 250, **Chapter 4.1** of this Programmatic EIS
Air quality permits for compliance with Section 328 of the Clean Air Act[3]	USEPA	Air Emissions and Pollution	40 CFR part 55, Chapters 2.1 and 6 of the GOM Oil and Gas SID
BSEE Pollution Prevention (30 CFR 250.300)	BSEE	Discharges and Wastes	Chapter 5.1.3 of the GOM Oil and Gas SID
MARPOL Annex V Treaty	USCG	Discharges and Wastes	Chapter 2.9.1.7 of the GOM Oil and Gas SID
International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI and the Act to Prevent Pollution from Ships (APPS)	USEPA, USCG	Air Emissions and Pollution	33 U.S.C. 1901-1915 – Prevention of Pollution from Ships
Federal Water Pollution Control Act of 1948, amended in 1972 as the Clean Water Act (CWA)	USEPA	Discharges and Wastes, Bottom Disturbance	Chapters 2.2, 4.2.2, and 5.11 of the GOM Oil and Gas SID
CWA Section 402, the National Pollutant Discharge Elimination System (NPDES) for Regions 4 and 6	USEPA	Discharges and Wastes	**Chapter 3.4.2** of this Programmatic EIS and Chapters 2.2 and 5.11 of the GOM Oil and Gas SID
CWA Section 312, Vessel Sewage Discharges	USEPA	Discharges and Wastes	Chapters 4.2.2.2 and 5.11 of the GOM Oil and Gas SID

Regulatory Requirement or Protective Measure[1]	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Vessel Incidental Discharge Act (VIDA) Framework for Incidental Discharges under CWA Section 312(p)	USEPA, USCG	Discharges and Wastes	Chapter 4.2.2.2 of the GOM Oil and Gas SID
BSEE Decommissioning Requirements (30 CFR subpart Q)	BSEE	Discharges and Wastes, Bottom Disturbance	Chapter 4.2.2.2 of the GOM Oil and Gas SID

[1] See Chapter 6 of the GOM Oil and Gas SID for conditions of approval commonly applied at the post-lease stage.
[2] Only for activities in the Central and Western Planning Areas (west of longitude 87.5 degrees).
[3] Only for activities in the Eastern Planning Area (east of longitude 87.5 degrees).

M.2.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Air Emissions and Pollution: Air emissions and pollution from OCS oil- and gas-related routine activities (e.g., structure and pipeline installation, drilling), including decommissioning, mostly occur above the sea surface but could indirectly affect pelagic waters through the absorption of CO_2 contributing to ocean acidification (see **Chapter 1.2.4**). Several existing regulatory programs and requirements are in place to reduce or minimize air emissions and pollution (**Table M.2-2**). For example, BOEM's regulations require air quality reviews for all post-lease plans (see Chapter 5.6 of the GOM Oil and Gas SID and **Chapter 4.1** of this Programmatic EIS) and, if required based on site-specific environmental reviews, BOEM assigns conditions of approval that are enforced by BSEE. Because lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements, emissions and pollution from the activities are localized and are expected to dissipate (i.e., return to baseline conditions) quickly.

Discharges and Wastes: Pelagic habitats and communities, including *Sargassum*, are exposed to operational discharges and wastes from structures and vessels from OCS oil- and gas-related routine activities (e.g., mud cuttings, graywater, and sanitary wastes) and decommissioning activities. Effects can include localized and temporary biodiversity loss, community structure shifts (i.e., changes in species diversity, species richness) that could affect predator-prey interactions, habitat degradation and suitability changes, and suspended material in the water column that could potentially increase nutrient availability and result in a localized increase in phytoplankton abundance (Fernandes et al. 2023), reduce the amount of light available for photosynthesis (Grobbelaar 2009), and/or clog and damage appendages and feeding structures (Berry et al. 2003). Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with regulatory requirements that minimize or avoid impacts to water quality and pelagic habitat from discharges (e.g., ballast), trash, and other waste (e.g., NPDES, 30 CFR § 250.300, and

MARPOL 73/78; see **Table M.2-2**). A description of these rules and regulations is provided in **Appendix C.2.4**.

The discharge of routine operational waste streams is regulated by the USEPA Region 4 and Region 6 in the GOA. The CWA Section 402, 33 U.S.C. 1342, authorizes the USEPA to issue NPDES permits allowing discharges on the condition they will meet certain requirements, including CWA Sections 301, 304, 306, 401, and 403. Discharges are only allowed if the requirements of the CWA and the corresponding NPDES permit are met, including no unreasonable degradation of the environment as discussed in Section 403 of the CWA (BOEM 2020; USEPA 2023). BOEM conducts post-lease water quality reviews for routine OCS oil- and gas-related activities to ensure that the above USEPA regulatory requirements, as shown in **Table M.2-2**, are met prior to plan approval. For more detail, see **Chapter 4.2**. Discharges and wastes resulting from these routine activities, including decommissioning, are regulated, localized, and expected to dissipate quickly. The dispersion and dilution of the discharges is influenced by a variety of factors, including the discharge composition, discharge rate, discharge point (e.g., depth and direction), and oceanographic conditions (e.g., currents, winds, waves temperature, and salinity) (Beyer et al. 2020). Based on available data, demonstrated effects have been shown to be relatively localized within 1,000 m (3,281 ft) of the discharge for drilling fluids and cuttings and within several hundred meters for produced waters (USEPA 2022). Pelagic eggs and larvae of fishes and invertebrates, along with phytoplankton, may also become impinged or entrained by seawater uptake equipment used by offshore structures and vessels (e.g., cooling water systems), resulting in injury or mortality.

Bottom Disturbance: Pelagic communities and habitats are exposed to bottom disturbance from OCS oil- and gas-related routine marine construction (e.g., structure and pipeline installation) and seafloor activity (e.g., drilling), including decommissioning activities (e.g., pipeline and structure removal). Pelagic organisms' (e.g., larval fish and zooplankton) feeding is potentially affected by increased turbidity from bottom disturbances by the clogging and damaging of appendages and feeding structures (Berry et al. 2003). Suspended particles can also reduce light penetration, which may impede photosynthesis, resulting in reduced phytoplankton biomass. However, if effects were to occur, they would be expected to occur in shallower, coastal waters where resuspension from bottom-disturbing activities could extend up into the photic zone of areas already experiencing high sediment loads from the Mississippi/Atchafalaya River System (Meade and Moody 2010; Yedema et al. 2023). Bottom disturbances resulting from routine activities are localized and temporary and any associated elevated turbidity levels are expected to dissipate quickly.

Noise: Active acoustic sources (e.g., seismic surveys), vessels (including decommissioning vessels), and equipment used in OCS oil- and gas-related routine activities (including decommissioning) generate underwater noise. These noise sources can affect the soundscape of pelagic habitats leading to both indirect (e.g., area avoidance) and direct (e.g., body malformations) effects to planktonic organisms. High-intensity noises (e.g., airguns, pile driving, and decommissioning explosives) could lead to the injury and mortality of organisms. However, study results have been indeterminate concerning the potential effects on plankton, including larvae from high-intensity underwater sounds (see **Section M.2.3**). Generally, limited spatial and temporal

impacts have been found from equipment such as seismic air guns (Richardson et al. 2017) and pile driving (Popper et al. 2014). For example, Popper et al. (2014) summarized that ichthyoplankton mortality could be expected in very close proximity (<5 m; 16 ft) to airgun exposure with the mortality rate considered insignificant compared to natural mortality.

Lighting and Visual Impacts: Artificial lighting as a result of OCS oil- and gas-related routine activities (e.g., structures and vessels, including decommissioning vessels) can result in the attraction of organisms and/or alter normal diel migration patterns. Potential effects are expected to vary by location (e.g., number of sources) and light source (e.g., type and irradiance). Study results suggest that artificial lighting could result in an increase in local (i.e., within the illuminated area) phytoplankton abundance, with the level of effect differing depending on wavelength (e.g., blue, red, and white). The local abundance of zooplankton could also change as result of attraction or disruption of normal diel vertical migration patterns (Diamantopoulou et al. 2021; Marangoni et al. 2022). Thus, artificial lighting (e.g., structures) may provide enhanced (beneficial) opportunities for foraging predators by providing sufficient light to locate and capture zooplankton and ichthyoplankton prey, as well as by concentrating positively phototaxic prey taxa (Keenan et al. 2007). The lower trophic levels possibly experience the adverse effect of localized areas of higher mortality due to elevated predation levels.

Offshore Habitat Modification/Space Use: The OCS oil- and gas-related routine activities include placement of vertical structures (e.g., structures and subsea trees) on the OCS. This offshore habitat modification/space use creates habitat that would otherwise not exist within the water column (e.g., structure installation, reefing of decommissioned structures). The presence of artificial structures can result in the attraction of organisms and alter normal migration patterns (e.g., deviation from their original direction and delaying or preventing arrival). They can also affect habitat use, distribution, and abundance, as well as predator/prey interactions (e.g., concentrating prey making them more vulnerable to predation) (Shaw et al. 2002). Delaying decommissioning or reefing structures in place may provide ecosystem services in the GOA, including providing habitat for economically important species such as red snapper (Schulze et al. 2020) and providing foraging habitat for pelagic species. For information on how offshore habitat modification and space use may affect pelagic species see **Chapter 4.6.2** for Fish, **Chapter 4.8.2** for Marine Mammals, and **Chapter 4.9.2** for sea turtles. Effects would be species- and life stage-specific and depend on the number, type, and spacing of structures that are placed on the OCS.

M.2.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Unintended Releases into the Environment: Unintended releases into the environment could affect pelagic habitat quality and function and associated communities, including *Sargassum*.

Polycyclic aromatic hydrocarbons (PAHs) in spilled oil can have toxic effects to plankton, and sea-surface slicks could inhibit light penetration essential to phytoplankton for photosynthesis, resulting in reduced phytoplankton growth and numbers. Alternatively, phytoplankton abundance could increase in response to the addition of nutrients or zooplankton could ingest spilled oil, reducing the abundance of phytoplankton grazers, causing increases in phytoplankton. An increase in phytoplankton could result in a bloom and possible oxygen depletion and/or toxin production (Quigg et al. 2021). Zooplankton have been found to be sensitive to oil exposure, for example, causing acute toxicity in copepods or with sublethal exposures causing decreased copepod feeding, egestion, and reproduction or altering behavior (e.g., swimming). Larval stages of marine invertebrates have also generally been found to be sensitive to oil exposure (Buskey et al. 2016). Typically, early life stages of fish are also more sensitive to acute oil exposure than adults, but some research indicates that embryos, depending on their developmental stage, would be less sensitive to acute exposure than larval stages (Fucik et al. 1995). Sea-surface slicks are subject to the same oceanographic processes that influence *Sargassum* and plankton movement and can result in them rafting together. The intensity of these effects would be species-specific, depend on the life stage exposed, and depend on the concentration and duration of exposure. The effects would depend on the volume of any spill and time before it is actively removed as part of a spill response or naturally weathers (see **Appendix B.3.1.1**). Further, plankton have a naturally high mortality rate and *Sargassum* has a yearly cycle that promotes quick recovery from impacts.

Although vessels used for routine OCS oil- and gas-related activities, including decommissioning, and structure operators are required to take preventative measures against the loss of marine trash and debris, accidental releases may still occur. Floating debris is also subject to the same oceanographic processes that influence *Sargassum* and plankton movement and can result in them rafting together. Debris, such as plastics, can degrade and become microdebris (e.g., microplastics, <5 millimeters in size), which can be ingested by the pelagic community. Negative effects of microdebris ingestion include physical damage (e.g., internal abrasions and gastrointestinal blockages) and exposure to organic pollutants, toxins, or foreign microbes that adhere to the debris surface and can lead to decreased growth, reproduction, and survival. Effects would be species-specific and life stage-dependent, with a possible trend found for decreasing exposure to microdebris with distance from shore in the GOA (Lestrade and Hernandez 2023). Industrialized bays appear to have higher microplastics levels than the open ocean, likely due to the proximity of microplastic sources (e.g., plastic manufacturing facilities) (Grace et al. 2022).

Response Activities: Response activities could cause injury/mortality of plankton in the area (e.g., burning and chemical dispersants). Further, response activities could also remove and/or concentrate plankton and *Sargassum* into affected areas (e.g., booms). Unlikely to be used on smaller spills, dispersants, when used during an oil-spill response, could be more toxic than oil alone, which is attributed to the chemical properties of the dispersants and greater accessibility of oil droplets. The effects of dispersants are species-specific, which can lead to community changes (Quigg et al. 2021). For example, Laramore et al. (2016) found that larval pink shrimp exposed to oil alone and oil treated with dispersants experienced greater negative impacts to the dispersant; impacts differed between larval stages, with zoea being the most sensitive. Similarly, eastern oysters

exposed to dispersants experienced some negative effects to immunological and physiological functions (Jasperse et al. 2018). In contrast, the effects of chemical dispersants on the larvae of blue crabs were laboratory tested, and only the larvae exposed to the highest treatment levels experienced significant increases in mortality (Anderson Lively and McKenzie 2014). The activities required for spill cleanup or retrieval of lost equipment are expected to be localized and minimized with monitoring for early detection of leaks, including leak detection systems that can enhance the ability to detect spills, which can result in reduced response times.

Strikes and Collisions: Vessel traffic from OCS oil- and gas-related routine activities, including decommissioning activities, can affect pelagic communities, including *Sargassum*, through strikes or ship wake effects (e.g., turbulence). Although potentially causing fragmentation, vessel strikes do not eliminate *Sargassum* habitat, which is prolific in the GOA and reproduces by fragmentation. Because of their limited swimming ability, vessel strikes could cause injury/mortality of plankton. Vessel traffic can also affect pelagic communities through the uptake and discharge of cooling and ballast water. These water uses cause impingement/entrainment, resulting in injury/mortality of plankton and *Sargassum*. However, plankton have a naturally high mortality rate, and *Sargassum* has a yearly cycle that would promote quick recovery from vessel traffic-related impacts.

M.2.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence pelagic communities and habitats, including *Sargassum*, in the GOA through air emissions; discharges and wastes; bottom disturbance; noise; lighting and visual impacts; offshore habitat modification/space use; and strikes and collisions. Each IPF is summarized below, with additional detail in Chapter 4.3.3.2.1 of the GOM Oil and Gas SID.

Air Emissions and Pollution: The potential types of impacts of air emissions from non-OCS oil- and gas-related activities, including natural (e.g., bacterial processes and natural oil seeps) and anthropogenic sources (e.g., commercial and fishing vessel traffic and State water oil and gas activities), are similar to those described above for OCS oil- and gas-related activity and include the potential to indirectly affect pelagic waters through the absorption of CO_2.

Discharges and Wastes: Discharges and wastes resulting from anthropogenic point-source activities (e.g., sewage treatment discharge) are regulated (e.g., NPDES), localized, and expected to dissipate (i.e., return to baseline conditions) quickly. Alternatively, effects from non-point discharges and waste sources (e.g., agricultural runoff) are often not localized and can have large-scale implications (e.g., hypoxic events). However, effects of these non-point sources primarily occur nearshore of the OCS. The potential types of impacts of discharges and wastes from non-OCS oil- and gas-related activities are similar to those described above for OCS oil- and gas-related activity and include exposure to contaminants and turbidity.

The potential types of impacts of unintended releases into the environment and response activities from non-OCS oil- and gas-related activities (e.g., State water oil and gas activities and commercial and fishing vessels), are similar to those described above for OCS oil- and gas-related activity. Unintended releases into the environment include the potential to affect pelagic habitat quality and function and associated communities, including *Sargassum,* through toxic effects or the prevention of light penetration. Response activities include the potential to cause injury/mortality of plankton in the area (e.g., burning and chemical dispersants). Further, response activities could also remove and/or concentrate plankton and *Sargassum* into affected areas (e.g., booms).

Bottom Disturbance: The potential types of impacts of bottom disturbance from non-OCS oil- and gas-related activities (e.g., trawling, buoys/mooring anchors, and renewable energy site characterization geotechnical surveys) are similar to those described above for OCS oil- and gas-related activity and include near seafloor turbidity.

Noise: The potential types of impacts of underwater noise from non-OCS oil- and gas-related activities, including natural (e.g., animals, wind, and rain) and anthropogenic sources (e.g., commercial and fishing vessels and renewable energy site characterization geological and geophysical surveys), are similar to those described above for OCS oil- and gas-related activity and include both indirect (e.g., area avoidance) and direct (e.g., body malformations) effects.

Lighting and Visual Impacts: The potential types of impacts of artificial lighting from non-OCS oil- and gas-related activities (e.g., navigational lighting and commercial and fishing vessels) are similar to those described above for OCS oil- and gas-related activity and include the attraction of organisms and/or alteration of normal diel migration patterns.

Offshore Habitat Modification/Space Use: The potential types of impacts of offshore habitat modification/space use from non-OCS oil- and gas-related activities (e.g., State water oil and gas activities and renewable energy site assessment buoys) are similar to those described above for OCS oil- and gas-related activity and include creating habitat that would otherwise not exist within the water column and possible altering of normal migration patterns and predator/prey interactions.

Strikes and Collisions: Potential impacts of strikes and collisions from vessels from non-OCS oil- and gas-related activities (e.g., commercial and fishing vessel traffic and military operations) are similar to those described above for OCS oil- and gas-related activity and include fragmentation of *Sargassum* and injury/mortality to plankton.

Other Environmental Factors: Other IPFs or programmatic concerns that are reasonably foreseeable and could contribute to cumulative impacts to pelagic communities and habitats, include ocean acidification, changes to sea surface temperature, sea-surface height, wind speed, eutrophication, and weather patterns. Ocean acidification from increased CO_2 absorption or sulfur and nitrogen deposition can impact pelagic pH levels, resulting in potential physiological (e.g., larval development) effects and alterations to food web dynamics. The changes may act additively or synergistically with other IPFs and have species- and life stage-specific effects. Within the open

waters of the GOA, changes to sea surface temperature (increases), sea-surface height (anomalies), wind speed, and weather patterns have not generally resulted in changes to primary production over a 20-year period (Li et al. 2022; Muller-Karger et al. 2015). However, the Mississippi River Delta area has seen an increase in chlorophyl-a concentration with the controlling factor (e.g., nutrients and mixing) unclear (Li et al. 2022). The potential impacts from these factors are discussed in **Section M.2.1** and **Appendix B.4.3**, and are expected to continue.

M.2.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, the direct or indirect impacts to pelagic communities and habitats that would occur as a result of the proposed action (i.e., a single proposed OCS oil and gas lease sale) are **none**. However, ongoing OCS oil- and gas-related activities associated with previous lease sales, and non-OCS oil- and gas-related activities would continue to potentially affect pelagic communities and habitats under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would still potentially affect pelagic communities and habitats through air emissions and pollution, discharges and wastes, bottom disturbance, light and visual impacts, noise, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions as described above in **Sections M.2.1** and **M.2.2.2**.

The potential impacts of ongoing OCS oil and gas activity (**Table 3.3-2**) on pelagic communities varies depending on the oceanographic conditions, as well as species distribution and space use. Pelagic habitats and communities, including *Sargassum*, may be exposed to operational discharges and wastes from structures and vessel traffic. Habitats and communities in close vicinity to the structure or vessel may experience temporary biodiversity loss, shifts in community structure, and suspended material in the water column. Lessees are required to comply with regulatory requirements (see **Table M.2-2**), including post-lease water quality and air quality reviews that ensure compliance, to minimize or avoid impacts to water quality and pelagic habitats from discharges. OCS oil- and gas-related routine marine construction and seafloor activity, including decommissioning activities, may expose pelagic communities and habitats to the effects associated with bottom disturbance. This may affect pelagic organisms' (e.g. larval fish and zooplankton) feeding due to increased turbidity in the water column, but the effects are expected to be localized and temporary. Active acoustic sources can affect the soundscape of pelagic habitats, leading to both indirect or direct effects to planktonic organisms. Study results have been inconclusive concerning the potential effects of high-intensity underwater sounds on plankton (see **Section M.2.3**). Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Section M.2.1** and in further detail in Chapter 4.3.3.1 of the GOM Oil and Gas SID. Considering the

estimates of ongoing OCS oil- and gas- activities (see **Table 3.3-2**), the expansive area pelagic habitats and communities cover, and the mitigations applied by BOEM and other regulations (see **Table M.2-2**), impacts from ongoing OCS oil- and gas- activities would range from **negligible** to **minor** for pelagic habitats and communities.

***Non-OCS Oil- and Gas-Related Activities*:** Air emissions and pollution, discharges and wastes, bottom disturbance, light and visual impacts, noise, offshore habitat modification/space use, and strikes and collisions associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect pelagic communities and habitats under the No Action alternative, as described above. Most notably, discharges and wastes could continue to cause a variety of impacts on pelagic habitats. Other non-OCS oil- and gas- related factors impacting pelagic communities and habitats in the GOA include, but are not limited to, ocean acidification, changes to sea surface temperature, sea-surface height, wind speed, eutrophication, and weather patterns. Eutrophication (over abundance of nutrients) continues to be one of the most important environmental stressors on the pelagic environment (Salmaso and Tolotti 2021). Eutrophication can lead to algal blooms and reduced water quality, which may in turn alter food webs due to impacts on plankton species. Eutrophication may lead to ocean acidification in pelagic habitats and communities. The link between eutrophication and ocean acidification is complex and depends on a variety of environmental factors. However, ocean acidification in the pelagic environment can impact marine species, assemblages, and fisheries (Frieder et al. 2024). For more information about impacts of ocean acidification on water quality see **Chapter 4.2.2.3**, on sea turtles see **Chapter 4.9.2.3**, on commercial fishing see **Section M.3.2.3**, and on recreational fishing see **Section M.4.2.2**. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. When considering impacts from non-OCS oil- and gas-activities and impacts from other anthropogenic activities, these factors have a greater effect on pelagic communities and habitats than OCS oil-and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a proposed regionwide OCS oil and gas lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing, which could change the spatial distribution of the scenario activities, but not their overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table M.2-3**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table M.2-3. Impact Determinations for Routine and Accidental Impacts to Pelagic Communities and Habitats from a single proposed OCS oil and gas lease sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Air Emissions and Pollution	N/A	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Discharges and Wastes	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Bottom Disturbance	N/A	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Noise	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Lighting and Visual Impacts	N/A	**Negligible**	**None** in excluded areas; **Negligible** in leased areas only	**None** in excluded areas; **Negligible** in leased areas only
Offshore Habitat Modification/ Space Use	N/A	**Negligible** to **Minor**	**None** in excluded areas; **Negligible** to **Minor** in leased areas only	**None** in excluded areas; **Negligible** to **Minor** in leased areas only
Unintended Releases into the Environment	N/A	**Negligible** to **Minor**	**Negligible** to **Mino**r	**Negligible** to **Minor**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	N/A	**Negligible**	**Negligible**	**Negligible**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **none**. Considering the estimates of ongoing OCS oil- and gas- activities (see **Table 3.3-2**), the expansive area pelagic habitats and communities cover, and the mitigations applied by BOEM and other regulations (see **Table M.2-2**), impacts from ongoing OCS oil- and gas- activities would range from **negligible** to **minor**.

[1] No programmatic protective measures for application at the OCS lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for pelagic communities and habitats would be considered at the site-specific stage.

Alternative B – Regionwide OCS Lease Sale

Air Emissions and Pollution: Alternative B considers a proposed regionwide OCS lease sale area. Within this geographic area, air emissions and pollution could indirectly affect pelagic communities and habitats, including *Sargassum*, through the absorption of CO_2 in the upper water column. Given the level of routine oil and gas activities, including decommissioning, that could lead to air emissions and pollution (e.g., G&G surveys, structure installation, pipeline installation, structure removal, vessel trips, and helicopter operations) described in **Table 3.3-2** for a single

proposed OCS oil and gas lease sale, and **Appendix C,** any impacts are expected to be **negligible** due to the basin-wide distribution of *Sargassum* and plankton in the northern GOA, which would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides). Any effects are expected to vary by location (e.g., the species present and number of emission sources), dissipate (i.e., return to baseline) quickly, and are not anticipated to reach a level that has population-level effects to pelagic communities or detectable effects on pelagic habitat function or use. Lessees are required to comply with regulatory requirements (see **Table M.2-2**), including post-lease water quality and air quality reviews that ensure compliance, to minimize or avoid impacts to water quality and pelagic habitats from air emissions and pollution.

Discharges and Wastes: Within this geographic area, discharges and wastes from structures and vessels (including decommissioning vessels) could affect pelagic communities and habitats, including *Sargassum*, located within discharge plumes. Based on the description of potential impacts above and the level of potential routine oil and gas installation and decommissioning activities that could lead to discharges and waste (e.g., exploration, development, and production wells; structure removal; vessel trips) described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale, and **Appendix C**, any resulting impacts are expected to be **negligible** to **minor** with discharges and wastes anticipated to be highly localized and dissipate (i.e., return to baseline conditions) quickly. Oceanographic drivers would cause plankton and *Sargassum* to passively float in and out of affected waters (i.e., short-term, temporary exposure); however, the basin-wide distribution and abundance of plankton and *Sargassum* in the northern GOA would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides) once the plume dissipates. Impacts are not expected to reach a level that would have population-level effects to pelagic communities or be detectable when compared to natural variation and mortality rates. Further, these temporary, localized effects are not expected to lead to any substantial, long-term changes to pelagic habitat function or use. Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with regulatory requirements that minimize or avoid impacts to water quality and pelagic habitat from discharges (e.g., ballast), trash, and other waste (e.g., NPDES, 30 CFR 250.300, and MARPOL 73/78; see **Table M.2-2**). BOEM conducts post-lease water quality reviews for routine OCS oil- and gas-related activities to ensure that USEPA regulatory requirements, as shown in **Table M.2-2**, are met prior to plan approval.

Bottom Disturbance: Within this geographic area, bottom disturbance from OCS oil- and gas-related activities, including decommissioning activities, could affect pelagic communities and habitats through an increase in water column turbidity. Based on the description of potential impacts above and the range of potential routine oil and gas installation and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale , and **Appendix C**, that could lead to bottom disturbance (e.g., structure installation; pipeline installation; structure removal; pipeline removal, and exploration, development, and production wells), any impacts are expected to be **negligible**. Effects would only be expected to occur in shallow, coastal waters where resuspension from bottom-disturbing activities could reach the photic zone where plankton and *Sargassum* reside. In all cases, any effects from elevated turbidity levels are anticipated to be temporary with baseline conditions returning within a short period of time, leaving no measurable or

detectable impacts (i.e., short-term, temporary exposure). Oceanographic drivers would cause plankton and *Sargassum* to passively float in and out of affected waters; however, the basin-wide distribution and abundance of plankton and *Sargassum* in the northern GOA would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides) once the turbidity plume dissipates. Impacts are not expected to reach a level that would have population-level effects to pelagic communities or be detectable when compared to natural variation and mortality rates. Further, these temporary, localized effects are not expected to lead to any substantial, long-term changes to pelagic habitat function or use.

Noise: Within this geographic area, noise could affect pelagic communities and habitats, including *Sargassum* associated fauna, within the ensonified area. Underwater noise generated from activities associated with a proposed regionwide OCS lease sale (e.g., vessel engines, seismic airgun surveys, explosive removals) has the potential to cause both indirect (e.g., behavioral effects such as area avoidance) and direct (e.g., mortality or body malformations) effects. Effects would be species- and life stage-specific and depend on exposure levels and duration. Given the level of routine oil and gas installation and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale, and **Appendix C**, that could lead to elevated noise levels (e.g., G&G surveys, structure installation, pipeline installation, structure removal with explosives, vessel trips, and helicopter operations), potential impacts are expected to be **negligible** to **minor** with underwater noise (e.g., seismic airgun surveys, explosive structure removals) potentially resulting in the injury or mortality of planktonic organisms within the immediate proximity (meters). Oceanographic drivers would cause plankton and *Sargassum* to passively float in and out of ensonified waters; however, the basin-wide distribution and abundance of plankton and *Sargassum* in the northern GOA would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, tides) once sound levels return to normal. Impacts are not expected to reach a level that would have population-level effects to pelagic communities or be detectable when compared to natural variation and mortality rates. **Minor** adverse impacts could also occur to the quality of pelagic and *Sargassum* habitat in the localized area of exposure (e.g., species avoidance); however, the quality of the habitat would be expected to immediately return to baseline conditions once the activity creating the sound (e.g., pile driving) has stopped. These temporary, localized effects are not expected to lead to any significant, long-term changes to pelagic habitat function or use.

Lighting and Visual Impacts: Within this geographic area, lighting and visual impacts could affect pelagic habitats and communities at or near the sea surface. Artificial lighting may result in the attraction of organisms and/or alter normal diel migration patterns with potential effects varying by location (e.g., the species and life stages present, amount of artificial light produced, and wavelength). Given the level of routine OCS oil- and gas-related installation and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale, and **Appendix C**, that could lead to artificial lighting (e.g., structures and vessels, including decommissioning vessels), any impacts are expected to be **negligible** and highly localized. The basin-wide distribution and abundance of plankton and *Sargassum* in the northern GOA would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides) during daylight hours. Impacts are not expected to reach a level that would have population-level effects to pelagic

communities or be detectable when compared to natural variation. The areas that would be affected by the installation of lighted structures or passing of lighted vessels do not contain unique pelagic habitats or communities that would be expected to differ from the remaining areas. In addition, the projected number of installed production structures is less than the number that is projected to be removed (**Table 3.3-2**), resulting in a presumed net reduction in the overall amount of artificial lighting contributed by OCS oil- and gas-related activities. Thus, localized and spatially dispersed effects from artificial lighting are not expected to lead to any substantial, long-term changes to pelagic habitat function or use in the GOA.

Offshore Habitat Modification/Space Use: Within this geographic area, offshore habitat modification/space use could affect pelagic communities, including *Sargassum*, within proximity to the emplaced structures on the OCS (e.g., structure installations and reefed decommissioned structures). The offshore habitat modification/space use has the potential to create habitat that would otherwise not exist within the water column and alter normal migration patterns and predator/prey interactions. Based on the level of routine OCS oil- and gas-related installation and decommissioning activities described in **Table 3.3-2** for a single proposed OCS oil and gas lease sale (e.g., structures), and **Appendix C** (decommissioned structure reefs), any impacts are expected to be **negligible** to **minor** and localized around the structures. The basin-wide distribution and abundance of plankton and *Sargassum* within the northern GOA would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides). Thus, impacts are not expected to reach a level that would have population-level effects to pelagic communities or be detectable when compared to natural variation. Further, the areas that would be affected by the installation and reefing of structures do not contain unique pelagic habitats or communities that would be expected to differ from the remaining areas. In addition, the projected number of installed production structures is less than the number that is projected to be removed (**Table 3.3-2**). Therefore, the localized effects from the placement of artificial structures are not expected to lead to any substantial long-term changes to pelagic habitat function or use in the GOA.

Unintended Releases into the Environment: Within this geographic area, unintended releases into the environment, including trash and debris, could affect pelagic communities, including *Sargassum*, located within the release plume as well as habitat quality and function. Trash and debris may be accidentally released into the environment from vessels, including service and decommissioning vessels. Impacts from unintended releases into the environment would be temporary and/or localized to the habitat and species common to the area. Oceanographic drivers would cause plankton and *Sargassum* to passively float in and out of affected waters; however, the basin-wide distribution and abundance of plankton and *Sargassum* in the northern GOA would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides) once baseline conditions return following oil recovery and/or weathering. Further, plankton have a naturally high mortality rate and *Sargassum* has a yearly cycle that promotes quick recovery; therefore, impacts to pelagic communities and habitats from unintended releases are anticipated to be **negligible** to **minor**. The effects from an unintentional release would be life stage and species-specific and challenging to separate from background mortality and variability and are not expected

to result in population-level effects to GOA pelagic communities or substantial effects on GOA pelagic habitat function or use.

Response Activities: Within this geographic area, response activities could affect pelagic communities and habitats, including *Sargassum*, located within the area of cleanup. Response activities could cause injury/mortality of plankton in the area (e.g., burning and chemical dispersants) and remove *Sargassum* and associated organisms (e.g., booms). Any impacts from response activities to pelagic communities and habitats would be **negligible** because the activities required for spill cleanup or retrieval of lost equipment are expected to be minimized with early detection of a release and localized. If dispersants were to be used during an oil-spill response to a larger spill, impacts to pelagic communities and habitats from unintended releases are anticipated to be life stage- and species-specific and **negligible** to **minor**. It is unlikely any measurable changes in habitat quality would occur because of the basin-wide distribution and high abundance of plankton and *Sargassum* and natural mixing (i.e., currents, wind, and tides) in the northern GOA. No resulting detectible impacts to pelagic communities and habitats are expected compared to natural variation (i.e., challenging to separate from background mortality and variability).

Strikes and Collisions: Within this geographic area, impacts from strikes and collisions from vessels used in routine OCS oil- and gas-related activities, including decommissioning, could affect pelagic communities and habitats, including *Sargassum*, located within the vessel's path. Vessel strikes can cause fragmentation of *Sargassum* and injury/mortality to plankton. Any impacts from accidental strikes and collisions to pelagic communities and habitats would be intermittent, localized, and expected to be **negligible** given the basin-wide distribution of *Sargassum* and plankton, which would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides) and the naturally high mortality rate of plankton. Effects are not expected to reach a level that would have population-level effects to pelagic communities or substantial effects on pelagic habitat function or use.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3** (**Table 3.3-2**) and **Appendix C**, the overall impacts from IPFs associated with Alternative B on pelagic communities and habitats would be **negligible** to **minor** and not anticipated to have population-level effects or be detectable when compared to natural variation and mortality (i.e., stage- and species-specific and challenging to separate from background mortality). Effects would be localized compared to the basin-wide distribution of plankton and *Sargassum* in the northern GOA. In addition, lessees are required to perform OCS oil- and gas-related activities and decommissioning, in accordance with regulatory requirements (see **Table M.2-2**), including post-lease water quality and air quality reviews that ensure compliance. Effects from air emissions, discharges, bottom disturbance (e.g., turbidity), noise, vessel lighting, and accidental events, including decommissioning associated with these IPFs, are expected to return to baseline conditions within a short period of time (i.e., no long-term measurable effects). The areas that would be affected by the installation of structures, including their use of artificial lighting, do not contain unique pelagic habitats or communities that would be expected to differ from the remaining areas. Use of these areas would not result in any substantial,

long-term changes to pelagic habitat function or use in the GOA. Further, the projected number of installed production structures is less than the number that is projected to be removed (**Table 3.3-2**). In summary, the extensive movements of water masses that carry and mix plankton and *Sargassum* across the northern GOA would allow for rapid recovery of any affected areas through natural mixing (i.e., currents, wind, and tides), and their reproductive capabilities support life histories that are resilient towards any localized or short-term adverse impacts expected to be associated with OCS oil- and gas-related routine activities or non-catastrophic spills and subsequent response activities associated with a single proposed OCS oil and gas lease sale.

Alternative C – Targeted OCS Lease Sale Area

Alternative C represents a geographical constraint on available acreage for leasing, which would cause a change in the spatial distribution of activities compared to Alternative B, but not their overall activity levels. Additional impacts to pelagic communities and habitats from routine OCS oil- and gas-related activities associated with a proposed lease sale are not expected to occur in areas removed from potential leasing under Alternative C because, as discussed under Alternative B, areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding the activity, and these activities would not occur in excluded areas. Routine impacts would be limited to the areas leased under this alternative. The impacts from accidental events would be the same as described for Alternative B, including vessel strikes, which could occur in excluded areas because vessels could still transit the excluded areas. Air emissions, discharges and wasters, and noise from routine vessel traffic could also occur in exclusion areas with vessel transit through those areas. Impacts from these vessels are expected to be the same as those described for Alternative B. In addition, oil spills and response activities could occur in the excluded areas. This potential spatial redistribution of activity does not affect impact levels to pelagic communities and habitats, including *Sargassum*, because of their abundance and basin-wide distribution across the northern GOA. The areas that are part of the geographical constraint (i.e., approximately 28.7 million acres removed from potential leasing) do not contain unique pelagic habitats or communities that differ from the remaining areas, leaving impact determinations unchanged for Alternative C. In addition, the IPFs from routine activities are not changed from Alternative B.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternatives C on pelagic communities and habitats, including *Sargassum*, would be **negligible** to **minor** in leased areas. This is due to the extensive movements of water masses that carry and mix plankton and *Sargassum* across the northern GOA, and their reproductive capabilities support life histories that are resilient towards localized or short-term adverse impacts. Any effects are expected to be localized and are not anticipated to reach a level that would have population-level effects to pelagic communities or detectable effects on GOA pelagic habitat function or use. In addition, lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements (**Table M.2-2**), including post-lease water quality and air quality reviews that ensure compliance.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D represents a geographical constraint on available acreage for leasing, which would cause a change in the spatial distribution of activities compared to Alternative B or C, but not their overall activity levels. Impacts to pelagic communities and habitats from routine OCS oil- and gas-related activities are not expected to occur in areas removed from potential leasing under Alternative D because, as discussed under Alternative B, areas of impacts from routine OCS oil- and gas-related activities occur within limited areas surrounding the activity, and these activities would not occur in excluded areas. Routine impacts would be limited to the areas leased under this alternative. The impacts from accidental events would be the same as described for Alternative B, including vessel strikes, which could occur in excluded areas because vessels could still transit the excluded areas. Air emissions, discharges and wasters, and noise from routine vessel traffic could also occur in exclusion areas with vessel transit through those areas. Impacts from these vessels are expected to be the same as those described for Alternative B. In addition, oil spills and response activities could occur in the excluded areas. This potential spatial redistribution of activity does not affect impact levels to pelagic communities and habitats, including *Sargassum*, because of their wide distribution across the northern GOA. The areas that are part of the geographical constraint (i.e., approximately 45.7 million acres removed from potential leasing) do not contain unique pelagic habitats or communities that differ from the remaining areas, leaving impact determinations unchanged for Alternative D. In addition, the IPFs from routine activities are unchanged from Alternative B.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative D to pelagic communities and habitats, including *Sargassum*, would be **negligible** to **minor** in leased areas. This is due to the extensive movements of water masses that carry and mix plankton and *Sargassum* across the northern GOA, and their reproductive capabilities, support life histories that are resilient towards localized or short-term adverse impacts. Any effects are expected to be localized and are not anticipated to reach a level that would have population-level effects to pelagic communities or detectable effects on GOA pelagic habitat function or use. In addition, lessees are required to perform OCS oil- and gas-related activities in accordance with regulatory requirements (**Table M.2-2**), including post-lease water quality and air quality reviews that ensure compliance.

M.2.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially

affect pelagic communities and habitats through air emissions and pollution, discharges and wastes, bottom disturbance, light and visual impacts, noise, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions as described above in **Sections M.2.2.1** and **M.2.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Section M.2.1** and in further detail in Chapter 4.3.3.1 of the GOM Oil and Gas SID. Considering the estimates of ongoing OCS oil- and gas- activities (see **Table 3.3-2**), the expansive area pelagic habitats and communities cover, and the mitigations applied by BOEM and other regulations (see **Table M.2-2**), these ongoing impacts would be **negligible** to **minor**. Future lease sales may add small but measurable impacts to the past and present impacts. Decommissioning activities are being performed at higher rates than installations over the most recent decade (see **Chapter 3.2.5**). This trend is expected to continue for the foreseeable future and is not expected to result in a net positive or net negative impact to pelagic habitats and communities. Structures modify pelagic habitat and may provide ecological benefits to pelagic species, such as fish (see **Chapter 4.6**), sea turtles (see **Chapter 4.9**), and marine mammals (see **Chapter 4.8**). The decommissioning of structures may lead to temporary impacts on pelagic habitats and communities, including bottom disturbance that causes turbidity, noise, and modifications to offshore habitat and space usage. OCS oil- and gas- activities occur in dense aggregations, with most drilling operations occurring in a finite area. Pelagic habitats and communities occupy a vast majority of the GOA. Regulatory requirements and protective measures applied by BOEM (**Table M.2-2**) minimize potential impacts to pelagic habitats and communities from OCS oil- and gas- activities. The requirements and protocols outlined in **Table M.2-2** are expected to be applied to future OCS oil- and gas- activities. Therefore, impacts from cumulative OCS oil and gas activities are expected to be similar to effects experienced from ongoing oil and gas activities, with no notable effects to overall population levels.

Non-OCS Oil- and Gas-Related Activities: Cumulative non-OCS oil- and gas- activities could potentially affect pelagic communities and habitats through ocean acidification, changes to sea surface temperature, sea-surface height, wind speed, eutrophication, weather patterns, discharges and wastes, air emissions and pollution, bottom disturbance, light and visual impacts, noise, and offshore habitat modification/space use, and strikes and collisions. Changes to the pH of the pelagic environment, or ocean acidification, could cause physiological effects on pelagic species and their prey that occupy pelagic habitats. The changes may act additively or synergistically with other IPFs and have species- and life stage-specific effects. Discharges and wastes resulting from anthropogenic point-source activities are highly localized and anticipated to dissipate quickly. However, non-point source discharges and waste can have large scale effects, such as eutrophication, which can cause hypoxic events. The potential types of impacts of offshore habitat modification/space use are similar to those described above for OCS oil- and gas-related activity and include creating habitat that would otherwise not exist within the water column and possible altering of normal migration patterns and predator/prey interactions. The potential impacts of discharges and wastes from non-OCS oil- and gas-related activities are similar to those described above for OCS oil- and gas-related activities, and include exposure to contaminants and increased turbidity. The potential impacts from these factors are discussed in greater detail in **M.2.2.3** and are expected to continue.

Future non-OCS oil- and gas-related activities include proposed deepwater ports as described in **Appendix B.4.2.7**. These proposed ports could impact pelagic habitats and communities by increasing turbidity. An increase in turbidity in the water column can lead to reduced light penetration, which, in turn, can affect the photosynthesis of plankton (Varkitzi et al. 2022). Additionally, pelagic habitats would continue to be used for commercial and recreational fishing (see **Appendix B.4.2.7**). Both commercial and recreational fishing in pelagic habitats can result in impacts to pelagic habitats and communities through noise, and discharges and wastes. The presence of vessels would introduce additional noise into the environment. Impacts of noise from fishing vessels on the pelagic environment are expected to be similar to those from OCS oil- and gas-activities. Discharges and waste from fishing vessels, including trash, debris, and gasoline, can impact the quality and function of pelagic habitats. *Sargassum* can be affected by reductions in light penetration, while associated communities may suffer from the ingestion of these pollutants. When considering impacts from non-OCS oil- and gas-activities and impacts from other anthropogenic activities, these factors have a greater effect on pelagic communities and habitats.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion (0.3-1.8 percent) of activity when compared to the overall Cumulative OCS Oil and Gas Program activity forecasted to occur in the GOA (**Table 3.3-2**). BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as not having a notable effect on pelagic species. The incremental contribution of impacts from one lease sale to those cumulative effects would not increase the level of impacts substantially. Therefore, the *incremental contribution* of a proposed Gulf of America OCS oil and gas lease sale to cumulative impacts on pelagic communities and habitats, including Sargassum, would be **negligible** when properly regulated. An OCS oil and gas lease sale would not be expected to result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by pelagic communities and habitats in the area of analysis. When considering impacts from non-OCS oil- and gas-activities, as well as other anthropogenic activities, the factors discussed above are likely have a greater effect on pelagic habitats and communities than the incremental contribution of the proposed action. These activities would still occur in the absence of the activities resulting from a single proposed lease sale.

The incremental contribution of a single proposed lease sale would not result in a notable increase in effects to pelagic habitats and communities, and the incremental contribution would not differ between alternatives. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Sections M.2.2.1** through **M.2.2.4** above. However, it should be noted that some activities, such as oil and gas extraction, may cease following decommissioning of facilities, potentially reducing impacts over time.

M.2.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on pelagic communities and habitats, including *Sargassum*, related to underwater noise, temperature, and ocean acidification.

Study results have been mixed concerning the potential effects of underwater noise on plankton, including larvae, as a result of high-intensity sounds (e.g., air guns), especially when in close range (e.g., Carroll et al. 2017; Fields et al. 2019; McCauley et al. 2017; Richardson et al. 2017). Generally, limited spatial and temporal impacts have been found (Richardson et al. 2017) and, similar to the conclusions of Vereide et al. (2023), any effects from noise are likely to be stage- and species-specific and challenging to separate from background mortality. Further, the areas that would experience elevated noise levels comprise a relatively small proportion of the areas where plankton and *Sargassum* are distributed in the GOA. In addition, seismic surveys would be expected to avoid areas of high *Sargassum* concentration to prevent entanglement of survey gear and vessel propulsion.

Temperature impacts on *Sargassum* remain unknown because the habitat has a vast distribution. Increased temperatures could result in benefits to *Sargassum* by increasing growth rates and the range where plants could be found. Alternatively, potential water column stratification and changes in water current patterns could have negative effects by altering access to nutrients and/or moving *Sargassum* mats into unfavorable areas (Osborne et al. 2022). In March 2023, the amount of *Sargassum* in the Great Atlantic Sargassum Belt (extending from west Africa to the GOA) was a record (approximately 13 million tons) for that time of year. Specific to the GOA, *Sargassum* quantity in 2023 exceeded the 75th percentile for the same month between 2011 and 2022 (University of South Florida 2023); however, in 2024, only a negligible amount was found (University of South Florida 2024). Although the effects of increased temperature may vary, *Sargassum* habitat is not limited in the GOA.

Increased CO_2 uptake in pelagic waters could contribute to ocean acidification. Under acidic conditions, typically evaluated in a laboratory setting, changes in plankton calcification rates, shell dissolution rates, physiology (e.g., photosynthesis/respiration), reproduction (e.g., egg production), and survival have been observed (Kim et al. 2016). Potential effects would be expected to vary by location and be stage- and species-specific. Determining the effects of ocean acidification in the northern GOA is challenging because it receives large freshwater and nutrient influxes leading to carbonate chemistry variability (Osborne et al. 2022).

BOEM has determined that such information (described above) is not essential to a reasoned choice among alternatives and that the above studies were used in lieu of the information to indicate that potential effects are challenging to separate from background mortality, would vary by location, and would affect only a fraction of the plankton and *Sargassum* population that is abundantly distributed across the GOA. Ultimately, the extensive movements of water masses that carry and mix plankton and *Sargassum* across the northern GOA, and their reproductive capabilities,

support life histories that are resilient towards localized or short-term adverse impacts, such as those expected to be associated with OCS oil- and gas-related routine activities or non-catastrophic spills and subsequent response activities. BOEM has used the best available scientific information to date and reasonably accepted scientific methodologies to extrapolate from existing information. Therefore, the incomplete or unavailable information, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

M.3 COMMERCIAL FISHERIES

Commercial fisheries are an important industry and economic driver in the GOA. Some of the most economically important commercial fisheries in the GOA are white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), eastern oysters (*Crassostrea virginica*), Gulf menhaden (*Brevoortia patronus*), blue crab (*Callinectes sapidus*), red grouper (*Epinephelus morio*), red snapper (*Lutjanus campechanus*), and tunas (*Thunnus* spp.). Commercial fisheries are managed by NOAA Fisheries (NMFS), as advised by the Regional Fisheries Management Councils. Each year, NOAA Fisheries reports to Congress and the Fishery Management Councils on the status of all fish stocks in the Nation. Commercial fisheries are regulated by various mechanisms, including permitting, closures, quotas, and gear restrictions; as described by the Gulf Council (2025). Some of the most common gear types are trawls (for shrimp), purse seines (for menhaden), dredges (for oysters), traps (for blue crab), and longlines (for various finfish).

M.3.1 Affected Environment

The biological aspects of the affected environment for the targeted species are discussed in **Chapter 4.6.1** and habitats are discussed in **Chapters 4.3.1**, **4.4.1, and Section M.2.1**. For more information on commercial fisheries of the GOA, see Chapter 4.2.2 of the GOM Oil and Gas SID (BOEM 2023b).

Landings Revenues

The Gulf of America is home to a large and complex commercial fishing industry. There were $891.2 million in total landings in the GOA in 2022, which comprised 16 percent of total U.S. landings (NMFS 2022b). Panel A of **Table M.3-1** presents the total landings revenues for key GOA fisheries, while Panels B through F present the landings revenues for the key fisheries in each Gulf Coast State from 2019 through 2022. There were $891.2 million in landings revenues in 2022, compared with $816 million in 2019, $755.3 million in 2020, and $920.1 million in 2021. Fisheries landed offshore of Louisiana accounted for the most fisheries revenue in 2022, followed (in descending order) by West Florida, Texas, Alabama, and Mississippi. Shrimp species (particularly white shrimp and brown shrimp) account for the most landings revenues ($342,314,000 in 2022) in the GOA. Shrimp are caught offshore of all states, particularly Texas and Louisiana, in Federal and State waters. Menhaden accounts for the most pounds (1,053,564,062 pounds in 2022) landed in the GOA (NMFS 2022b; 2024b). However, because the average price per pound of menhaden is much lower than for other species, menhaden landings accounted for the second most landings

revenue ($150,774,000) in 2022. Menhaden is caught primarily in State and Federal waters offshore of Louisiana and Mississippi. Blue crab ($102,363,000) and oysters ($93,010,000) accounted for the third and fourth highest landings revenues in 2022. These species are caught in State waters of all Gulf Coast States. Red snapper and tunas are primarily caught in Federal waters offshore various states. Stone crab (*Menippe mercenaria*) and Caribbean spiny lobster (*Panulirus argus*) are caught primarily offshore Florida.

Table M.3-1. Landings Revenue by Species and State (in thousands of dollars).

Panel	Species	2019	2020	2021	2022
Panel A: Gulfwide	Shrimp	371,027	350,013	442,620	342,314
Panel A: Gulfwide	Menhaden	102,448	105,097	81,751	150,774
Panel A: Gulfwide	Oysters	87,929	62,247	91,105	93,010
Panel A: Gulfwide	Blue crab	69,605	78,929	107,840	102,363
Panel A: Gulfwide	Spiny lobster	30,045	22,149	37,873	39,912
Panel A: Gulfwide	Groupers	21,044	4,823	5,153	3,650
Panel A: Gulfwide	Red snapper	32,161	31,005	32,383	34,476
Panel A: Gulfwide	Crawfish	13,169	11,487	14,300	13,870
Panel A: Gulfwide	Mullets	5,229	4,169	5,041	5,810
Panel A: Gulfwide	Tunas	2,466	1,760	1,693	1,314
Panel A: Gulfwide	Total Revenue	816,050	755,359	920,087	891,243
Panel B: Louisiana	Shrimp	120,385	98,952	130,619	115,470
Panel B: Louisiana	Menhaden	60,347	66,442	60,396	107,078
Panel B: Louisiana	Oysters	50,134	26,967	53,054	75,281
Panel B: Louisiana	Blue crab	52,232	63,484	92,292	87,174
Panel B: Louisiana	Crawfish	13,169	11,487	14,300	13,870
Panel B: Louisiana	Red snapper	5,445	4,695	5,299	5,607
Panel B: Louisiana	Tunas	1,813	1,216	1,017	4
Panel B: Louisiana	King mackerel	2,427	1,602	771	615
Panel B: Louisiana	Vermillion snapper	581	261	287	401
Panel B: Louisiana	Mullets	132	3	2	338
Panel B: Louisiana	Total Revenue	317,319	283,823	367,125	416,484
Panel C: Texas	Shrimp	151,041	142,954	183,629	132,389
Panel C: Texas	Oysters	33,496	30,626	31,213	11,847
Panel C: Texas	Red snapper	12,548	12,176	12,647	14,376
Panel C: Texas	Blue crab	5,529	5,028	5,156	4,961
Panel C: Texas	Black drum	2,288	1,471	1,622	1,892
Panel C: Texas	Groupers	1,302	542	549	450
Panel C: Texas	Vermillion snapper	323	276	179	332
Panel C: Texas	Flounders	107	112	68	94
Panel C: Texas	Atlantic croaker	1320	1,343	1,099	869

Panel	Species	2019	2020	2021	2022
Panel C: Texas	Total Revenue	209,279	195,628	237,233	168,446
Panel D: West Florida	Shrimp	34,454	42,690	53,175	46,958
Panel D: West Florida	Lobsters	30,053	53,418	44,056	39,371
Panel D: West Florida	Stone crab	33,957	27,911	35,758	28,106
Panel D: West Florida	Red grouper	10,691	21,217	18,931	17,836
Panel D: West Florida	Red snapper	11,751	8,111	9,997	8,599
Panel D: West Florida	Mullets	4,209	9,387	6,148	6,336
Panel D: West Florida	Blue crab	9,748	7,385	8,487	6,127
Panel D: West Florida	Gag grouper	3,205	2,889	2,782	4,659
Panel D: West Florida	Oyster	2,756	4,178	4,722	4,266
Panel D: West Florida	Total Revenue	173,129	155,538	198,466	188,467
Panel E: Mississippi	Shrimp	15,128	13,012	12,282	9,567
Panel E: Mississippi	Menhaden	41,992	38,527	21,054	43,422
Panel E: Mississippi	Blue crab	692	1,340	1,635	1,495
Panel E: Mississippi	Mullets	18	12	15	14
Panel E: Mississippi	Red snapper	155	393	307	221
Panel E: Mississippi	Total Revenue	58,661	53,550	35,561	55,173
Panel F: Alabama	Shrimp	50,020	60,055	71,060	52,830
Panel F: Alabama	Blue crab	1,404	901	1,143	1,188
Panel F: Alabama	Red snapper	2024	1,511	1,175	661
Panel F: Alabama	Spanish mackerel	577	288	250	330
Panel F: Alabama	Oysters	1543	2,426	5,238	4,360
Panel F: Alabama	Mullets	392	344	1,222	1,300
Panel F: Alabama	Total Revenue	57,662	66,821	81,703	62,673

Source: NMFS (2023a).

Fisheries Supply Chain

Some of the leading commercial fishing ports along the Gulf coast, along with the fisheries revenues received in 2022 at these ports, are Empire-Venice, Louisiana ($163.3 million); Bayou La Batre, Alabama ($59.5 million); Dulac-Chauvin, Louisiana ($59.4 million); Galveston, Texas ($43.8 million); Port Arthur, Texas ($40.4 million); Brownsville-Port Isabel, Texas ($32 million); and Intracoastal City, Louisiana ($24.9 million) (NMFS 2023b). Fish landings then proceed through supply chains that include dealers, processors, distributors, markets, and restaurants. NMFS used economic modeling techniques to estimate the supply chain impacts of fisheries landings (NMFS 2022a). NMFS' estimates of the number of jobs and the amount of value-added (the economic contribution beyond the initial landed catch, including processing, distribution, and marketing) supported by fisheries landings in each Gulf Coast State are listed below in **Table M.3-2**. The large impacts in Florida are due to its high numbers of seafood importers, wholesalers, distributors, and retailers.

Table M.3-2. Estimated Number of Jobs and Value-Added to the Gulf of America States by Commercial Fisheries in 2022.

State	Number of Jobs	Value-Added
Texas	41,171	$2,048,828,766
Louisiana	32,514	$837,859,844
Florida	121,710	$8,206,788,902
Alabama	6,971	$195,934,267
Mississippi	6,954	$165,074,427

Note: The information for Florida is for the entire state.
Source: NMFS (2025).

COVID-19 Pandemic

Since the onset of COVID-19 in early 2020, the pandemic has persistently affected fisheries in the GOA. The adverse consequences include complete shutdowns of certain fisheries, market disruptions, heightened health risks for fishers, and additional implications for marginalized communities (Bennett et al. 2020; Peters 2020). The Coronavirus Aid Relief and Economic Security Act earmarked $300 million in relief funds for fisheries and aquaculture (NMFS 2020) and $255 million in fisheries assistance funding was provided by the Consolidated Appropriations Act of 2021 to states with coastal and marine fishery participants negatively affected by COVID-19 (NMFS 2021c). The Gulf States Marine Fisheries Commission, in coordination with NOAA Fisheries, is working to distribute the funds in the GOA region (Gulf States Marine Fisheries Commission 2021). BOEM undertook a comparative analysis of NMFS (2025) landing data in the GOA pre-COVID-19, during COVID-19, and post-COVID. The average of 2017, 2018, and 2019 data served as the pre-COVID-19 baseline, while the average of 2020 and 2021 data represented the COVID year (spanning 2020 and 2021), and the average of 2022 and 2023 data reflected the post-COVID period. During the COVID year, there was a 19 percent reduction in landings—from 658,901 metric tons to 535,683 metric tons. However, the industry rebounded, and landings subsequently increased to 626,520 metric tons during the post-COVID period of 2022 and 2023.

M.3.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact commercial fisheries. Non-OCS oil- and gas-related activities also have the potential to impact commercial fisheries (**Table M.3-3**). These IPFs and their potential to affect commercial fisheries are discussed below and in greater detail in Chapter 4.4.2 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.4.2 of the GOM Oil and Gas SID.

Table M.3-3. Impact-Producing Factors with the Potential to Impact Commercial Fisheries.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Noise	Strikes and Collisions	Air Emissions and Pollution
Socioeconomic Changes and Drivers	Unintended Releases into the Environment	Noise
Bottom Disturbance	Response Activities	Socioeconomic Changes and Drivers
Coastal Land Use/ Modification	-	Discharges and Wastes
Lighting and Visual Impacts	-	Bottom Disturbance
Offshore Habitat Modification/ Space Use	-	Coastal Land Use/Modification
-	-	Lighting and Visual Impacts
-	-	Offshore Habitat Modification/ Space Use
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

Several existing regulatory programs and requirements reduce or minimize the effects of these IPFs to commercial fisheries in the GOA (**Table M.3-4**) and are enforced by BOEM, BSEE, and other agencies. The *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025) overviews the complex interconnected regulatory regime that exists around OCS oil- and gas-related activities in the GOA. Lessees are required to perform OCS oil- and gas-related activities in accordance with all regulatory requirements; therefore, the analysis factors in the mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

Table M.3-4. Existing Regulatory Requirements and Protective Measures That Reduce Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure	Enforcing Agency	Impact-Producing Factors(s) Reduced/Avoided	Supporting References and Sections
Marine Plastic Pollution Research and Control Act of 1987	USCG	Unintended Releases into the Environment (marine trash and debris)	Chapters 2.9.1.7 and 4.4.5.2.3 of the GOM Oil and Gas SID
National Fishing Enhancement Act of 1984 (Rigs-to-Reefs)	Secretary of Commerce; BSEE; State agencies	Bottom Disturbance; Offshore Habitat Modification/Space Use	Chapters 2.3.2.4 and 5.3 of the GOM Oil and Gas SID
Fishermen's Contingency Fund	Financial Services Division of NMFS	Offshore Habitat Modification/Space Use; Accidental Events (compensates commercial fishermen for damages or loss of fishing gear related to oil and gas exploration, development, or production on the OCS)	50 CFR part 296; OCS Report BOEM 2020-059

Regulatory Requirement or Protective Measure	Enforcing Agency	Impact-Producing Factors(s) Reduced/Avoided	Supporting References and Sections
Hard Bottom Habitat Avoidance Mitigations	BOEM; BSEE	Bottom Disturbance	BOEM NTL No. 2009-G39; BOEM NTL No. 2009-G40; Chapters 5.10, 6, and 7.9 of the GOM Oil and Gas SID
Magnuson-Stevens Fishery Conservation & Management Act of 1976	NMFS; Regional Fisheries Management Councils; BSEE	Bottom Disturbance; Noise; Coastal Land Use/ Modification; Lighting and Visual Impacts; Offshore Habitat Modification/Space Use; Unintended Releases into the Environment	Chapters 1.3 and 4.4.3.2.1 of the GOM Oil and Gas SID
Pollution Prevention	BSEE	Unintended Releases into the Environment	30 CFR 250.300
Coastal Zone Management Act[1]	NOAA, States	Coastal Land Use/ Modification; Offshore Habitat Modification/ Space Use	16 U.S.C. 1251 and 15 CFR 930
United States Aids to Navigation System	USCG	Strikes and Collisions	33 CFR 62

[1] A summary of the CZMA enforceable policies for the Gulf Coast States related to OCS plans can be found at https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Assessment/CZMA/CZM-Program-Policies-for-GOM-States.pdf.

M.3.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Bottom Disturbance: Pipelaying, drilling, anchoring, structure emplacement, and decommissioning can have both negative and positive effects on fish and invertebrates. These activities can cause turbidity and sedimentation, smothering benthic species (e.g., oysters), prey, as well as eggs, larvae, and juvenile fishes, crabs, and shrimp. This can lead to a decrease in the availability of commercially important fish species and ultimately negatively affect commercial fisheries through reduced landings and revenues. Conversely, habitat formation from structure emplacements can benefit fish and invertebrates. Impacts to commercial fisheries from bottom disturbance can be reduced by the National Fishing Enhancement Act of 1984, which promotes the Rigs-to-Reefs program, which converts decommissioned oil structures into artificial reefs, providing new habitats for marine life and enhancing fish populations. Hard Bottom Habitat Avoidance Mitigations ensure that crucial marine habitats are preserved, preventing the disruption of ecosystems vital for fish spawning and growth. The Magnuson-Stevens Fishery Conservation & Management Act of 1976 (MSA) enforces sustainable fishing practices, ensuring long-term fish stock health and commercial fishing industry stability. These regulatory requirements (see **Table M.3-4**) collectively play a crucial role in minimizing impacts on commercial fisheries. More information about

of the potential effects of bottom disturbances to localized fish and invertebrate populations are provided in **Chapters 4.4** and **4.6** of this Programmatic EIS.

Noise: Seismic surveys, vessel traffic, propeller cavitation, rotating machinery, and explosive removals, generate sound that can have various effects on fish and invertebrates ranging from stimulating behavioral responses to masking biologically important signals. Additionally, exposure to such sound can cause temporary or permanent hearing loss and even result in physiological injury leading to mortality (de Soto 2016; Hastings and Popper 2005; Hawkins and Popper 2014). Although OCS oil- and gas-related activities are not expected to have population-level impacts to fish and invertebrates (**Chapter 4.6**), they may indirectly impact commercial fisheries by displacing, harming, or killing localized fish populations. The extent of these effects would depend on the vulnerability of the fish and invertebrate populations. Disruptions to fish populations could reduce landings in proportion to the amount of commercial fisheries activities in the area. Explosive severance, such as structure decommissioning, can lead to fish and invertebrate mortality due to the rapid oscillation in pressure waveform caused by detonation. However, studies on recreationally and commercially important fish species with swim bladders, such as red snapper, greater amberjack, vermillion snapper, grey triggerfish, and cobia, suggest the level of explosive severance activity in the GOA does not substantially alter stock levels (Gallaway et al. 2020). Furthermore, the MSA (see **Table M.3-4**) enforces sustainable fishing practices, ensuring long-term fish stock health and commercial fishing industry stability.

Coastal Land Use/Modification: Changes in coastal land use due to OCS oil and gas operations may lead to changes in species biomass, landings, and other fishing industry variables. Smaller ports may be more vulnerable to market conditions and therefore in need of greater land use controls to prevent the conversion of marine-related uses (Portman et al. 2011). Although coastal land use from OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (**Chapters 4.6 and 4.3**), localized effects to fish may occur. For example, habitat destruction, erosion and sedimentation, discharge of pollution, alteration of coastal vegetations, and conflict with other land use are some of the potential effects. Commercially important fish and invertebrate species can be negatively affected through the modification of coastal vegetation and submerged aquatic vegetation habitats such as salt marsh grasses crucial to various life stages of fish species. Coastal land disturbance can result in a reduction of recreationally important fish, which may negatively affect commercial fisheries through reduced landings and revenues. Coastal land disturbances for OCS oil and gas-related activities are typically localized in nature, and the amount of coastal construction or dredging associated with new OCS oil- and gas-related activities is relatively low as infrastructure is already largely in place (**Chapter 3**). Impacts to commercial fisheries from coastal land use/modification can be reduced by MSA, which establishes sustainable fishing practices to maintain fish stocks and support the fishing industry. The Coastal Zone Management Act (CZMA) promotes sustainable coastal development and the protection of coastal resources through state-federal partnerships. For more details, see **Table M.3-4**.

Lighting and Visual Impacts: Artificial lighting from OCS oil- and gas-related infrastructure can interfere with natural predator-prey interactions. Although lighting from OCS oil- and gas-related

activities is not expected to have population-level effects to fish and invertebrates (**Chapters 4.6** and **4.3**), localized adverse effects to fish may occur from altered feeding patterns and movement, or avoidance of certain areas due to variations in light intensity, color, and patterns, which could adversely impact commercial fisheries if they rely on any of these areas. MSA (see **Table M.3-4**) reduces impacts to commercial fisheries from lighting and visual impacts by implementing regulations that manage and mitigate these impacts by ensuring sustainable fishing practices, thereby preserving fish stocks and supporting the long-term viability of the fishing industry. Delayed decommissioning may prolong lighting that potentially influences fish behavior or attracts specific species, having downstream effects on commercial fishing practices or landings. However, structures proposed for decommissioning would have very limited lighting and these effects would be localized and would not substantially impact stock levels in a manner that would reduce catch or necessitate stricter fishing regulations that would adversely impact commercial fishing landings or revenues.

Offshore Habitat Modification/Space Use: Infrastructure emplacements (e.g., platforms) can have an artificial reef effect or act as fish aggregating devices, resulting in increased commercial fishing opportunities and subsequent increases in landings and revenues. Additionally, the presence of artificial structures can affect marine habitats, potentially leading to shifts in fish populations. These changes could impact catch rates and require adjustments in fishing operations to maintain sustainability. However, they can also pose navigation and gear hazards, potentially lead to habitat loss for non-reef species, and present regulatory challenges. Commercial reef fishermen in the GOA are known to fish around oil and gas structures where they target commercially valuable reef fishes like snappers, groupers, and jacks (**Chapter 4.6**). Decommissioning in place of pipelines or subsea infrastructure or delayed decommissioning would prolong the benefits (acting as artificial reefs, sustaining fishing grounds, and reducing costs) as long as the infrastructure is present. In contrast, the removal of structures on the OCS, particularly in nearshore waters, could have localized effects on commercial fisheries. These effects could be the loss of artificial habitats that some species might use for shelter or aggregation, and of easily accessible structures, which can result in decreased fishing opportunities and revenues, and increased fuel costs required to reach structures farther offshore for fisheries targeting reef fishes like snapper and grouper. However, removals alleviate the potential hazards, non-reef habitat loss, and regulatory challenges of maintaining DIP structures. Concerns from the fishing industry over the explosive removals of standing oil and gas structures, which often result in fish mortalities, was the basis for a BOEM-funded study in 2020 (Gallaway et al. 2020) that investigated the impacts of explosive structure removals to stocks of commercially valuable fishes. Gallaway et al. (2020) found that the current level of explosive structure removals and associated mortalities are not expected to substantially impact stock levels which, in turn, would not be expected to result in stricter fishing regulations that have downstream impacts to revenues.

There is a large amount of vessel traffic in the GOA, particularly within shipping channels leading to and from major ports. Consequently, space-use conflicts between commercial fishing and oil and gas vessels may occur near major ports and in shipping lanes as vessels transit to and from shore. Although both industries have coexisted in these waters since the 1940s, potential impacts from space-use conflicts—such as fishing disruptions, gear entanglements, and vessel collisions—

are generally expected to be rare or minimal. However, localized effects from space-use conflicts can still pose challenges for commercial fishing. Impacts to commercial fisheries from offshore habitat modification/space use can be reduced by: the National Fishing Enhancement Act of 1984 (Rigs-to-Reefs), which converts decommissioned oil rigs into artificial reefs, enhancing marine habitats and fish populations; the Fishermen's Contingency Fund, which provides compensation to fishermen for gear and vessel damage caused by oil and gas exploration activities; and CZMA, which promotes sustainable coastal development and the protection of coastal resources through state-federal partnerships. For more detail, see **Table M.3-4**.

Socioeconomic Changes and Drivers: Routine OCS oil- and gas-related activities are indirectly associated with socioeconomic changes and drivers that can positively or negatively affect commercial fisheries. To the extent that OCS activity levels increase or decrease, the potential for new structure emplacements and removals increases or decreases. These new structures serve as fish habitats, providing opportunities for commercial fishers to enhance their landing revenues. However, structure removals would remove this utility. Delayed decommissioning or decommissioning in place of certain offshore infrastructure would prolong these benefits for as long as they remain in place. Delayed decommissioning or decommissioning in place can also lead to increased risks, including structural deterioration and environmental hazards that may obstruct fishing routes or damage marine habitats critical to commercial fisheries. Furthermore, the use of port facilities by the oil and gas industry can infuse funds into ports, leading to enhancement or sustainment of infrastructure that benefit commercial fisheries. Additionally, thriving oil-related employment opportunities attract individuals to coastal areas, fostering a community that appreciates and consumes seafood. In-depth exploration of these socioeconomic variables is provided in Chapter 2.8 of the GOM Oil and Gas SID.

M.3.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Unintended Releases into the Environment: Chemical or oil spills can affect commercial fisheries by affecting the fish and invertebrate populations that support commercial fishing activities, by affecting fishermen's access to those populations, or by affecting the seafood supply chain. For example, an oil spill could have lethal and sublethal effects on fish and shellfish species in the area of the spill. Oil spills in Federal waters would be most likely to affect fisheries for coastal or oceanic species (such as shrimp, menhaden, reef fish, tunas, and groupers), and accidental spills in nearshore waters would be most likely to affect coastal and inshore fisheries (e.g., shrimp, menhaden, oysters, and blue crab). The effects of an oil spill on commercial fisheries would depend on the size and locations of oil spills, species affected, intensity of commercial fishing activity in the affected area, and substitutions available for any lost fishing access. Most oil spills arising from a single oil and gas lease sale would be small, temporary and localized, and weather quickly, leaving

commercial fishers numerous alternative fishing sites. For more details, see Chapter 4.3.4 of the GOM Oil and Gas SID and **Chapter 3.5.1** of this Programmatic EIS. Impacts to commercial fisheries from unintended releases into the environment can be reduced by: the Marine Plastic Pollution Research and Control Act of 1987, which reduces marine plastic pollution by regulating waste disposal from ships and promoting research on its effects; the Fishermen's Contingency Fund, which provides compensation to fishermen for gear and vessel damage caused by oil and gas exploration activities; the MSA of 1976, which enforces sustainable fishing practices, ensuring long-term fish stock health and commercial fishing industry stability; and Pollution Prevention, which encourages practices to reduce pollution at the source, focusing on minimizing waste and emissions. For more detail, see **Table M.3-4**.

Response Activities: Response activities (such as assessing risk, confining a spill, stopping the source, evaluating the incident, implementing cleanup, and decontaminating the site) can cause negative but localized space-use conflicts for commercial fisheries at ports and offshore waters where fishers would need to avoid certain fishing areas while response is ongoing. In the rare event of a large oil spill near the coast requiring response activities, fisheries like oysters and blue crab are more likely to be impacted than more mobile species and fisheries farther offshore. Dispersant use and improper anchoring can cause mortality among less mobile fish and invertebrate resources, which can in turn negatively affect commercial fisheries. As a result, commercial fisheries can be affected by these negative effects to target species populations, causing reduced landings and revenues, thereby adversely affecting the coastal economies associated with those fisheries. For more details, see Chapter 4.3.4 of the GOM Oil and Gas SID.

Strikes and Collisions: Negative impacts from vessel collisions are likely to be localized and not interfere with overall commercial fisheries, except in cases where inland waterways are involved and there is disruption in vessel flow. Such disruptions could potentially impact commercial fishing vessels traveling to and from the port. Any disruptions from strikes and collisions would be expected to be short-term and localized. The likelihood of collisions has decreased with advanced technology of ships, particularly dynamic positioning systems. Furthermore, USCG requirements for indicating the location of fixed structures on nautical charts and for lights, sound-producing devices, and radar reflectors to mark fixed structures and moored objects help minimize the risk of collisions. The USCG's Local Notices to Mariners (monthly editions and weekly supplements) also inform users of the Gulf of America OCS (including commercial fishers) about the addition or removal of drilling rigs and structures, locations of aids to navigation, and defense operations involving temporary moorings. Marked structures often become aids to navigation for vessels (particularly fishing boats and vessels supporting offshore oil and gas operations) that operate in areas with high densities of fixed structures. For more detail, see **Table M.3-4**.

M.3.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence commercial fisheries in the GOA as summarized below, with additional detail in Chapter 4.4.2 of the GOM Oil and Gas SID. Effects from

these IPF categories would vary depending on their frequency, duration, and geographic extent as discussed below.

Air Emissions and Pollution: Commercial fisheries are dependent on the health of fish and invertebrate populations. Although air emissions from non-OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (**Chapter 4.6**), localized effects to fish may occur. Air emissions resulting from non-OCS oil- and gas-related activities may have negative effects on coastal habitats, upon which many of these species depend. Air pollutants result from anthropogenic and natural sources (e.g., vehicle emissions and wildfires) and contribute to increased CO_2, leading to ocean acidification. This can negatively affects the health and habitat of fish and invertebrates resources, resulting in similar negative impacts on commercial fisheries, landings, and revenues.

Discharges and Wastes: Discharges and wastes associated with non-OCS oil- and gas-related activities can indirectly affect commercial fisheries by negatively affecting fish and invertebrate populations. Potential effects of discharges and wastes to fish and invertebrate populations, upon which commercial fisheries depend, are discussed in **Chapter 4.6**. Decreases in water quality caused by the influx of freshwater from rivers carrying excess nutrients and chemicals related to agricultural and industrial uses inland and discharges of chemical waste products from non-point sources and accidental discharges can negatively affect the health and survival of non-mobile species (e.g., oysters). Because the success of commercial fisheries depends on the health of the target species, if these species are negatively affected by discharges and wastes, then commercial landings, revenues, and associated fisheries reliant economies can also be negatively affected.

Bottom Disturbance: Bottom disturbance related to non-OCS oil- and gas-related activities, such as indiscriminate commercial fishing practices, offshore dredging and sand mining, placement of artificial reefs, and State oil and gas production, can negatively or positively affect fish and invertebrates, thereby causing indirect effects to commercial fisheries landings. Indiscriminate commercial fishing practices (e.g., trawling and pots) can injure or kill many fish species caught as bycatch, such as juveniles of commercially important species, reducing fish populations and negatively affecting potential landings and revenues because the juvenile fish unintentionally caught would not be available for future harvesting. The potential effects of bottom disturbances to fish and invertebrates, upon which commercial fisheries depend, are discussed in **Chapter 4.6**.

Noise: While noise from non-OCS oil- and gas-related activities is not expected to have population-level effects on fish and invertebrates (**Chapter 4.6**), anthropogenic sound caused by non-OCS oil- and gas-related activities may negatively affect commercial fisheries. When anthropogenic sound impacts fish and invertebrates, it indirectly influences commercial fisheries. Displacement, physical harm, or fatalities to fish and invertebrates due to anthropogenic sound can result in decreased fishing landings and revenues, ultimately affecting jobs and incomes throughout the commercial fisheries supply chain.

Coastal Land Use/Modification: Although coastal land use from non-OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (**Chapter 4.6**), localized effects to fish may occur. Coastal developments such as industrial and residential construction near harbors, waterways, and beachfronts can negatively affect fish and invertebrate species. These impacts extend to commercial fisheries, their landings, and revenue by modifying or degrading coastal vegetation and submerged aquatic vegetation habitats, such as salt marsh grasses, crucial to various life stages of commercially important fish species.

Lighting and Visual Impacts: Non-OCS oil- and gas-related activities can produce artificial lighting from public and private docks and piers and industry-related infrastructure that can interfere with natural predator-prey interactions, causing negative effects to fish and invertebrates, and consequently affecting commercial fisheries. Although lighting from non-OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (**Chapter 4.6**), localized effects to fish and invertebrates may also result in negative effects to commercial fisheries by potentially decreased landings.

Offshore Habitat Modification/Space Use: Although space-use conflicts from non-OCS oil- and gas-related activities are not expected to have population-level effects to fish and invertebrates (see Chapter 4.3.4 of the GOM Oil and Gas SID), localized effects to fish may occur. Commercial fishermen may encounter space-use conflicts with non-OCS oil- and gas-related activities in State waters and recreational, commercial, and military vessels that temporarily restrict access to fishing areas, thereby reducing fish landings temporarily. Vessel space-use conflicts may particularly occur near major ports and in shipping lanes as vessels transit to and from shore. There is a large amount of vessel traffic in the GOA, particularly near major ports. Offshore habitat modification caused by non-OCS oil- and gas-related oil and gas structure emplacement in State waters can cause positive effects to commercial fisheries by providing habitat for fish populations for a period of years until the structures are decommissioned, which may have negative or positive effects depending on the nature of the decommissioning. If the structures are decommissioned, it will negatively impact their habitat, landings, and revenues. If the structures are not decommissioned or only partially decommissioned, it will have a positive impact and will not reduce landings and revenues.

Socioeconomic Changes and Drivers: This explores how commercial fisheries in the GOA are affected by various economic and management factors. Some of these factors are related to non-OCS oil- and gas-related activities, such as competing with other markets, the demand for GOA seafood, and the overall state of the economy. Other factors are related to fisheries management strategies, such as limiting the fishing season, size, and number of fish to conserve the species. These factors can have positive or negative impacts on commercial fisheries depending on the situation. For example, economic fluctuations influence consumer spending and seafood consumption. During economic downturns, people may cut back on purchasing seafood, affecting the market and ultimately commercial fishers. Furthermore, if the demand for GOA seafood increases due to factors like tourism or culinary trends, it can be beneficial for commercial fisheries.

However, if demand declines, it may lead to lower prices for seafood products, impacting fishers' income.

Other Environmental Factors: Future alterations of the physical ocean and coastal environment are expected to have substantial impacts on GOA fisheries (NMFS 2019). Based on recent information, the NOAA Fisheries Climate Science Strategy is still active and evolving. The strategy is designed to integrate climate-related data into fishery decision-making and has been updated through 2024 (Griffis et al. 2023). NOAA continues to refine its approach by implementing Regional Action Plans to address climate impacts on fisheries. As rising sea temperatures, ocean acidification, and changes in water currents continue to reshape marine ecosystems, the integration of these projections into fisheries management remains essential. NOAA and The Gulf Council employ advanced regional models, climate-informed regulatory frameworks, adaptive management strategies, and stakeholder engagement to safeguard marine resources. By embracing a data-driven and adaptive approach, these institutions strengthen the resilience of fisheries while supporting sustainable practices that benefit both ecological systems and coastal communities (Regional Fisheries Management Council Climate Action, 2025). For further descriptions of the cause-and-effect relationships between these IPFs and fishes and invertebrates, see **Chapter 4.6** of this programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID.

Rising sea temperatures, ocean acidification, and changes in water currents are some of the key consequences of climate-related factors that directly impact commercial fisheries in the offshore GOA. Warmer waters alter the distribution and abundance of fish species, leading to a shift in the ecosystem's dynamics. For instance, studies (Coleman and Koenig 2010) indicate that certain commercially valuable species, such as red snapper and grouper, are moving towards deeper and cooler waters in search of suitable habitats. This not only affects the availability of these species for fishing activities but also disrupts the delicate balance of the food web, potentially impacting other species within the ecosystem. Furthermore, ocean acidification (Osborne et al. 2022) poses a threat to the offshore GOA's commercial fisheries. This acidification negatively impacts shell-forming organisms, such as oysters and clams, which are crucial components of the GOA's commercial fisheries. Research suggests that reduced shell growth and increased mortality rates among these species can disrupt the entire fishery ecosystem, affecting both the economic viability and sustainability of the industry. The location and size of coastal hypoxic zones (which are likely exacerbated by temperature and ocean acidification) can also affect the spatial dynamics of fisheries, such as the GOA shrimp fishery, with potential economic repercussions (Purcell et al. 2017). For further descriptions of the cause-and-effect relationships between these IPFs and fishes and invertebrates, see Chapter 4.6 of this programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID.

M.3.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct impacts to commercial fisheries would occur as a result of the proposed action (i.e., a proposed oil and gas lease sale), including any potential beneficial effects from structure emplacement. Any indirect effects to commercial fisheries from energy substitution due to cancellation of a single sale would likely be **negligible adverse**. Cancellation of a single proposed oil and gas lease sale would not be expected to cause any noticeable changes in coastal land-use patterns (such as wetlands that are vital to some fisheries) given the expansive existing OCS Oil and Gas Program and the reasonably foreseeable future lease sales anticipated over the next 10 years. There are ongoing OCS oil- and gas-related activities and other non-OCS oil- and gas-related activities that would continue to potentially affect commercial fisheries under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would potentially affect commercial fisheries through air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, noise, lighting/visual impacts, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions as described above in **Sections M.3.1** and **M.3.2.2**.

The impacts to commercial fishing from ongoing activities depend on the types and scales of commercial fishing activities in an impacted area. Shrimp, menhaden, red snapper, tunas, and groupers are the species most often sought by commercial fishermen in Federal waters and therefore are most directly impacted by ongoing activities. The presence of oil and gas infrastructure can alter fish migration patterns and habitat availability, potentially affecting population dynamics. Increased noise from drilling operations may disrupt communication and navigation for species like snapper and grouper, influencing their ability to locate food sources and breeding grounds. Pollution and unintended releases into the environment, such as oil spills or chemical discharges, can degrade water quality, leading to health risks for commercially valuable fish stocks. Additionally, bottom disturbances and coastal modifications may reduce access to key fishing areas, forcing commercial fishermen to adapt by altering routes or targeting alternative species, which could impact economic viability. Ongoing impacts to commercial fisheries would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline for commercial fisheries is described in **Section M.3.1** and in further detail in Chapter 4.4.2.1 of the GOM Oil and Gas SID). Ongoing, impacts to fish populations from OCS oil- and gas-related activities would be **negligible** to **minor** (see **Chapter 4.6** for more detail), therefore the corresponding impacts to commercial fisheries would also be **negligible** to **minor**. This is because disruptions to fish and invertebrate populations would proportionately reduce commercial fishing revenues, as well as the impacts on the seafood supply chain.

***Non-OCS Oil- and Gas-Related Activities*:** Air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, light and visual impacts, noise, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions from past and present non-OCS oil and gas-related activities would continue to potentially affect commercial fisheries under the No Action alternative, as described above. These impacts would likely persist into the future, even if the No Action alternative were selected. Additionally, State oil and gas activities could result in space-use conflicts with commercial fisheries and accidental events, which may pose risks to fisheries and associated habitats. While State oil and gas structures may support reef fish populations of importance to commercial fishermen, routine and accidental impacts, such as spills, could substantially affect coastal and inshore fisheries, especially shrimp, menhaden, oysters, and blue crab. Early life stages of these species are particularly vulnerable to oil exposure, and accidental spills coinciding with spawning events or impacting nursery habitats could exacerbate such effects. Furthermore, commercial fishermen may face additional space-use conflicts with recreational, commercial, and military vessels, which can temporarily restrict access to fishing areas, adding strain to the industry. Non-OCS activities contribute consistently to impacts on commercial fishing, and their overall impacts may be more notable compared to OCS activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a regionwide OCS oil and gas lease sale. This alternatives analysis focuses on the potential environmental impacts of a regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table M.3-5**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table M.3-5. Impact Determinations for Routine and Accidental Impacts to Commercial Fisheries from a single proposed OCS oil and gas lease sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure(s)[1]	Alternative B	Alternative C	Alternative D
Noise	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible Adverse**
Socioeconomic Changes and Drivers	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**
Bottom Disturbance	N/A	**Negligible**	**Negligible**	**Negligible**
Coastal Land Use/ Modification	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**
Lighting and Visual Impacts	N/A	**Negligible Beneficial** to **Negligible Adverse**	**Negligible Beneficial** to **Negligible Adverse**	**Negligible Beneficial** to **Negligible Adverse**

Impact-Producing Factor	BOEM's Protective Measure(s)[1]	Alternative B	Alternative C	Alternative D
Offshore Habitat Modification/Space Use	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Negligible Beneficial** to **Negligible Adverse**
Unintended Releases into the Environment	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**
Response Activities	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**
Strikes and Collisions	N/A	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**	**Negligible** to **Minor Adverse**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors would be **none** and indirect impacts from the alternative would be **negligible**. Ongoing, impacts to fish populations from OCS oil- and gas-related activities would be **negligible** to **minor** (see **Chapter 4.6** for more detail), therefore the corresponding impacts to commercial fisheries would also be **negligible to minor**. This is because disruptions to fish and invertebrate populations would proportionately reduce commercial fishing revenues, as well as the impacts on the seafood supply chain.

[1] No programmatic protective measures related to commercial fisheries for application at the lease sale stage are being contemplated in this Programmatic EIS. All BOEM protective measures for resources that commercial fisheries rely on would be considered at the site-specific stage.

Alternative B – Regionwide OCS Lease Sale

Within the regionwide lease sale area under Alternative B, various factors such as bottom disturbance, coastal land use/modification, noise, lighting, visual impacts, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions could potentially impact commercial fisheries, as described above in **Section M.3.2.2**.

Bottom Disturbance: Based on the description of potential impacts from bottom disturbance above and the expected amount of activity that would cause bottom disturbance described in **Table 3.3-2**, impacts to commercial fisheries are expected to be **negligible** because the impacts on fish populations and supporting habitats would be minimal (see **Chapters 4.3, 4.4,** and **4.6**) and mitigated in compliance with the existing regulatory requirements outlined in **Table M.3-4**. Additionally, most commercial fishing does not target bottom-dwelling species that are more likely to be impacted by localized bottom disturbances.

Coastal Land Use/Modification: Regarding coastal land use/modification, the impacts on commercial fisheries would range from **negligible** to **minor adverse**. Coastal land disturbances for OCS oil- and gas-related activities are typically localized, and few new construction or dredging activities are anticipated in coastal areas resulting from a single OCS oil and gas lease sale (**Table 3.3-2**). Onshore industrial infrastructure is already largely in place and complies with the existing regulatory requirements outlined in **Table M.3-4**.

Noise: Noise impacts on commercial fisheries would also be **negligible** to **minor adverse**. While disruptions to fish populations could reduce landings proportionally to the amount of

commercial fisheries activity in an area, stock-level disruptions to recreational species are not expected. There are regulatory requirements to reduce impacts on commercial fisheries, as outlined in **Table M.3-4**.

Lighting and Visual Impacts: Impacts from lighting and visual impacts would range from **negligible beneficial** to **negligible adverse** because fish behavior might be altered at specific locales, but local alterations to fish behavior would not result in stock-level disruptions or landings. There are regulatory requirements to reduce impacts on commercial fisheries, as outlined in **Table M.3-4**.

Offshore Habitat Modification/Space Use: The impacts of OCS oil- and gas-related vessel traffic on commercial fisheries would depend on activity locations, affected species, the intensity of commercial fisheries in the area, and the substitutability of any lost fishing access. However, due to vessel mobility and the availability of alternative fishing sites, and compliance with the regulatory requirements outlined in **Table M.3-4**, impacts are anticipated to be **minor beneficial** to **minor adverse**, short-term, and localized.

Offshore habitat modification from a single OCS oil and gas lease sale would likely have **minor beneficial** to **minor adverse** impacts to commercial fisheries. This assessment considers several factors, including the limited activity in Federal waters, the interplay of positive and negative effects from routine OCS oil- and gas-related activities that modify habitat (such as infrastructure emplacement and decommissioning) and their partial offsets to one another, and the influence of regulatory programs like Rigs-to-Reefs (**Table M.3-4**).

Socioeconomic Changes and Drivers: OCS oil- and gas related socioeconomic changes and drivers would have **minor beneficial** to **minor adverse** impacts to commercial fisheries, primarily from the expected amount of activity described in **Table 3.3-2** and the construction (or lack thereof) of new structures that facilitate offshore commercial fisheries in comparison to existing infrastructure. Most production structure installations are expected closer to shore, within the water-depth range of 0 - 200 m (0 - 656 ft). Estimated structure installations between 0 and 60 m (0 and 197 ft) are nearly the same as between 60 and 200 m (0 and 656 ft). Consequently, these installations are more accessible to commercial fishers than structures located farther from shore at greater depths (as detailed in **Chapter 3.3.2**). Considering the IPFs analysis, the overall impact conclusion for routine OCS oil- and gas-related activities on commercial fisheries remains **negligible beneficial** to **minor adverse**.

Unintended Releases into the Environment and Response Activities: Unintended releases into the environment, and associated response activities, would likely be **negligible** to **minor adverse** because most oil spills arising from the proposed action would be small and localized (**Chapter 3.5.1**), leaving commercial fishermen with numerous alternative fishing sites. The exact impacts would depend on the locations of oil spills, affected species, the intensity of commercial fisheries activity in the affected area, and the substitutability of any lost fishing access.

There are regulatory requirements to reduce impacts on commercial fisheries, as outlined in **Table M.3-4**.

Response Activities: Spill-response activities can cause negative but localized space-use conflicts for commercial fishermen at ports and offshore where fishermen would need to avoid certain fishing areas while spill response is ongoing. Spill-response activities may negatively affect fish and invertebrate resources, particularly oysters, because such resources are not mobile, cannot engage in avoidance behaviors, and can suffer mortality caused by dispersant use or improper anchoring. As a result, commercial fisheries can be affected by these negative effects to target species populations, causing reduced landings and revenues, thereby adversely affecting the coastal economies associated with those fisheries. Overall, response activities are anticipated to result in **negligible** to **minor adverse** impacts, primarily due to the localized nature of these activities, avoidance behaviors exhibited by fish, and availability of alternative fishing sites. Chapter 4.3.1 and Chapter 4.3.4 of the SID provide additional detail of the potential effects of spill-response activities on coastal habitats and fish and invertebrates, which are crucial to commercial fisheries.

Strikes and Collisions: Strikes and collisions would also likely have **negligible** to **minor adverse** impacts. If a strike or collision were severe enough to interfere with inland waterway traffic or access to a port, a longer duration of interference (such as closure) or lack of access to alternative ports would have a greater impact. According to the National Institute for Occupational Safety and Health (2023), commercial fishing fatalities due to traumatic injuries in the GOA fisheries have decreased over the past decade. Between 2000 and 2009, there was an average of nearly 11.5 commercial fatalities annually, while between 2010 and 2019, there were nearly 8.6 commercial fishing fatalities annually (National Institute for Occupational Safety and Health 2023). However, there is no information available on how many of those fishing fatalities are specifically related to OCS oil- and gas-related activities. Based on the analysis of the IPFs above, the overall impact conclusion for accidental events on commercial fisheries is **negligible** to **minor adverse**. Furthermore, USCG requirements for indicating the location of fixed structures on nautical charts and for lights, sound-producing devices, and radar reflectors to mark fixed structures and moored objects help minimize the risk of collisions. The USCG's Local Notices to Mariners (monthly editions and weekly supplements) also inform users of the Gulf of America OCS (including commercial fishers) about the addition or removal of drilling rigs and structures, locations of aids to navigation, and defense operations involving temporary moorings. For more detail, see Table **M.3-4**.

Therefore, based on the description of the IPFs above and the scenario projections for a single oil and gas lease sale provided in **Chapter 3**, and compliance with the existing regulatory requirements outlined in **Table M.3-4**, the overall impacts from IPFs associated with Alternatives B on commercial fisheries would range from **minor beneficial** to **minor adverse**.

Alternative C – Targeted OCS Lease Sale Area

Alternative C involves leasing a subset of the area considered in Alternative B by making blocks that would normally be subject to the Topographic Features, Live Bottom (Pinnacle Trend),

and/or Blocks South of Baldwin County, Alabama, Stipulations; Wind Energy Leasing Areas; and Rice's whale critical habitat unavailable for lease. Alternative C represents a geographical constraint on available acreage for leasing, which could cause a change in the spatial distribution of activities compared to Alternative B, but not the types of activities or their overall levels. This potential spatial redistribution of activity does not affect commercial fishing from a regional perspective because overall exploration and development activity levels would be the same. Therefore, the analysis for Alternative B (described above) also covers the range of potential impacts from Alternative C. However, Alternative C could reduce localized space-use conflicts and potential impacts to commercial fisheries from noise, bottom disturbance, habitat loss, and oil spills in the areas excluded from leasing. Because Alternative C would offer less area for lease, this alternative reduces impacts to commercial fisheries because of a reduction in the number of new structures and any associated subsea infrastructure (e.g., pipelines, pipeline end manifolds [PLEMs], sub-sea tie-ins [SSTIs], etc.) that would preclude commercial shrimpers who would be forced to avoid those areas. Conversely, Alternative C introduces additional restrictions on offshore oil- and gas-related activities, which would also preclude the possibility of beneficial effects stemming from new structures or other fish attractions in the excluded areas. Therefore, the impact conclusions for Alternative C range from **minor beneficial** to **minor adverse**.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D represents a further geographical constraint on available acreage for leasing, which could cause a change in the spatial distribution of activities compared to Alternative B, but not the types of activities or their overall levels. This potential distribution of activities could be especially noticeable in Texas and western Louisiana with the removal of the entire GOA Wind Leasing Call Area and waters shoreward of the 20-m (66-ft) isobath, which could alter the spatial distribution of the positive and negative impacts identified under Alternative B. For example, the geographic extent of potential production structures from a proposed oil and gas lease sale in shallower OCS waters, which commercial fishermen may prefer to target as a potential fishing ground, is much more restrictive than in the other alternatives. However, it would not affect other areas of the GOA to the same extent, nor would it necessarily reduce the amount of activity resulting from an oil and gas lease sale from a regional perspective. Therefore, the analyses for Alternative B (described above) also covers the range of potential impacts from Alternative D from a regional perspective. By excluding oil and gas activities from additional locations, Alternative D is expected to reduce space-use conflicts and impacts on commercial fishing operations in certain areas. The reduction in available leasing acreage means fewer new structures and any associated subsea infrastructure (e.g., pipelines, PLEMs, SSTIs, etc.), which would otherwise limit access for commercial shrimpers in those locations. Conversely, this restriction also eliminates potential beneficial effects from artificial reef structures or new structures that could attract fish to excluded areas. Impacts from routine activities would more than likely be **negligible beneficial** to **negligible adverse** considering the vast overlap of most commercial fishing grounds with the exclusion areas, as well as the mitigating effects of existing regulatory requirements and protective measures as outlined in **Table M.3-4**. In some instances, there may still be the potential for **minor adverse** impacts from large oil spills and response activities if they travel into fishing grounds within the excluded areas.

Therefore, BOEM concludes the impacts of this further reduced area would vary from **negligible beneficial** to **minor adverse** from a regional perspective.

M.3.2.5 Cumulative Impacts

This cumulative analysis incorporates and builds on the evaluation of past and present effects under Alternative A by also considering the potential effects from reasonably foreseeable future OCS oil and gas lease sales and reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect commercial fisheries through bottom disturbance, coastal land use/modification, light and visual impacts, noise, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions as described above in **Sections M.3.2.1** and **M.3.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Section M.3.1** and in further detail in Chapter 4.4.2.1 of the GOM Oil and Gas SID. These ongoing impacts would be **negligible** to **minor**. Future lease sales would add small but measurable impacts to the past and present impacts. Of particular interest are potential space-use conflicts (**Section M.3.2.3**), habitat disruption, water quality concerns, and the potential for accidental events (which are discussed above) arising from the cumulative OCS Oil and Gas Program. Any of these impact-producing factors would limit the habitat available to some fisheries and thus could affect the potential landings of commercial fisheries. Oil spills could also affect the health of the target species.

The installation of production structures could provide artificial reef habitat for some species and thus, enhance commercial fishing opportunities. However, the ultimate decommissioning of production structures would limit their useful life to commercial fishing. In addition, the shifting of the oil and gas industry to deeper water might ease the space use conflicts in shallower waters where OCS commercial fishing is most concentrated. **Chapter 4.6** discusses the cumulative impacts to fish and invertebrate populations from OCS oil- and gas-related activities. The associated cumulative impacts to commercial fisheries would be determined by the intensity of commercial fishing for each species in an affected area. In particular, impacts to fish populations could lead to decreased fishing landings and revenues, which would impact jobs and incomes throughout the seafood supply chain. However, the impacts to fishes and invertebrates from cumulative activities are expected to be similar to those of ongoing oil and gas activities, with no notable effects to overall populations or the sustainability of important commercial stocks. Given the industry trends that may reduce space use conflicts, and the potential for cumulative impacts to fishes and invertebrates discussed in **Chapter 4.6**, BOEM anticipates future lease sales to add small but measurable impacts to the past and present impacts to commercial fishing.

Non-OCS Oil- and Gas-Related Activities: Other IPFs or programmatic concerns which are reasonably foreseeable and could contribute to cumulative impacts to commercial fisheries, include ocean acidification, changes to sea surface temperature, and currents. The potential impacts from these factors are discussed in Chapter 4.10.1 and are expected to continue. While both OCS and non-OCS oil- and gas-related activities contribute to cumulative impacts on commercial fisheries, non-OCS factors—such as ocean acidification, changes in sea surface temperature, and shifts in ocean currents—are expected to have broader, long-term consequences. In contrast, OCS-related impacts, while notable, tend to be more localized and primarily associated with direct industrial activities such as habitat modification, noise, and space use. Therefore, when viewed cumulatively, non-OCS factors may present a greater overarching risk to commercial fisheries due to their extensive and persistent nature.

Additionally, State oil and gas activities also have impacts on commercial fisheries. For example, State oil and gas activities could lead to space-use conflicts with commercial fisheries and could lead to accidental events. State oil and gas structures could also support reef fish populations important to commercial fishermen. The nature of these impacts would be similar to those of a proposed action, although the affected species may be different. Accidental spills in State waters would most likely affect coastal and inshore fisheries due to proximity to the shorelines (e.g., shrimp, menhaden, oysters, and blue crab). The early life stages of these targets are generally more vulnerable to oil exposure and could be affected if a spill coincides with a spawning event or if a spill impacts nursery habitat. For example, oysters and blue crab are located primarily in State waters and thus could be impacted by the associated State oil and gas routine and accidental impacts.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion of activity when compared to the existing OCS Oil and Gas Program in the GOA (see **Table 3.3-2**). BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as having minimal effect on commercial fisheries. The incremental contribution of impacts from one lease sale is not expected to cause a notable increase in ongoing or foreseeable cumulative impacts affecting commercial fisheries within the area of analysis. The *incremental contribution* of a proposed GOA oil and gas lease sale to cumulative impacts on commercial fisheries is anticipated to be **negligible to minor adverse**, provided that appropriate regulations and mitigation measures are applied (see **Table M.3-4**). Analysis of the baseline conditions has identified negligible impacts, and the additional activity introduced by a single lease sale would represent only a fraction of the existing baseline. Consequently, the cumulative effects of the proposed lease sale, when combined with past, present, and reasonably foreseeable future activities, are expected to remain minimal

The cumulative effects on commercial fisheries would not differ much between action alternatives. While the distribution of areas offered for leasing vary among alternatives, the total amount of activity would not. Cancellation of the proposed lease sale (No Action Alternative) would not halt all OCS oil- and gas-related activities. Operations associated with previously issued leases, permits, and future decisions under the broader OCS Oil and Gas Program would continue, potentially resulting in impacts consistent with those described in **Sections M.3.2.1** through **M.3.2.4**.

However, these ongoing activities are also unlikely to notably affect commercial fisheries under proper regulation and management.

M.3.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on commercial fisheries. Some of this incomplete or unavailable information relates to fish populations that support commercial fishing, which is discussed in **Chapter 4.6**. For instance, the long-term effects of acute and chronic oil exposure on fish and invertebrates that are crucial for commercial fishing are still uncertain, as they may take time to manifest. Similarly, little is known about the uptake of PAHs from oil exposure on fish species. The response of GOA-specific fish species to anthropogenic sound also remains highly variable and poorly understood. To address these gaps, BOEM relied on a range of data sources and studies to estimate the environmental impact of both OCS oil- and gas-related activities and non-OCS oil and gas activities on commercial fishing (Chapters 4.4.2.2.1 and 4.4.2.2.2 of the GOM Oil and Gas SID). BOEM continuously pursues collaborative research, and ongoing efforts are necessary to bridge the gaps and enhance our knowledge. Fisheries production in the GOA region as a whole remained relatively stable before and after the *Deepwater Horizon* oil spill (Swinea and Fodrie 2021). For instance, between 2005 and 2009, the average landing over a 5-year period was 627.2 thousand metric tons, whereas between 2011 and 2015, the average landing over a 5-year period was 688.2 thousand metric tons. BOEM has determined that such information is not essential to a reasoned choice among alternatives because existing data sources provide sufficient information. BOEM has used the best available scientific information to date and reasonably accepted scientific methodologies to extrapolate from existing information. Therefore, the incomplete or unavailable information, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

M.4 RECREATIONAL FISHING

Marine recreational fishing in the GOA is very popular with both residents and tourists, and it is economically important to the coastal states of Florida, Alabama, Mississippi, Louisiana, and Texas. The recreational fishing resource category includes land-based, coastal, and offshore fishing. Recreational fishing is confined primarily to smaller, closer inshore areas of the GOA than commercial fishing. This resource includes private land- and vessel-based fishing, rental boat fishing, and charter boat fishing. Recreational fishing activities on the OCS take several forms (e.g., bottom fishing, trolling, and spearfishing).

M.4.1 Affected Environment

Recreational fishing is a popular pastime in many parts of the GOA. The GOA's extensive estuarine habitats, live bottom habitats, and artificial substrates (including artificial reefs, shipwrecks, and oil and gas structures) support several valuable recreational fisheries. Fisheries are managed by NMFS, as advised by the regional fisheries management councils. Details about the most recent regulatory mechanisms relevant to recreational fishing are described by the Gulf Council (2025).

Chapter 4.4.3 of the GOM Oil and Gas SID presents landings and effort data as part of its recreational fishing analysis, and the biological aspects of the affected environment are discussed in **Chapter 4.3.4** of this Programmatic EIS. The least amount of recreational fishing for the Gulf Coast States occurs in Federal waters, where most OCS oil- and gas-related activities occur. Most recreational fishing takes place from shore and in State waters (Fisher 2023a; Louisiana Department of Wildlife and Fisheries 2023a; NMFS 2023c). Within the OCS, some of the most popular species (by quantity) caught recreationally include Epinephelus grouper (*Epinephelus* spp.), gray snapper (*Lutjanus griseus*), herrings (Clupeidae), red snapper (*Lutjanus campechanus*), triggerfish/filefish (Balistidae/Monacanthidae), vermilion snapper (*Rhomboplites aurorubens*), white grunt (*Haemulon plumierii*), and yellowtail snapper (*Ocyurus chrysurus*) (Fisher 2023b; Louisiana Department of Wildlife and Fisheries 2023b; NMFS 2023d). Additionally, Camp et al. (2018) present baseline data on the distances traveled by anglers to fish for various species near Florida. Farmer et al. (2020) present a case study of the forecasting methods used to estimate GOA red snapper Federal recreation seasons.

The COVID-19 pandemic had varying impacts on recreational fishing in the GOA. Some recreational fishing experienced negative economic impacts in the first half of 2020 due to pandemic related shutdowns, supply-chain disruptions, decreases in demand, losses of revenues, and increased costs related to necessary safety precautions to prevent the spread of the virus (e.g., purchasing personal protective equipment, testing workers, quarantining) (NMFS 2021a; Upton 2020). This was especially pronounced among charter fishing trips. For example, from January through June 2020, 94 percent of charter boat operators from North Carolina to Mississippi experienced revenue losses averaging 58 percent when compared to the same time period in 2019, with roughly 47 percent of operators shutdown completely for 1-3 months (NMFS 2021b). This differed from non-charter recreational fishing, however, as the GOA region experienced a 50 percent increase of aggregate fishing trips in 2020 compared to previous years (Apriesnig and Thompson 2021). In Louisiana, some regions experienced a roughly 150 percent higher increase in recreational fishing for some months in 2020 (Midway and Miller 2023). The increase in the fishing effort was due in part to lost jobs or lost work hours of anglers (Midway et al. 2021). Many anglers reported that fishing helped with mental stress and family bonding during the pandemic. In Louisiana, recreational fishing trips began to fall back to pre-pandemic levels towards the end of the year and going into 2021 (Midway and Miller 2023).

Offshore recreational trips in the GOA have demonstrated uneven trends in the recent years during and after the pandemic. A look at NMFS data for the GOA (which excludes Texas and Louisiana) shows that from 2019 through 2023, specific to OCS recreational fishing, for-hire angler trips continued to decrease from an estimated 659,174 in 2019 to 534,166 in 2023, while private recreational fishing trips declined to a low of 2,587,871 in 2021 from a high of 3,346,396 in 2019, with 2023 rebounding to an estimated 3,030,007 trips (NMFS 2024a). In Louisiana during the same period, charter trips offshore peaked in 2023 at an estimated 27,564 from a low of 12,199 in 2022 and private trips offshore peaked in 2021 at estimated 104,034 before declining to 55,624 in 2023 (Louisiana Department of Wildlife and Fisheries 2024).

Warming waters have caused northward expansions of tropical and subtropical fish species. Land loss, and sea-level rise, and major storm effects can also alter estuarine habitats, which support a wide variety of fishes and invertebrates at various life stages (**Chapter 4.3**). As most recreational fishing occurs inland and in State waters, changes to coastal habitats could impact the availability of recreational target species, making the habitat less or more attractive depending on the species (although habitat change would imply that historical species in a given habitat would be impacted negatively).

M.4.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact recreational fishing. Non-OCS oil- and gas-related activities also have the potential to impact recreational fishing (**Table M.4-1**). These IPFs and their potential to affect recreational fishing are discussed below and in greater detail in Chapter 4.4.3 of the GOM Oil and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.4.3 of the GOM Oil and Gas SID.

Table M.4-1. Impact-Producing Factors with the Potential to Impact Recreational Fishing.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Bottom Disturbance	Unintended Releases into the Environment	Air Emissions and Pollution
Coastal Land Use/ Modification	Response Activities	Discharges and Wastes
Noise	Strikes and Collisions	Bottom Disturbance
Lighting and Visual Impacts	-	Coastal Land Use/Modification
Offshore Habitat Modification/ Space Use	-	Noise
Socioeconomic Changes and Drivers	-	Lighting and Visual Impacts
-	-	Offshore Habitat Modification/Space Use
-	-	Socioeconomic Changes and Drivers
-	-	
-	-	
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

There are several existing regulatory programs and requirements enforced by BOEM, BSEE, and other agencies, that reduce or minimize the environmental effects of these IPFs to recreational fishing in the GOA (**Table M.4-2**). The *Gulf of America OCS Regulatory Framework* technical report (BOEM 2020) overviews the complex interconnected regulatory regime that exists around GOA activities. Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with regulatory requirements. Therefore, the analysis factors in the

mitigating effects of all applicable regulatory requirements as part of the proposed action when making impact determinations.

Table M.4-2. Existing Regulatory Requirements and Protective Measures That Reduce Potential Impacts of Impact-Producing Factors.

Regulatory Requirement or Protective Measure	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
Coastal Zone Management Act[1]	NOAA, States	Coastal Land Use/ Modification; Offshore Habitat Modification/ Space Use	Chapter 5.4 of the GOM Oil and Gas SID
Magnuson-Stevens Fishery Conservation and Management Act	Regional Fishery Management Councils	Bottom Disturbance; Coastal Land Use/ Modification; Offshore Habitat Modification/Space Use; Unintended Releases into the Environment	Chapter 4.3.4.1.1 of the GOM Oil and Gas SID; Chapter 4.4.3.1 of BOEM's Biological Environmental Background Report
Marine Debris Research, Prevention and Reduction Act	NOAA, USCG	Unintended Releases into the Environment	Chapters 2.9.1.7 and 4.4.5.2.3 of the GOM Oil and Gas SID
Marine Plastic Pollution Research and Control Act	USCG	Unintended Releases into the Environment	Chapters 2.9.1.7 and 4.4.5.2.3 of the GOM Oil and Gas SID
Marine Trash and Debris Prevention Program	BSEE	Unintended Releases into the Environment	30 CFR § 250.300
National Fishing Enhancement Act	Secretary of Commerce, BSEE, State agencies	Offshore Habitat Modification/ Space Use	Chapters 2.3.2.4 and 5.3 of the GOM Oil and Gas SID
United States Aids to Navigation System	USCG	Strikes and Collisions	33 CFR 62

[1] For a summary of the CZMA enforceable policies for the Gulf Coast States related to OCS plans, see https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Assessment/CZMA/CZM-Program-Policies-for-GOM-States.pdf.

M.4.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Bottom Disturbance: Bottom-disturbing activities associated with routine OCS oil- and gas-related activities (e.g., pipelaying, drilling, anchoring, structure emplacement, and decommissioning activities) can cause negative effects (e.g., turbidity and sedimentation). Turbidity can cause smothering of benthic prey as well as eggs, larvae, and juvenile fishes that may be fished recreationally. Harm or death to fish and invertebrates as a result of smothering can negatively affect recreational fishing by decreasing the availability of fish. To the extent that fish and invertebrates are

affected by bottom disturbance, recreational fishing can experience negative effects to potential landings, revenues, and associated fisheries reliant economies. The MSA (see **Table M.4-2**) protects some areas designated as EFH from bottom disturbance; for example, BOEM has established Topographic Features and Live Bottom (Pinnacle Trend) Stipulations to reduce impacts to EFH, which, in turn, could benefit populations of recreationally important species. More information about of the potential effects of bottom disturbances to localized fish and invertebrate populations are provided in **Chapters 4.4 and 4.6** of this Programmatic EIS with more detailed description in Chapters 4.3.2 and 4.3.4 of the GOM Oil and Gas SID and Chapters 4.4 and 4.5 in the Biological Environmental Background Report.

Coastal Land Use/Modification: Coastal land use from OCS oil- and gas-related activities is not expected to have population level effects to fish and invertebrates (see **Chapters 4.3** and **4.6** of this Programmatic EIS and Chapters 4.3.4 and 4.3.1 of the GOM Oil and Gas SID), although localized effects to fish may occur. Recreational fishing can be indirectly and negatively affected by routine OCS oil- and gas-related coastal land disturbance activities, such as construction of new onshore facilities (including decommissioning, refurbishment, or disposal sites), pipeline landfalls, and navigation canal dredging that can negatively affect fish and invertebrate resources or reduce access to preferred fishing areas and infrastructure (e.g., boat launches). Fish and invertebrate species important to recreational fisheries can be negatively affected through the modification of coastal vegetation and submerged aquatic vegetation habitats, such as salt marsh grasses crucial to various life stages of fish species. Coastal land disturbance can result in a reduction of recreationally important fish, which may negatively affect recreational fishing through reduced landings, which could lead to reduced charter trips. Land-disturbing activities may negatively affect recreational fishing to the extent that reduced catch interferes with recreational fishers' aesthetic enjoyment and potentially decrease desirability of the area where activities are occurring. The MSA protects some areas designated as EFH from some coastal land use/modification activities, which, in turn, could benefit populations of recreationally important species. The CZMA requires Federal actions which have reasonably foreseeable coastal effects (including Federal agency activities and Federal license or permit activities) to be consistent with the enforceable policies of State coastal management programs and could impact recreational fishing depending on how the impacted State prioritizes recreational fishing as a competing use for coastal areas. For more details, see **Table M.4-2**. Coastal land disturbances for OCS oil- and gas-related activities are typically localized in nature, and the amount of coastal construction or dredging associated with new OCS oil- and gas-related activities is relatively low as infrastructure is already largely in place (see **Chapter 3**).

Noise: Sound caused by routine OCS oil- and gas-related activities (e.g., seismic surveys, vessel traffic, propeller cavitation, explosive removals, and rotating machinery) may negatively affect recreational fishing indirectly through displacement, physical harm, or fatalities within localized fish populations, but is not expected to have population-level effects to fish and invertebrates (see **Chapter 4.6** of this Programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID). Disruptions to fish populations could reduce landings in proportion to the amount of recreational fishing activities in an area.

Lighting and Visual Impacts: Lighting from OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (see **Chapter 4.6** of this Programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID). Artificial lighting associated with routine OCS oil- and gas-related activities (e.g., offshore standing platforms, tension-leg platforms, drillships, onshore facilities, and docked vessels) can affect localized fish and invertebrate resources by altering predator-prey interactions and larval settlement site selection. Artificial lighting can cause beneficial effects because many recreational fishers enjoy night fishing near offshore structures where the lights attract fish to be caught. The impacts of lighting and visual impacts on recreational fishing would be based on its facilitation of nighttime fishing and in possibly altering fish behavior in particular areas. Localized, adverse impacts to the richness or abundance of species common to the area of activities would be expected.

Offshore Habitat Modification/Space Use: Offshore habitat modification from OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (see **Chapter 4.6** of this Programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID). Offshore habitat modification from OCS oil- and gas-related activities can cause potential effects to fish and invertebrate resources, which range from beneficial (e.g., structure emplacement adding new habitat) to adverse (e.g., structure removal reducing habitat). For example, OCS oil- and gas-related structures could enhance reef fish habitat and thus improve some fishing opportunities by congregating fish populations near the structures (Scott-Denton et al. 2011). Hiett and Milon (2002) estimate that 20.2 percent of private boat fishing, 32.2 percent of charter boat fishing, and 50.9 percent of party boat fishing in Texas, Louisiana, Mississippi, and Alabama combined occur within 300 ft (91 m) of an oil or gas structure in State or Federal waters. The extent to which a structure would serve as an attractor to fish would depend on the fish populations in nearby areas, and the extent to which structure emplacement would support recreational fishing activity would depend on characteristics of location and structure type (e.g., standing versus toppled-in-place structures). Idle infrastructure could present safety risks to recreational fishers if required lighting and other navigational aides are not maintained or if aging components of the structure have compromised integrity (leading to possible leakages); however, BSEE maintains safety inspections of idle infrastructure. For more details, see **Appendix C.3**. The removal of a structure would preclude its use for recreational fishing unless it is redeployed as artificial reef substrate as part of an artificial reef program. A recent study on offshore recreation fishing found that because the rate of structure decommissioning is higher than the construction of new structures built in desirable recreational fishing areas, this has increased recreational fishing space use competition and fishing pressure at offshore structure locations (both active and decommissioned), and further, that new boat technologies may increase competition at structures further from shore (CSA Ocean Sciences Inc and SWCA 2025).

The MSA protects some areas designated as EFH from offshore habitat modification; for example, BOEM has established Topographic Features and Live Bottom (Pinnacle Trend) Stipulations to reduce impacts to EFH, which could benefit populations of recreationally important species. BSEE regulations (30 CFR § 250.1730) allows for retired structures to be used as artificial reefs regulated under the National Fishing Enhancement Act of 1984, which positively impacts

recreational fishing through the establishment of potential target locations. The CZMA pushes Federal agencies to align their activities with State coastal management programs and could impact recreational fishing depending on how the impacted State prioritizes recreational fishing as a competing use for state waters. For more detail, see **Table M.4-2**.

Space-use conflicts with recreational fishing can arise from overlap with routine OCS oil and gas operations such as seismic surveys, pipeline emplacement, drilling, and production structure emplacement and removals. The nature of space-use conflicts from these activities depends on the durations of the activities, as well as the locations and species affected. For example, structure emplacement prevents trolling in the associated area because gear can become entangled with the structure as the fishing vessel passes. Delayed decommissioning could extend these impacts while decommissioning in place could make these impacts permanent.

Vessel traffic would occur between ports that service the offshore industry and drilling and production facilities in Federal waters; however, there is limited spatial overlap between recreational fishing and oil and gas ports. In addition, most recreational fishing activities in the GOA occur inland or in State waters. Recreational vessels can often easily avoid temporary OCS vessel traffic. The extent of potential effects would depend on the locations of activities, the species affected, the intensity of recreational fishing activity in the affected area, and the substitutability of any lost fishing access.

Socioeconomic Changes and Drivers: Routine OCS oil- and gas-related activities are indirectly associated with socioeconomic changes and drivers that can positively or negatively affect recreational fisheries. For example, to the extent that OCS activity levels increase, the potential for new structure emplacements increase, which creates new fish habitats and opportunities for recreational fishers to visit. Similarly, to the extent that OCS activity levels decrease, the potential for new structure emplacements decrease, reducing opportunities for recreational and charter fishers to visit.

M.4.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Unintended Releases into the Environment: The actual effects of an unintended release on recreational fishing, especially an oil spill, would depend on the locations of oil spills, the species affected, the intensity of recreational fishing activity in the affected area, and the substitutions available for any lost fishing access. Oil spills and other accidental events could indirectly and directly affect recreational fishing activity (including from idle or decommissioned infrastructure). For example, recreational fishers may be impacted indirectly through their effects on fish and their habitats in the affected areas. A spill could either contaminate fish in the immediate area or cause

fish to move during the duration of the spill. A spill would likely cause more direct harm to larvae and eggs than adults, which could possibly affect recreational species in the longer term. Should fish populations that support recreational fishing decline, recreational fishing activity could decline as well, negatively affecting the economic supply chain related to recreational fishing. More information about the potential effects of oil spills on fish populations that support recreational fishing are described in **Chapters 4.3** and **4.6** of this Programmatic EIS and described in detail in Chapters 4.3.1 and 4.3.4 of the GOM Oil and Gas SID and Chapters 4.4 and 4.5 of the Biological Environmental Background Report (BOEM 2021). Oil spills can also lead to direct impacts, such as localized fishing closures that could affect fishermen's access to fish resources. The size of the closure would be dependent on the size of the oil spill. Small-scale spills should not affect recreational fishing to a large degree due to the likely availability of substitute fishing sites in neighboring regions. A large spill can have substantial effects on recreational fishing due to the larger potential closure regions, and due to the wider economic implications that such closures can have. However, the longer-term implications of a large oil spill would depend primarily on the extent to which fish ecosystems recover after the spill has been cleaned. For further discussion, see Chapter 4.4.3.2.3 of the GOM Oil and Gas SID. The MSA protects some areas designated as EFH from certain oil- and gas-related activities, for example BOEM has established Topographic Features and Live Bottom (Pinnacle Trend) Stipulations to reduce impacts to EFH. In that accidental releases could be localized, the restrictions on these locations could protect fish populations in these EFH from localized impacts from accidental releases which in turn could positively impact recreational fishing. Various regulatory measures, such as the Marine Debris Research, Prevention and Reduction Act; the Marine Plastic Pollution Research and Control Act; and BSEE's Marine Trash and Debris Prevention Program, exist to prevent and mitigate the potential impacts of marine trash and debris related to oil- and gas-related activities, which could have localized impacts to recreational fishers (for example, if they encounter a drum with chemicals or chemical residue). For more detail, see **Table M.4-2**.

Response Activities: Spill-response activities (e.g., the use of chemical dispersants) can cause negative but localized space-use conflicts for recreational fishing at ports and offshore where fishers would need to avoid certain fishing areas while spill response is ongoing. Spill-response activities may affect fish and invertebrate resources, particularly oysters, because such resources are not mobile, cannot engage in avoidance behaviors, and can suffer mortality caused by dispersant use or improper anchoring. As a result, recreational fishing can be affected by these negative effects to target species' populations, causing reduced landings and adversely affecting charter boat revenues and by extension, the coastal economies associated with those fisheries.

Strikes and Collisions: Vessel collisions would be localized and not likely to notably interfere with recreational fishing activities unless they occur on inland waterways and disrupt the flow of vessels, possibly interfering with fishing vessels coming from and going to port. Even then, the disruption would be expected to be short term with minimal localized effects. Accidental strikes typically would not affect most fish and invertebrates because their mobility allows them to avoid vessels. Furthermore, USCG requirements for indicating the location of fixed structures on nautical charts and for lights, sound-producing devices, and radar reflectors to mark fixed structures and

moored objects help minimize the risk of collisions. The USCG District 8's Local Notices to Mariners (monthly editions and weekly supplements) also inform users of the Gulf of America OCS (including recreational fishers) about the addition or removal of drilling rigs and structures, locations of aids to navigation, and defense operations involving temporary moorings. For more detail, see **Table M.4-2**.

M.4.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence recreational fishing in the GOA through air emissions and pollution; discharges and wastes; bottom disturbance; coastal land use/modification; noise; lighting and visual impacts; offshore habitat modification/space use; and socioeconomic changes and drivers. Each IPF is summarized below, with additional detail in Chapter 4.4.3 of the GOM Oil and Gas SID.

Air Emissions and Pollution: Recreational fishing depends on the health of fish and invertebrate populations. Although air emissions and pollution from non-OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (**Chapter 4.6** of this Programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID), localized effects to fish may occur. Air emissions resulting from non-OCS oil- and gas-related activities may have negative effects on coastal habitats upon which many of these species depend. Air pollutants result from anthropogenic and natural sources (e.g., vehicle emissions and wildfires) and contribute to increased CO_2, leading to ocean acidification, which can negatively affect fish and invertebrate resources' health and their habitat. To the extent that air emissions can negatively affect coastal habitats and fish and invertebrates, recreational fishing can also experience negative effects in terms of reduced aesthetic enjoyment and catches.

***Discharges and Wastes*:** Discharges and wastes associated with non-OCS oil- and gas-related activities can indirectly and negatively affect recreational fishing by negatively affecting fish and invertebrate populations. For example, decreases in water quality caused by the influx of freshwater from rivers carrying excess nutrients and chemicals related to agricultural and industrial uses inland and discharges of chemical waste products from non-point sources and accidental discharges can expand the size of the hypoxia zone in the GOA, which can cause pelagic species of recreational interest to re-locate. The movement of the fish can interfere with recreational fishers' access to desired species by extending the distance to reach fishing grounds, increasing fuel costs, and interfering with the aesthetic enjoyment of the activity. Accidental oil spills in State waters from State oil and gas activities could affect recreational fishing by polluting the waters, harming or killing target fish, closing areas to fishing, and negatively affecting the aesthetic fishing experience. In addition, these negative effects could also potentially lead to less demand for charter fishing and a negative ripple effect through the economic supply chain.

Bottom Disturbance: Bottom disturbances related to non-OCS oil- and gas-related activities can negatively affect fish and invertebrate resources, thereby causing indirect effects to recreational fishing. Indiscriminate commercial fishing practices (e.g., trawling and pots) can injure or kill many fish species caught as bycatch, reducing the potential for recreational fishers to catch these fish.

Sediment dredging and disposal, sand mining, anchoring, and offshore marine transportation disturb sediments and increase turbidity, resulting in negative effects to fish and invertebrates. Benthic prey, juvenile fishes, eggs, and larvae can all be smothered from turbidity causing harm or death, negatively affecting recreational fishing by decreasing the availability of important fish and invertebrates. Emplacement and decommissioning activities related production structures could negatively affect fish populations in the area by generating turbidity, removing habitats, and fish mortality if explosives are used. These negative effects would be localized and short-term because turbidity subsides, surviving fish move to other habitats, and fish populations are expected to recover from localized fish mortality. The biological consequences of these changes are further discussed in **Chapters 4.3** and **4.6** of this Programmatic EIS and in greater detail in Chapters 4.3.1 and 4.3.4 of the GOM Oil and Gas SID and Chapters 4.4 and 4.5 of the Biological Environmental Background Report. To the extent that fish and invertebrates are affected by bottom disturbances, there could be negative effects on the economic supply chain for recreational fishing through reduced private or charter fishing trips and reduced purchases of durable equipment.

Noise: Although noise from non-OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (see **Chapter 4.6** of this Programmatic EIS and Chapter 4.3.4 the GOM Oil and Gas SID), anthropogenic sound caused by non-OCS oil- and gas-related activities may negatively affect recreational fishing. Examples of non-OCS oil- and gas-related activities that can produce underwater noise include recreational boating activities, commercial fishing vessels, cruise ships, cargo vessels, military activities, dredging operations, and in-water construction. To the extent that anthropogenic sound caused by non-OCS oil- and gas-related activities can negatively affect fish populations, it can indirectly affect recreational fishing. Noise may directly affect recreational fishing to the extent that it may reduce the aesthetic enjoyment of the activity.

Coastal Land Use/Modification: Although coastal land use from non-OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (see **Chapter 4.6** of this Programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID), localized effects to fish may occur. Coastal land disturbances caused by non-OCS oil- and gas-related activities (e.g., coastal developments such as industrial and residential construction near harbors, waterways, and beachfronts) can negatively affect fish and invertebrate species important to recreational fishing by modifying or degrading coastal vegetation and submerged aquatic vegetation habitats such as salt marsh grasses crucial to various life stages of recreationally important fish species or reduce access to preferred fishing areas and infrastructure (e.g., boat launches). Non-OCS oil- and gas-related coastal land-disturbing activities may negatively affect recreational fishing to the extent that reduced catch or the activity itself interferes with recreational fishers' aesthetic enjoyment and potentially decrease demand for charter services. These negative effects would be localized in nature and temporally limited in the case of construction activities. Conversely, recreational fishing can be positively affected by coastal land disturbances if they involve improvements to existing coastal infrastructure or development of new support infrastructure, such as hotels and restaurants, that would attract economic inputs from recreational fishers. In addition,

construction of piers and boat launches can positively affect recreational fishing by increasing fishing opportunity.

Coastal land use for risk protection and mitigation can also affect recreational fishing. For example, in September 2019, a Federal disaster declaration was issued for Louisiana, Mississippi, and Alabama when oyster and coastal shrimp fisheries were severely impacted by freshwater flooding into Mississippi Sound as a result of freshwater flow from the Bonnet Carré Spillway in 2019 (DOC 2019). The Spillway was opened multiple times from 2016 to 2020 to relieve pressure on Mississippi River levees, causing negative impacts to coastal fisheries (Byrd 2019). The economic impacts to recreational fishing for the 2016-2020 time period are not yet clear; however, Posadas and Posadas Jr. (2017) studied the impact of the 2011 Bonnet Carré Spillway opening and estimated that the Mississippi oyster fishery suffered forgone landing values ranging from $21.8 to $46.0 million, lost 145-324 jobs per year from 2011 to 2013, and lost labor income estimated at $1.8-$8 million per year.

Lighting and Visual Impacts: Non-OCS oil- and gas-related activities can produce artificial lighting from public and private docks and piers and industry-related infrastructure that can interfere with natural predator-prey interactions and larval settlement site selection, potentially causing negative effects to fish and invertebrates. Although lighting from non-OCS oil- and gas-related activities is not expected to have population-level effects to fish and invertebrates (see **Chapter 4.6** of this Programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID), localized effects to fish may occur. Conversely, artificial lighting can also cause positive effects for recreational fishing because many recreational fishers enjoy night fishing at public and private docks where the lights attract fish to be caught, as well as provide safety for fishing at night.

Offshore Habitat Modification/Space Use: Although space-use conflicts from non-OCS oil- and gas-related activities are not expected to have population-level effects to fish and invertebrates (see **Chapter 4.6** of this Programmatic EIS and Chapter 4.3.4 of the GOM Oil and Gas SID), localized effects to fish may occur. Recreational fishing may encounter negative space-use conflicts with non-OCS oil- and gas-related activities in State waters, as well as recreational and military vessels that temporarily restrict access to fishing areas. Vessel space-use conflicts may particularly occur near major ports and in shipping lanes as vessels transit to and from shore. In many instances throughout the GOA, competition between commercial and recreational fishermen targeting the same species led to depleted fish stocks and habitat alterations, reducing overall landings. Offshore habitat modification/space use from the installation of production structures related to State oil and gas activities, as well as artificial reef placement could enhance reef fish habitat and thus improve recreational fishing opportunities by congregating some fish and invertebrates near the structures. Accessible fishing structures can lead to an increase in recreational fishing trips with a positive ripple effect through the economic supply chain until the structures are decommissioned, which may have negative or positive effects depending on the nature of the decommissioning (e.g., rigs may be decommissioned through BSEE's Rigs-to-Reefs program and be moved closer to shore and thus be more easily accessed by recreational fishers).

Socioeconomic Changes and Drivers: Various socioeconomic changes and drivers associated with non-OCS oil- and gas-related activities also may affect recreational fishing. Changes in commodity prices can negatively affect fuel costs for fishers who are likely to alter their behavior due to this economic disincentive. During times of economic hardship, the levels of recreational fishing are likely to decrease, causing supply chain effects related to decreased demand for services depending on the recreational fishing sector. Conversely, when economies are flourishing with high gross domestic product and low unemployment, recreational fishing activity would increase, positively feeding back into the economy. Recreational fishing would also be positively correlated with general trends in tourism and the overall economy.

Recreational fishing activity is also heavily influenced by regulations and competition between commercial and recreational fishermen targeting the same species. National concern for the health and sustainability of marine fisheries has led to the development of fishery management plans, which affect recreational fish species in the GOA. Fisheries management plans focused on targeted species, such as red snapper, have led to size and creel limits as well as seasonal closures and gear restrictions or modifications in both commercial and recreational fishing. The MSA requires that fishery management plans also identify essential fish habitat to allow it to be protected from fishing, other coastal and marine activities, and developments.

Other Environmental Factors: Range expansions of tropical fishes may continue to occur and have the potential to alter the ecology of existing ecosystems, including food web and habitat interactions (Fodrie et al. 2010; Fujiwara et al. 2019; Purtlebaugh et al. 2020). Warming waters may continue to result in land loss and sea-level rise, altering habitat in coastal areas that many fishes and invertebrates use during some or all of their lives. The expected impacts to fishes and invertebrates, including those targeted by recreational fishers, from climate-related factors over the 40-year span of a proposed action would be regional in scale, potentially altering distributions of fishes and invertebrates from warming waters and negatively affecting the habitat quality and extent through land loss and sea-level rise for traditionally targeted species (although different species might find these altered habitats attractive). For further descriptions of the cause-and-effect relationships between these IPFs and fishes and invertebrates, see Chapter 4.3.4 of the GOM Oil and Gas SID. Climate-related factors could then impact recreational fishing through multiple (and potentially unexpected) ways to the extent that it affects species targeted and habitats used by recreational fishers.

The Gulf Coast of Texas, Louisiana, Mississippi, Alabama, and Florida has experienced multiple hurricanes in recent years: Hanna, Laura, Sally, Delta, and Zeta (2020); Ida and Nicholas (2021); Ian and Nicole (2022); Idalia (2023); Beryl, Debbie, Francine, Helene, and Milton (2024). Of these, Category 4 Hurricanes Laura (with Delta following), Ida, Ian, Idalia, and Helene, and Category 5 Hurricane Milton, were particularly devastating, prompting multi-year recoveries often spanning multiple states. Hurricanes can directly impact businesses and infrastructure related to recreational fishing, such as boat ramps and fishing piers. They can also directly destroy or damage boats used in recreational fishing. Hurricanes can also cause large impacts to regional economies, which could

in turn impact recreational fishing. See **Appendix B.4.2.9** of this Programmatic EIS and Chapter 3.3.1 of the GOM Oil and Gas SID for more information on major storms affecting the Gulf Coast.

Coastal land loss, especially prominent in Louisiana, can negatively affect recreational fishing areas. Land loss could impact infrastructure used in recreational fishing, such as fishing piers or boat launches. It could also impact the environment, converting marsh areas into open water and increasing salinity levels, impacting which fish species are available to recreational fishers. Human population movement from land loss could also impact businesses and communities of those involved in recreational fishing, either as a pastime or as a business, such as charter boat captains. Conversely, population movement away from coastal communities due to factors, such as land loss allows the proliferation of recreational homes often associated recreational fishing, replacing permanent residents in those communities (Solet 2006). See **Chapter 4.16** for more information on how land loss can impact social factors, which in turn could indirectly impact those engaged in recreational fishing in those communities. State and Federal plans to protect against, and restore areas from, land loss can both indirectly impact recreational fishing through protection infrastructure (which could incidentally protect recreational fishing infrastructure, such as through levee systems) and ecosystem restoration (which could provide additional recreational fishing areas), and it can directly impact recreational fishing when explicitly incorporating it in protection and restoration planning. An example of the latter includes the Pointe-aux-Chenes Wildlife Management Area – Island Road Fishing Piers, which was constructed by the Louisiana Coastal Protection and Restoration Authority in 2020 using BP settlement monies (Louisiana Department of Wildlife and Fisheries 2024).

Activities related to site characterization assessments for renewable energy, including bottom disturbance from geotechnical surveys, biological sampling (e.g., bottom trawling), and buoy installation may negatively impact fishes and invertebrates through displacement, injury, mortality, behavioral changes, or changes to population or community dynamics. Noise from sources such as HRG survey equipment and vessel engines may also result in negative effects to fishes and invertebrates such as masking, behavioral changes, and injury. These impacts could indirectly affect recreational fishing, although they would be high localized and temporary in nature. Vessel activity related to site characterization activities could present a space-use conflict with recreational fishers, although, like with oil- and gas-related vessel space-use, recreational fishers should be able to easily avoid these activities. For more information on the anticipated effects of GOA renewable energy site assessment and characterization, see BOEM's *Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Outer Continental Shelf of the Gulf of Mexico: Final Environmental Assessment* (BOEM 2023a).

M.4.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. No direct

impacts to recreational fishing would occur as a result of the proposed action (i.e., a single proposed oil and gas lease sale). Indirect impacts to recreational fishing from the cancellation of a single OCS oil and gas lease sale would be **negligible** (mostly stemming from possible economic impacts, see **Chapter 4.15**). Additionally, there are ongoing OCS oil- and gas-related activities associated with previous lease sales, and non-OCS oil- and gas-related activities would continue to potentially affect recreational fishing under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would still potentially affect recreational fishing through bottom disturbance, coastal land use/modification, noise, lighting and visual impacts, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions as described above in **Sections M.4.2.1** and **M.4.2.2** and in greater detail in Chapter 4.4.3 of the GOM Oil and Gas SID. The overall number of production structures serves more of a beneficial role for reef fishing, although the corresponding decommissioning of these structures negatively impacts recreational fishing. The total projected ongoing OCS oil and gas structures installed (0-62) are much lower than the number of structures expected to be decommissioned (2,133-2,346) (**Table 3.3-2**); however, decommissioned structures can be reefed in place or relocated to designated artificial reef planning areas through the Rigs-to-Reef program. As of March 31, 2025, ~35% of decommissioning applications proposed using the Rigs-to-Reefs program (**Appendix C.2.2**). Decommissioning, then, represents a gradient wherein if more rigs used by recreational fishers are removed (and newer rigs are deployed in unfavorable fishing areas, such as deepwater), there could be permanent adverse impacts to recreational fishers who use rigs, while on the other hand, decommissioning a structure in an artificial reef that is accessible to those fishers could create a permanent benefit which outlives the working life of an operational rig. Similarly, accidental events, such as unintended releases into the environment, could be more impactful if offshore structures attractive to recreational fishers decline in quantity, as there would fewer accessible and attractive structures overall as alternatives. As discussed above, most recreational fishing in the GOA occurs close to shore. The actual impacts would depend on the locations of activities, species affected, intensity of recreational fishing activity in the affected area, and substitutability of any lost fishing access. Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Section M.4.1** and in further detail in Chapter 4.4.3.1 of the GOM Oil and Gas SID). Under the ongoing scenario, impacts from OCS oil- and gas-related activities to recreational fishing would still occur and range from **beneficial (moderate)** to **moderate adverse**. This is primarily because the addition or removal of structures has a notable and measurable localized impact on the subsection of recreational fishers which might use them. They create benefits for recreational fishers when structures with beneficial characteristics for those fishers are left in place or transported to attractive artificial reef planning areas. Conversely, their removal would force recreational fishers to make adjustments in their fishing activities and could further compound the impacts of other adverse impacts, such as accidental releases, as fewer structures become available to recreational fishers.

***Non-OCS Oil- and Gas-Related Activities*:** Air emissions and pollution, discharges and wastes, bottom disturbance, light and visual impacts, noise, coastal habitat use/modification, offshore habitat modification/space use, socioeconomic changes and drivers, and other environmental factors associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect recreational fishing under the No Action alternative, as described above. These IPFs would be expected to persist into the future, even if the No Action alternative were selected. Most recreational fishing in the region occurs onshore or in State waters, thus are removed from many OCS oil and gas activities, and so is more influenced by non-OCS oil- and gas-related activities, such as local water quality, access to fishing areas, and State laws and regulations. Offshore recreational fishing is also impacted by non-OCS oil- and gas-related activities, such as a variety of socioeconomic changes and drivers. For example, economic conditions impact decisions on buying, maintaining, and operating private boats that can reach offshore waters or renting charter boats to fish offshore. Further, a host of regulations and management strategies (such as from Gulf Council [formerly Gulf of Mexico Fishery Management Council]) heavily impact recreational fishers on the OCS. Thus, these non-OCS oil- and gas-related activities, discussed above in **Section M.4.2.3** (and in Chapter 4.4.3.2.1 of the GOM Oil and Gas SID), have a greater and more encompassing impact across recreational fishers in the GOA region than do impacts directly from OCS oil- and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a regionwide OCS oil and gas lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing that could change the spatial distribution of the scenario activities but not their overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table M.4-3**). The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table M.4-3. Impact Determinations for Routine and Accidental Impacts to Recreational Fishing from a single proposed OCS oil and gas lease sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure[1]	Alternative B	Alternative C	Alternative D
Bottom Disturbance	N/A	**Negligible**	**Negligible**	**Negligible**
Coastal Land Use/ Modification	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Noise	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Lighting and Visual Impacts	N/A	**Minor Beneficial** to **Negligible**	**Minor Beneficial** to **Negligible**	**Minor Beneficial** to **Negligible**
Offshore Habitat Modification/Space Use	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**
Socioeconomic Changes and Drivers	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**
Unintended Releases into the Environment	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Response Activities	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**
Strikes and Collisions	N/A	**Negligible** to **Minor**	**Negligible** to **Minor**	**Negligible** to **Minor**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors is **negligible**. Under the ongoing scenario, impacts from OCS oil- and gas-related activities to recreational fishing would still occur and range from **beneficial (moderate)** to **moderate adverse**. This is primarily because the addition or removal of structures has a notable and measurable localized impact on the subsection of recreational fishers which might use them.

[1] No recreational fishing specific programmatic protective measures for application at the lease sale stage are being contemplated in this Programmatic EIS.

Alternative B – Regionwide OCS Lease Sale

Within the regionwide OCS oil and gas lease sale area under Alternative B, bottom disturbance, coastal land use/modification, noise, lighting and visual impacts, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions could potentially impact recreational fishing as described above in **Chapters 4.11.2.1** and **4.11.2.2**.

Impacts of short-term **bottom disturbances** on recreational fishing are expected to be **negligible** given their short-term and localized nature, and because the impacts to fish populations would be **negligible**. Most recreational fishing does not target the bottom-dwelling species that are more likely to be impacted by bottom disturbances. The impacts of **coastal land use/modification** on recreational fishing would be **negligible** to **minor** because coastal land disturbances for OCS oil- and gas-related activities are typically localized in nature and few new construction or dredging activities are anticipated in coastal areas as a result of a single oil and gas lease sale. The impacts of **noise** on recreational fishing would be **negligible** to **minor** because disruptions to fish populations could reduce landings in proportion to the amount of recreational fishing activities in an

area, although stock-level disruptions to recreational species are not expected. The impacts of **lighting and visual impacts** on recreation fishing would be **minor beneficial** to **negligible adverse** based on its facilitation of nighttime fishing and in possibly altering fish behavior at specific locales.

Potential ***offshore habitat modification/space-use*** conflicts from OCS oil- and gas-related vessel traffic on recreational fishing would be **negligible** to **minor**. The actual impacts would depend on the locations of activities, the species affected, the intensity of recreational fishing activity in the affected area, and the availability of substitute fishing access. Given vessel mobility and availability of many alternative fishing sites, space-use impacts are expected to be **negligible** to **minor,** short-term, and localized. The ***offshore habitat modification/space-use*** impact to recreational fishing from structures installed due to a proposed oil and gas lease sale would likely be **minor beneficial** to **minor adverse** because of the limited amount of activity that occurs in Federal waters and because the positive and negative effects of routine OCS oil- and gas-related activities that modify habitat (i.e., infrastructure emplacement and decommissioning) would partially offset each other. The impacts of OCS oil- and gas-related ***socioeconomic changes and drivers*** would be **minor beneficial** to **minor adverse** based primarily on the construction, or not, of new structures that facilitate offshore recreational fishing. Based on the analysis of the IPFs above, including compliance with the existing regulatory requirements outlined in **Table M.4-2**, the overall impact conclusion for routine OCS oil- and gas-related activities on recreational fishing is **minor beneficial** to **minor adverse**.

Impacts from unintended releases into the environment would likely be **negligible** to **minor** because most oil spills arising from a single OCS oil and gas lease sale would be small and localized (see **Chapter 3.5.1**), leaving recreational fishermen numerous alternative fishing sites. The exact impacts would depend on the locations of oil spills, the species affected, the intensity of recreational fishing activity in the affected area, and the substitutability of any lost fishing access. Impacts from response activities would likely by **negligible** to **minor** because the oil spill itself would likely be small and localized. Impacts from strikes and collisions would likely be **negligible** to **minor** were a strike or collision be severe enough to interfere with inland waterway traffic or access to a port, with a longer duration of interference (such as closure) or lack of access to alternative ports having a greater impact. Based on the analysis of the IPFs above, including compliance with the existing regulatory requirements outlined in **Table M.4-2**, the overall adverse impacts from accidental events on recreational fishing would range from **negligible** to **minor**.

Therefore, based on the analysis of the IPFs above, including compliance with the existing regulatory requirements outlined in **Table M.4-2**, and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternatives B on recreational fishing would be **minor beneficial** to **minor adverse**.

Alternative C – Targeted OCS Lease Sale Area

Alternative C represents a geographical constraint on available acreage for leasing, which could cause a change in the spatial distribution of activities compared to Alternative B, but not the

types of activities or their overall levels. This potential spatial redistribution of activity does not affect recreational fishing because overall activity levels would be the same. The IPFs from routine activities and accidental events are also unchanged from Alternative B, **minor beneficial** to **minor adverse**, though the removal of the wind energy areas, SSRAs, and other blocks (**Figure 2.2-2**) could reduce the probability of some accidental events being experienced in adjacent coastal areas, especially in Texas and western Louisiana where recreational fishing is common.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Alternative D represents a geographical constraint on available acreage for leasing, which could cause a change in the spatial distribution of activities compared to Alternative B, but not the types of activities or their overall levels. This potential distribution of activities could be especially noticeable in Texas and western Louisiana with the removal of the entire Gulf of America Wind Leasing Call Area and waters shoreward of the 20-m (66-ft) isobath, which could alter the spatial distribution of the positive and negative impacts identified under Alternative B. For example, the geographic extent of potential production structures from a proposed oil and gas lease sale in shallower OCS waters, which recreational fishermen may prefer to target as a potential fishing ground, is much more restrictive than in the other alternatives. However, it would not affect other areas of the GOA to the same extent nor would it necessarily reduce the amount of activity resulting from an oil and gas lease sale. The IPFs from routine activities and accidental events are unchanged from Alternative B. Therefore, the routine activity and accidental event impacts to recreational fishing under Alternative D would be **minor beneficial** to **minor**.

M.4.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect recreational fishing through bottom disturbance, coastal land use/modification, light and visual impacts, noise, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions as described above in **Sections M.4.2.1** and **M.4.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Section M.4.1** and in further detail in Chapter 4.4.3.1 of the GOM Oil and Gas SID. These ongoing impacts would be **moderate beneficial** to **moderate adverse**. Future lease sales would add notable impacts to the past and present impacts. The scope of impacts changes when considering the reasonably foreseeable OCS Oil and Gas Program against ongoing OCS Oil and Gas Activities (**Section M.4.2.4**), although the conclusions stay the same. For example, the total projected cumulative (which includes future sales) OCS oil and gas structures installed (770-6,361)

are still lower than the number of structures expected to be decommissioned (3,317-8,895) (**Table 3.3-2**); however, some decommissioned structures can still be expected to be reefed in place or relocated to designated artificial reef planning areas through the Rigs-to-Reef program. Therefore, impacts from cumulative OCS oil and gas activities are expected to be similar to effects experienced from ongoing oil and gas activities, and BOEM anticipates future lease sales to add notably to the past and present impacts to recreational fishing.

Non-OCS Oil- and Gas-Related Activities: Other IPFs or programmatic concerns which are reasonably foreseeable and could contribute to cumulative impacts to recreational fishing include air emissions and pollution, discharges and wastes, bottom disturbance, light and visual impacts, noise, coastal habitat use/modification, offshore habitat modification/space use, socioeconomic changes and drivers, and other environmental factors. Additionally, potential future renewable energy development activities could also impact recreational fishing. There is no difference in the impacts from non-OCS oil- and gas-related activities discussed in **Chapter 4.16.2.4**. Because most recreational fishing in the region occurs onshore or in State waters and in that offshore recreational fishing is especially impacted by a variety of socioeconomic changes and drivers (including both economically-influenced decision making as well as numerous regulations and management activities), non-OCS oil- and gas-related activities have a stronger influence on recreational fishing across the region than do OCS oil- and gas-related activities. Accordingly, factors identified above, such as non-OCS oil- and gas-related habitat modification (which could influence both targeted fish and access for fishers), regional changes in socioeconomic conditions (which could favor or impede recreational fishing activities), and environmental factors (such as major storms) are expected to have a greater impact on recreational fishers across the region in the reasonably foreseeable future.

Incremental Contribution of the Proposed Action: A proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion of activity when compared to the existing OCS Oil and Gas Program in the GOA (**Table 3.3-2**). BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as having a substantial effect on recreational fishing. The incremental contribution of impacts from one lease sale to those cumulative effects will not increase the level of impacts notably. Therefore, the *incremental contribution* of a proposed GOA lease sale to cumulative impacts on recreational fishing would be **minor beneficial** (due to fish attraction at structures and the potential use of decommissioned structures as rigs-to-reefs) to **minor adverse** incremental impacts (due to impacts to fish populations, space-use conflicts, and oil spills) on recreational fishing activities because of the limited amount of activity and because the positive and negative impacts would partially offset each other. The actual impacts would depend on the locations of activities, species affected, intensity of recreational fishing activity in the affected area, and substitutability of any lost fishing access. An OCS oil and gas lease sale would not be expected to result in notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by recreational fishing in the area of analysis. The incremental contribution would not differ between action alternatives because, although they represent a geographical constraint on available acreage for leasing that could cause a change in the spatial distribution of activities compared to Alternative B, they do not alter the types of activities or their overall levels. Cancellation of a proposed lease sale (i.e., No Action) would not

stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Section M.4.2.1** through **M.4.2.4** above.

M.4.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on recreational fishing regarding the extent to which recreational fishing is dependent upon OCS structures, as well as on the site-specific determinants of this dependency. In lieu of this incomplete or unavailable information, BOEM used existing information and reasonably accepted scientific methodologies. For example, BOEM used data on recreational fishing activity provided by the Louisiana Department of Wildlife and Fisheries, the Texas Parks and Wildlife Department, and NMFS to examine trends in recreational fishing in various areas. BOEM has also used information from Hiett and Milon (2002) and Ajemian et al. (2015), which provide some information on the scale and location of "platform-dependent" recreational fishing. A recently released exploratory study (CSA Ocean Sciences Inc and SWCA 2025) notes that these earlier "platform-dependent" recreational fishing studies could be updated to account for trends in structure decommissioning and changes in technologies and regulations, but that general geographic patterns remain accurate. BOEM has determined that such information is not essential to a reasoned choice among alternatives because BOEM still has enough baseline data to reasonably estimate impacts. BOEM has used the best available scientific information to date and reasonably accepted scientific methodologies to extrapolate from existing information. Therefore, the incomplete or unavailable information, while relevant, would not likely change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

M.5 RECREATIONAL RESOURCES

Recreational resources are natural or humanmade things that are used as part of activities that are primarily for human enjoyment, including tourism. The Gulf Coast is home to various ocean and land-based resources that support recreational activities, including coastal beaches, barrier islands, estuarine bays and sounds, river deltas, and tidal marshes enjoyed by residents of the Gulf Coast and tourists from throughout the Nation and globally. Publicly owned and administered areas (such as national seashores, parks, beaches, marine protected areas, artificial reefs, and wildlife lands), as well as specially designated preservation areas (such as historic and natural sites and landmarks, wilderness areas, wildlife sanctuaries, and scenic rivers) attract residents and visitors throughout the year. Commercial and private recreational facilities and establishments (such as resorts, casinos, marinas, amusement parks, and ornamental gardens) also serve as primary interest areas and support services for people who seek enjoyment from the recreational resources near the GOA.

M.5.1 Affected Environment

The recreation and tourism industries are sizable in many areas along the Gulf Coast and are susceptible to effects from past, present, and future OCS oil- and gas-related activities and non-OCS oil- and gas-related activities. In 2020, the tourism and recreation sector was the largest employment sector in the GOA's marine economy, making up 56 percent of marine employment (NOAA Office for Coastal Management 2022). By state, the tourism and recreation sector led in marine economy employment for Louisiana (45%), Mississippi (46%), Alabama (61%), and Florida (75%) (NOAA Office for Coastal Management 2022). Texas was the only Gulf Coast State where the marine tourism and recreation sector was not the largest employer in the marine economy but instead was led by offshore mineral resources employment (41%) (NOAA Office for Coastal Management 2022).

Beach visitation is one of the most popular recreational activities among coastal states. Beaches along the Gulf Coast could have their availability for recreational use affected, as well as have alterations made to the unique characteristics enjoyed by recreators, such as specific natural features or types of wildlife that frequent a location. Wildlife tourism is another prominent feature of the Gulf Coast's recreational landscape available to residents and visitors alike, and it is also vulnerable to effects from OCS oil- and gas-related activities and non-OCS oil- and gas-related activities. Artificial reefs are also prolific in the GOA and support many recreational opportunities. The GOA is home to many marine protected areas that support recreational activities such as wildlife viewing, nature experiences, and beach visitation. The marine protected areas in the area of interest include various Federal and State entities such as parks, wildlife refuges, national marine sanctuaries, and national seashores. For example, six units of the National Park System are located on or near the shorelines and in State adjacent to the OCS lease areas are considered in this Programmatic EIS, including Palo Alto Battlefield National Historical Park, Padre Island National Seashore, Big Thicket National Preserve, Jean Lafitte National Historical Park and Preserve, New Orleans Jazz National Historical Park, and the Gulf Islands National Seashore (**Figure M.5-1**). Numerous historic sites, natural landmarks, wilderness areas, and other features are managed by the NPS and other Federal agencies (**Figure M.5-1**).

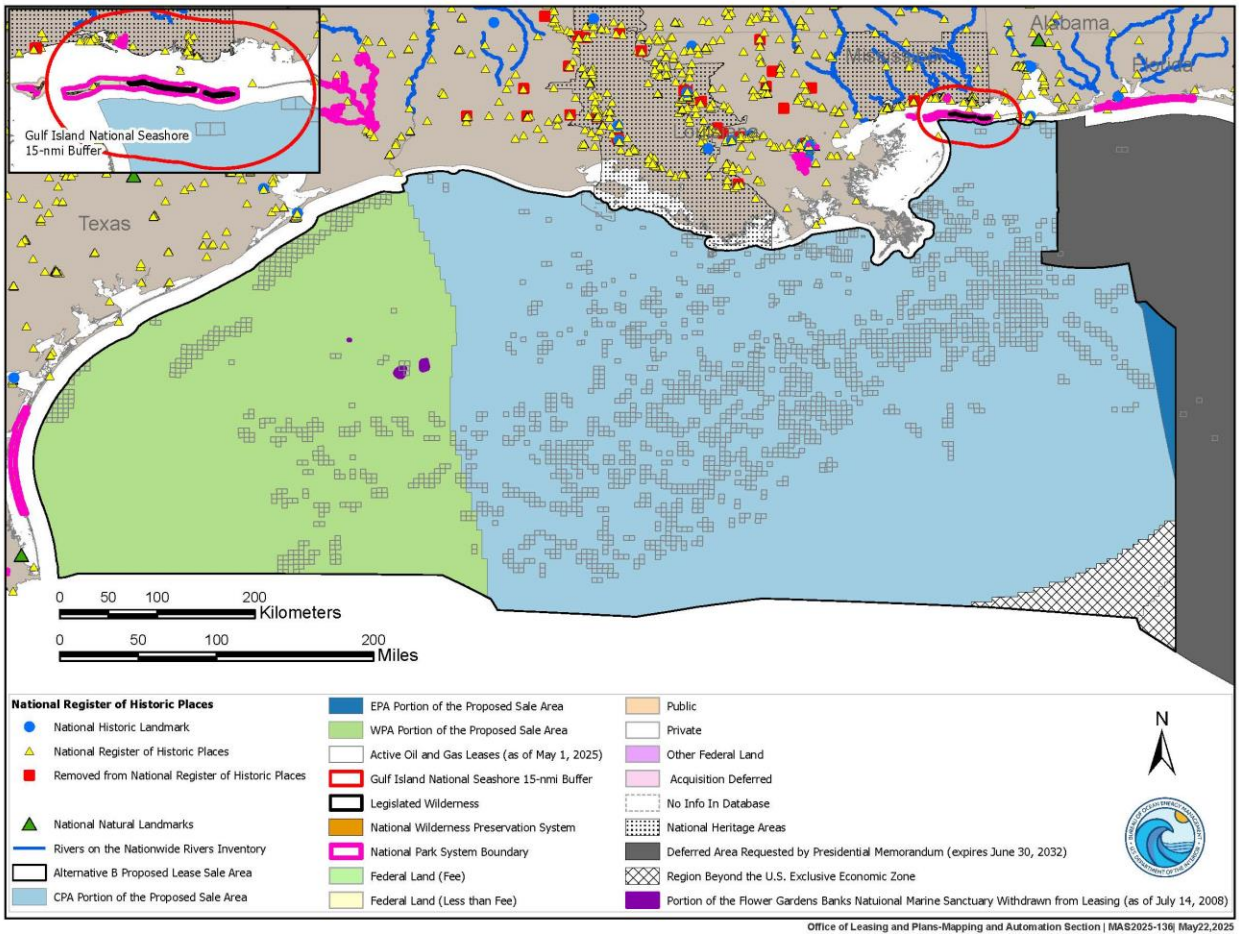

Figure M.5-1. National Park Service Units and Other Program Areas Within or Near the Area of Analysis.

Sea-level rise; increasing temperatures; ocean acidification; coastal erosion/subsidence; more numerous, stronger tropical storms and hurricanes; and severe flooding events continue to influence the baseline conditions for recreational resources (Carter et al. 2018; Fleming et al. 2018). Chapters 4.3.1 and 4.4.5 of the GOM Oil and Gas SID provide detailed descriptions of the above baseline conditions and the ongoing effects of natural processes and events such as habitat degradation, saltwater intrusion, sedimentation of rivers, sediment deprivation, river or rainfall flooding, barrier island migration and erosion, fish kills, and red tide.

M.5.2 Environmental Consequences

BOEM conducted an initial screening of IPFs in the GOM Oil and Gas SID and determined that there are several IPFs from OCS oil- and gas-related activities, including decommissioning, with the potential to impact recreational resources. Non-OCS oil- and gas-related activities also have the potential to impact recreational resources (**Table M.5-1**). These IPFs and their potential to affect recreational resources are discussed below and in greater detail in Chapter 4.4.5 of the GOM Oil

and Gas SID. Supporting rationale for IPFs that were not analyzed in detail in this Programmatic EIS can also be found in Chapter 4.4.5 of the GOM Oil and Gas SID.

Table M.5-1. Impact-Producing Factors with the Potential to Impact Recreational Resources.

OCS Oil- and Gas-Related Routine Activities[1]	OCS Oil- and Gas-Related Accidental Events[1]	Non-OCS Oil- and Gas-Related Activities
Bottom Disturbance	Unintended Releases into the Environment	Bottom Disturbance
Offshore Habitat Modification/ Space Use	Response Activities	Discharges and Wastes
Lighting and Visual Impacts	Strikes and Collisions	Coastal Land Use/Modification
Air Emissions and Pollution	-	Lighting and Visual Impacts
Coastal Land Use/Modification	-	Offshore Habitat Modification/ Space Use
Socioeconomic Changes and Drivers	-	Air Emissions and Pollution
-	-	Socioeconomic Changes and Drivers
-	-	Other Environmental Factors

[1] These IPFs could result from ongoing OCS oil and gas activities, a single proposed OCS oil and gas lease sale (i.e., a Proposed Action), and Cumulative OCS Oil and Gas Program activities.

There are several existing regulatory programs to reduce or minimize the environmental effects of these IPFs to recreational resources in the GOA and are enforced by BOEM, BSEE, and other agencies. The *Gulf of America OCS Regulatory Framework* technical report (BOEM 2025) overviews the complex interconnected regulatory regime that exists around GOA activities. Lessees are required to perform OCS oil- and gas-related activities, including decommissioning, in accordance with regulatory requirements; therefore, the analysis factors in the mitigating effects of all applicable regulatory requirements when making impact determinations.

Table M.5-2. Existing Regulatory Requirements and Protective Measures That Reduce Potential Impacts of the Impact-Producing Factors.

Regulatory Requirement or Mitigating Measure	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
30 CFR 551.6 – Obligations and rights under a permit or a notice	BOEM	Air Emissions and Pollution, Bottom Disturbance, Offshore Habitat Modification/Space Use	Chapter 6 of the GOM Oil and Gas SID
Magnuson-Stevens Fishery Conservation and Management Act	NOAA	Bottom Disturbance	Chapter 4.4.3 of the GOM Oil and Gas SID
Air quality reviews of all site-specific plans for compliance with NAAQS through the OCSLA	BOEM	Air Emissions and Pollution – CAPs only	Chapter 5.6 of the GOM Oil and Gas SID, 30 CFR part 550

Regulatory Requirement or Mitigating Measure	Enforcing Agency	Impact-Producing Factor(s) Reduced/Avoided	Supporting References and Sections
International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI and the Act to Prevent Pollution from Ships (APPS)	USEPA, USCG	Air Emissions and Pollution – CAPs only	33 U.S.C. 1901-1915 – Prevention of Pollution from Ships
Air quality permits for compliance with Section 328 of the Clean Air Act*	USEPA	Air Emissions and Pollution – CAPs and HAPs only	40 CFR 55
Oil Pollution Act of 1990	USCG, USEPA, DOT, DOI	Unintended Releases into the Environment, Response Activities	Chapters 2.9.2, 2.9.3, and 5.13.3 of the GOM Oil and Gas SID
Energy Policy Act of 2005 – Section 388	BOEM	Bottom Disturbance, Offshore Habitat Modification/Space Use	Chapter 2.5.2 of the GOM Oil and Gas SID
Blocks South of Baldwin County, Alabama, Stipulation	BOEM	Lighting and Visual Impacts	Chapter 4.4.5.1 of the GOM Oil and Gas SID
Marine Debris Research, Prevention, and Reduction Act	NOAA, USCG	Unintended Releases into the Environment	Chapter 4.4.5.2.3 of the GOM Oil and Gas SID
Marine Plastic Pollution Research and Control Act	USEPA, NOAA, USCG	Unintended Releases into the Environment	Chapter 4.4.5.2.3 of the GOM Oil and Gas SID
MARPOL-Annex V Treaty	USCG	Unintended Releases into the Environment	Chapter 4.4.5.2.3 of the GOM Oil and Gas SID
Gulf Islands National Seashore Information to Lessees	BOEM	Lighting and Visual Impacts	Chapter 4.4.5.1 of the GOM Oil and Gas SID
Rigs-to-Reefs program	BSEE	Offshore Habitat Modification/Space Use	Chapter 5.3 of the GOM Oil and Gas SID
30 CFR 250	BSEE	Unintended Releases into the Environment	Chapter 5.13.1 of the GOM Oil and Gas SID

*Only for activities in the Eastern Planning Area (east of longitude 87.5 degrees).

M.5.2.1 OCS Oil- and Gas-Related Impact-Producing Factors from Routine Activities

The routine activities and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Air Emissions and Pollution: Air emissions, like those from routine OCS oil- and gas-related activities, can affect visibility and aquatic and terrestrial resources (USFS et al. 2010). These air emissions and pollution contribute to the degradation of recreational destinations such as habitats of culturally and economically significant species, and damage of cultural and archaeological resources. The Breton Wilderness Area — part of the National Wilderness Preservation System — is the closest Federal Class 1 air quality sensitive area to OCS oil- and gas-related activities in the GOA region (Figure 4.1.1-1 of the GOM Oil and Gas SID). Air emissions could pose a persistent effect on recreational resources if people choose not to visit areas due to poor air quality. However,

air emissions and pollution from routine offshore activities and onshore oil and gas infrastructure are regulated and monitored for compliance with the NAAQS by BOEM through the OCSLA. Additionally, air quality is regulated by 30 CFR 551.6, Section 328 of the Clean Air Act, and the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI and the Act to Prevent Pollution from Ships (APPS) to reduce pollution from oil and gas activities and impacts to recreational resources. For more detail, see **Table M.5-2**. National parks and Federal wilderness areas' (e.g., Breton Wilderness Area) air quality and AQRVs are protected more stringently than under the NAAQS as discussed in **Chapter 4.1**.

Bottom Disturbance: Bottom disturbances, such as structure installations, can enhance recreational opportunities in the GOA by providing hard substrate in areas where only sandy bottom existed before. Alternatively, sediment disturbance and increased turbidity from these installations can smother marine life and negatively affect recreational fishing. Similar sediment disturbance and increased turbidity occur during structure decommissioning, if not retained as an artificial reef. Regulations from 30 CFR 551.6, the Magnuson-Stevens Fishery Conservation and Management Act, and Section 388 of the Energy Policy Act of 2005, however, protect marine life and habitats from undue bottom disturbances, reducing impacts to recreational resources (see **Table M.5-2**).

Coastal Land Use/Modification: Coastal land use/modification can cause minimal impacts to recreational resources though it is unlikely that new coastal infrastructure (including decommissioning refurbishment or disposal sites) would be necessary to support OCS oil- and gas-related activities due to the amount of existing support infrastructure. If new infrastructure is developed in a previously undeveloped space, however, recreational resources could be negatively affected by the reduction of land available for these activities. Negative aesthetic effects may be experienced by recreators viewing wildlife, boating, or fishing in areas where OCS oil- and gas-related ports, navigational fairways, and support industry are located. However, even if a recreational space was lost to coastal OCS oil and gas infrastructure in a particular location, it is likely that a number of substitute recreational sites could be available nearby. Also, any land use changes would largely depend upon local zoning and economic trends.

Lighting and Visual Impacts: Lighting and visual impacts contribute positively and negatively to recreational resources. The visibility of OCS vessel traffic and structures can affect the aesthetics of recreational experiences in certain areas. These effects depend on the type of recreational area, the extent to which vessel traffic and structures are visible, and the subjective opinion of the viewer. The extent to which a structure is visible depends on various factors, including but not limited to, distance, elevation, size, location, weather and atmospheric conditions, air pollution, the curvature of the Earth, lighting, and the viewer's expectations and perceptions (Bounds 2012). The size and location of an offshore structure depends on the reservoir being tapped, characteristics of the well stream fluid, and the type of processing needed to treat the hydrocarbons. The decommissioning of structures, at the end of their useful life, would eliminate these negative (or positive, depending on the viewer) visual impacts.

Negative effects of offshore lighting from OCS oil- and gas-related activities could include a diminished sky-viewing experience at recreational sites, including protected areas, along the Gulf Coast. Visual impacts from oil and gas structures could be subjective depending on the location and people in question, however, as preferences vary among recreators. Bounds (2012) offers evidence that oil and gas development near Dauphin Island (Alabama) caused negative effects to tourism. The visibility of oil and gas structures near Texas and Louisiana appear to have more limited (and in some cases positive) effects (Nassauer and Benner 1984; NPS 2001). The OCS oil- and gas-related activities would generally cause less visual impact for nearshore and onshore recreators than State oil and gas activities because they are further from shore.

Currently leased blocks south of Baldwin County, Alabama, are subject to a stipulation aimed at minimizing visual impacts from oil and gas development (see **Appendix J.10** and **Table M.5-2**). It requires that the lessee contact other lessees and operators of leases in the vicinity to determine if existing surface production structures can be shared. If the lessee cannot formulate a development scenario that does not require new surface structures, the lessee should ensure that the new structures use orientation or other design measures intended to limit their visibility from the shore.

Horn and Petit Bois Islands are federally designated wilderness areas and are sensitive to disruptions to nature experiences. The NPS has expressed concern regarding the impacts from OCS oil- and gas-related structures on the sky-viewing experiences on these islands, particularly at night. The NPS also requested during scoping that BOEM consider a no-leasing area within 15 nm (17 mi; 28 km) of the Gulf Islands National Seashore (ICF International 2024). However, potential impacts to Horn and Petit Bois Islands are directly addressed by BOEM's Gulf Islands National Seashore Information to Lessees (ITL), which notifies bidders that post-lease plans submitted by lessees of blocks within 12 mi (19 km) of Federal waters may be subject to additional review in order to minimize visual impacts from development operations (see **Table M.5-2** for more detail). It is unlikely that a production structure would be installed near Horn and Petit Bois Islands in the foreseeable future due to a lack of remaining oil or gas reserves in unleased blocks within 10 mi (16 km) of the islands (Burgess et al. 2021). Furthermore, if there were a block(s) leased near Horn or Petit Bois Island, it would likely be developed using minimal structures that tie back to existing infrastructure, due to cost considerations. Therefore, it is unlikely that a production structure would arise near Horn and Petit Bois Islands. In the unlikely event that any blocks are leased within the first 12 mi (19 km) of Federal waters south of the Gulf Islands National Seashore, BOEM would follow the Gulf Islands National Seashore ITL to coordinate with the NPS and the States of Mississippi and/or Alabama during its review of any post-lease development plans. Because of their distance from OCS oil- and gas-related activities, lighting and visual impacts to other NPS park units and managed areas are expected to be avoided or **negligible**.

Offshore Habitat Modification/Space Use: Offshore habitat modification from structure installations and removals can impact recreational resources by providing hard substrate in areas where only sandy bottom existed before. The OCS oil and gas structure installations can enhance recreational opportunities, such as fishing and diving, in the GOA (Hiett and Milon 2002). The positive effects of structures could be reversed at decommissioning unless a structure is

decommissioned in place or maintained as an artificial reef through a State's Rigs-to-Reefs program (see **Table M.5-2** for more detail). Space-use conflicts can be caused by OCS oil- and gas-related vessel traffic navigating in the same areas as recreational vessels. However, OCS oil- and gas-related vessels move between onshore support bases (which are typically not near recreational areas) and production areas far offshore, while recreational vessels typically navigate closer to shore, with the exception of recreators that use offshore structures.

There can be other space-use conflicts between recreational activities and OCS oil- and gas-related activities. Brody et al. (2006) present an analysis of space-use conflicts using a GIS-based framework to identify specific locations off the Texas coast where conflicts between oil activities and other concerns (including recreational use) are most acute. The study found that recreational use conflicts tend to be concentrated around the major wildlife viewing and beach areas near the larger population areas. Other potential space-use conflicts in the GOA include those areas near ports, along coastal Louisiana due to the high concentration of OCS oil and gas industry activities in this area. However, even if a space-use conflict was to arise in a particular instance, it is likely that a number of substitute recreational sites would be available. Additionally, 30 CFR 551.6 and Section 388 of the Energy Policy Act of 2005 protect recreational resources from being unreasonably interfered with from oil and gas exploration and development respectively (see **Table M.5-2**).

Socioeconomic Changes and Drivers: Increased demand for recreational resources has the potential to attract new recreational firms to a community, boosting the local economy; however, increased demand also has the potential to lessen the enjoyment of a particular resource by some community members. Since coastal infrastructure is well established and not prone to rapid fluctuations, existing oil and gas infrastructure will be sufficient to handle demand associated with ongoing routine OCS oil- and gas-related activities. Additionally, there is adequate undeveloped land in the analysis area to handle any new development, so a disturbance to an existing recreational site resulting from future development would be unlikely.

M.5.2.2 OCS Oil- and Gas-Related Impact-Producing Factors from Accidental Events

The accidental events and associated effects described in this section are applicable to OCS oil- and gas-related activities resulting from a single proposed OCS oil and gas lease sale, as well as BOEM's ongoing and reasonably foreseeable OCS oil and gas program (i.e., past or other future lease sales in the GOA).

Unintended Releases into the Environment: The impacts of drilling fluid spills and chemical spills on recreational resources are not discussed in detail because of their small sizes and far distances from recreational resources. An oil spill that remains offshore can cause closures that may affect recreational fishing, diving, and boating. An oil spill can have more direct impacts on tourism and recreational areas like the contamination of beaches, killing of marine life, and diminishment of aesthetic quality if it reaches coastal areas. These impacts would depend on the size of the spill and the success of any associated containment and cleanup operations. An offshore oil spill can also impact nearby coastal recreational use areas through media coverage or through

misperceptions and uncertainty regarding the extent of the spill. Following the *Deepwater Horizon* oil spill, the U.S. Government instituted substantial new safeguards to protect the environment. These new safety measures include heightened drilling safety standards to reduce the chances of unintended releases in the first place, as well as a new focus on containment capabilities in the event of an oil spill (see Chapter 5.13 of the GOM Oil and Gas SID). Much of these measures are covered in 30 CFR § 250 and enforced by BSEE (see **Table M.5-2**).

Marine debris from OCS oil- and gas-related vessels and facilities could reach beaches and other coastal resources, which could affect the aesthetics of these areas. The discharge of marine debris is subject to a number of laws and treaties, including the Oil Pollution Act of 1990, Marine Debris Research, Prevention, and Reduction Act; the Marine Plastic Pollution Research and Control Act; and the MARPOL-Annex V Treaty (see **Table M.5-2**). These laws and treaties reduce the potential impacts to recreational resources from the discharge of marine debris from OCS operations.

Response Activities: Response activities can impact recreational resources to some extent, depending on the techniques deployed, location, and duration, as well as the success of the containment and cleanup operations following an oil spill. Oiled beach regions and the resulting cleanup effort can cause reduced visits to beaches and use of recreational areas. On the other hand, restaurants and hotels in the spill-response area could receive an influx of demand from cleanup workers that could offset losses otherwise expected from tourism declines resulting from a spill. No spill-response activities may be necessary if accidental spills are small or if they occur far enough offshore and weather before reaching shorelines. In addition, the Oil Pollution Act of 1990 mitigates impacts to recreational resources from response activities by holding those responsible for the spill accountable for the resulting cleanup, translating into quicker response times and thus lower impacts (see **Table 4.12-2**).

Strikes and Collisions: A collision with a recreational boat could occur and could lead to damages, injuries, lost wages, and other effects for the boat operator and other persons involved. Vessel collisions may also disrupt recreational activities offshore and along the coast, as they could restrict waterway access for other boaters. If a bridge, pier, or other structure is hit, the transportation of goods, services, and people to and from recreational sites may be disrupted. The severity of the effects would depend on the duration and extent of the event. The effects from vessel collisions could be compounded if they encumbered a seasonal event, such as a coastal festival or fishing tournament. The effects of vessel strikes and collisions on recreational fishing is discussed in **Section M.4**.

M.5.2.3 Impact-Producing Factors from Non-OCS Oil- and Gas-Related Activities

Non-OCS oil- and gas-related activities also influence recreational resources in the GOA through air emissions and pollution; discharges and wastes; bottom disturbance; coastal land use/modification, lighting and visual impacts; offshore habitat modification/space use; socioeconomic

changes and drivers, and other environmental factors. Each IPF is summarized below, with additional detail in Chapter 4.3.3.2.1 of the GOM Oil and Gas SID.

Air Emissions and Pollution: Air emissions and pollution from non-OCS oil- and gas-related activities can affect visibility and aquatic and terrestrial resources. Chapter 2.1.2 of the GOM Oil and Gas SID estimates and discusses non-OCS oil- and gas-related activities air emissions. These emissions can negatively affect human health, degrade habitats of plant and animal species, impede visibility, contribute to ocean acidification, and impact climate. Moreover, poor air quality can dissuade people from visiting and enjoying affected recreational sites.

Discharges and Wastes: Discharge and wastes from non-OCS oil- and gas-related activities can negatively affect recreation and tourism by detracting from the aesthetic values of coastal areas, particularly beaches. However, dredge material can be used to enhance tourism and recreational usage of areas by shoring up areas undergoing subsidence and improving previous land uses.

Bottom Disturbance: Bottom disturbances from non-OCS oil- and gas-related activities can cause both positive and negative effects on tourism and recreational resources. While the installation of artificial reefs may temporarily disturb the ocean floor and smother some marine life, the additional hard substrate provides additional habitat that often enhances opportunities for recreational fishers and divers.

Coastal Land Use/Modification: Coastal land use/modification from non-OCS oil- and gas-related activities, such as oil spills in State waters, have the potential to contribute to beach erosion, both due to contaminated sediment and the potential sediment losses during the cleanup process. Also, increased coastal infrastructure can negatively affect tourism and recreational resources by reducing land available for these activities and diminishing recreational experiences.

Lighting and Visual Impacts: Lighting and visual impacts from non-OCS oil- and gas-related activities may be subjective depending on the location of the object, its lighting, and people in question. For example, structure lighting can detract from some nature experiences, but it can also improve visibility near the structure and add contrast to the landscape.

Offshore Habitat Modification/Space Use: Offshore habitat modification/space use from non-OCS oil- and gas-related activities, such as sand borrowing for beach nourishment projects, may temporarily conflict with recreational activities, causing recreationists to potentially relocate. Other activities can cause permanent space-use conflicts for recreational boating and water activities in those areas, forcing regular users of those locations to either choose a different location to recreate or engage in another activity entirely.

Socioeconomic Changes and Drivers: Socioeconomic changes and drivers from non-OCS oil- and gas-related activities can have several positive and negative effects on tourism and recreation. There may be pressures to develop industrial areas in existing natural or recreational

areas. However, development may also encourage the expansion of other recreational resources, such as hotels and restaurants, to accommodate increased tourism and/or recreational activities.

Other Environmental Factors: By affecting the natural environment on which recreational resources are based, climate could indirectly impact recreational resources in multiple ways. Sea-level rise, increasing temperatures, ocean acidification, coastal erosion/subsidence, more numerous or stronger tropical storms and hurricanes, and severe flooding events contribute to potential negative impacts to recreational resources (Carter et al. 2018; Fleming et al. 2018). These impacts may result in permanent flooding or isolating of coastal habitat, rendering it unsuitable for recreational use. Coastal marshes and bays along the Gulf Coast that are havens for recreational activities (e.g., fishing, hunting, swimming, water sports, wildlife viewing, etc.) are facing substantial impacts that could be worsened by climate-related factors. For example, the estuary of Galveston Bay, Texas, is at great risk from sea-level rise and subsidence, having lost over 35,000 acres of critical marsh habitat over the last 7 decades and experiencing a 27-inch sea-level rise in 120 years (Bertrand 2022). Altering the natural conditions for recreation and damaging recreational infrastructure through sea-level rise, land loss, more severe flooding and storms, among other factors challenge natural resource managers to develop targeted actions for handling climate-related issues (O'Toole et al. 2019). Coral reefs in the GOA, which are very popular for recreational diving, have been and would likely continue to be negatively impacted by rising temperatures and ocean acidification, ultimately negatively impacting the recreational and tourism sectors of the regional economy through reduced trips or visits (Lawman et al. 2022).

M.5.2.4 Alternatives Analysis

Alternative A – No Action (Cancellation of a Single Proposed OCS Oil and Gas Lease Sale)

Under Alternative A, a proposed OCS oil and gas lease sale would not occur, so there would be no new routine activities or accidental events resulting from the proposed action. Therefore, no direct impacts to recreational resources would occur as a result of the proposed action (i.e., a proposed oil and gas lease sale), including any potential beneficial effects from structure emplacement. Any indirect effects on recreation and tourism from energy substitution due to cancellation of a single OCS oil and gas lease sale would likely be **negligible**. Though an increase in energy-related activities on land or nearshore could potentially make some areas less attractive for recreation and tourism, any noticeable increase in energy-related activities on land to replace foregone activities from cancellation of a single proposed oil and gas lease sale is highly unlikely given the well-developed and extensive existing oil and gas industry and infrastructure in the region. Furthermore, cancellation of a single proposed OCS oil and gas lease sale would not be expected to cause any noticeable changes in coastal land use patterns given the expansive existing OCS Oil and Gas Program and the reasonably foreseeable future oil and gas lease sales anticipated over the next 10 years.

There are ongoing OCS oil- and gas-related activities associated with previous lease sales, and non-OCS oil- and gas-related activities that would continue to potentially affect recreational resources under all of the alternatives, including the No Action.

***Ongoing OCS Oil and Gas Activities*:** Ongoing activities associated with previous OCS oil and gas lease sales (**Table 3.3-2**) would still potentially affect recreational resources through air emissions and pollution, bottom disturbance, coastal land use/modification, lighting/visual impacts, offshore habitat modification/space use, socioeconomic changes and drivers, unintended releases into the environment, response activities, and strikes and collisions, as summarized above in **Section M.5.2.2** and with greater detail in Chapter 4.4.5.1 of the GOM Oil and Gas SID.

The most notable impacts from routine ongoing OCS oil and gas activities would come from the lighting and visual effects provided by offshore structures and vessels and potential changes to demand for recreational resources. Whether these impacts were positive or negative overall would depend on the individual recreator. Some could appreciate the contrast to the landscape afforded by the offshore oil and gas activity and find increased enjoyment from new recreational firms entering the area. On the other hand, some may dislike the visual impact of offshore oil and gas activity and prefer when recreational areas were less popular. Either way, given the distance of offshore oil and gas activities from most recreators and the degree of impacts ongoing OCS oil and gas activities would have on demand for recreational resources, both of these effects would likely be minor overall. In addition, regarding the impact of accidental events arising from ongoing OCS oil and gas activities, such impacts are likely to be minor as well, given that they are mostly localized. Ongoing impacts would occur in addition to the existing baseline environment (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Section M.5.1** and in further detail in Chapter 4.4.5.1 of the GOM Oil and Gas SID. Impacts from ongoing OCS oil and gas activities would range from **minor beneficial** to **minor adverse,** with no substantial effects to overall recreationist levels.

***Non-OCS Oil- and Gas-Related Activities*:** Air emissions and pollution, discharges and wastes, bottom disturbance, coastal land use/modification, lighting and visual impacts, offshore habitat modification/space use, socioeconomic changes and drivers, other environmental factors, unintended releases into the environment, response activities, and strikes and collisions associated with past and present non-OCS oil- and gas-related activities would continue to potentially affect recreational resources under the No Action alternative, as described above. Among these IPFs, socioeconomic changes and drivers from non-OCS oil- and gas-related activities and other environmental factors would have the greatest impacts on recreational resources. Changes in the socioeconomic landscape could have both positive and negative impacts. On one hand, these changes could yield an expansion of the recreational industry, benefiting recreators. On the other, changes in socioeconomic factors can result in industrial or agricultural development over previously recreational areas and lead to more crowded recreational spaces, detracting from the experience of recreators. Additionally, climate-related factors, such as sea-level rise, severe flooding, and coastal erosion, threaten recreational areas and infrastructure. These IPFs would be expected to persist into the future, even if the No Action alternative were selected.

IPFs from non-OCS oil- and gas-related activities as well as other environmental factors would have a greater overall impact than that of a single proposed OCS oil and gas lease sale. Most notably, the aforementioned socioeconomic changes and drivers from non-OCS oil- and gas-related

sources and climate-related impacts would be much more influential on recreational resources than OCS oil and gas development as a result of a single proposed OCS oil and gas lease sale, and would still occur without the presence of ongoing OCS oil- and gas-related activities.

Comparison of Impacts under Alternatives B, C, and D

Alternative B represents the largest geographic area under consideration for a regionwide lease sale. Alternatives C and D represent geographical constraints on available acreage for leasing, which could change the spatial distribution of the scenario activities but not the types of activities or overall activity levels. Therefore, this alternatives analysis focuses on the potential environmental impacts of a proposed regionwide OCS oil and gas lease sale (Alternative B) and then considers if these potential impacts could be reduced by the geographic constraints under Alternatives C and D (**Table M.5-3**). For lighting and visual impacts, the impact levels are shown both with and without BOEM's proposed Blocks South of Baldwin County, Alabama, Stipulation applied. The effects from ongoing OCS oil- and gas-related activities and non-OCS oil- and gas-related activities described under Alternative A (i.e., No Action) would also be applicable under Alternatives B through D.

Table M.5-3. Impact Determinations for Routine and Accidental Impacts to Recreational Resources from a single proposed OCS oil and gas lease sale for Alternatives B-D.

Impact-Producing Factor	BOEM's Protective Measure	Alternative B	Alternative C	Alternative D
Air Emissions and Pollution	N/A	**Negligible**	**Negligible**	**Negligible**
Bottom Disturbance	N/A	**Minor Adverse**	**Minor Adverse**	**Negligible**
Coastal Land Use/Modification	N/A	**Negligible**	**Negligible**	**Negligible**
Lighting and Visual Impacts	Without	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Negligible**
Lighting and Visual Impacts	With	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Negligible**
Offshore Habitat Modification/ Space Use	N/A	**Minor Beneficial**	**Minor Beneficial**	**Negligible**
Socioeconomic Changes and Drivers	N/A	**Minor Beneficial** to **Minor Adverse**	**Minor Beneficial** to **Minor Adverse**	**Negligible**
Unintended Releases into the Environment	N/A	**Minor Adverse**	**Minor Adverse**	**Negligible**
Response Activities	N/A	**Negligible**	**Negligible**	**Negligible**
Strikes and Collisions	N/A	**Negligible**	**Negligible**	**Negligible**

Note: Alternative A is not shown in the table because the impacts from all impact-producing factors would be **none**, and indirect impacts from the alternative would be **negligible**. Impacts from ongoing OCS oil and gas activities would range from **minor beneficial** to **minor adverse,** with no substantial effects to overall recreationist levels.

Alternative B – Regionwide OCS Lease Sale

Air Emissions and Pollution: Alternative B considers a regionwide lease sale area under the scenario described in **Chapter 3**. Within this geographic area, impacts from air emissions and pollution are expected to be **negligible**, given the level of activity expected in **Chapter 3** and existing air quality regulations for offshore oil and gas operations under 30 CFR part 550, 40 CFR 55, and the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI and the Act to Prevent Pollution from Ships (APPS) (33 U.S.C §§ 1901-1915).

Bottom Disturbance: Impacts from bottom disturbance are expected to be **minor adverse** due to increased turbidity resulting from the expected level of installation and decommissioning activities of structures, pipelines, and other seafloor infrastructure (**Chapter 3**). These negative impacts are likely to be short-term and localized, and impacts would be reduced through the regulatory requirements shown in **Table M.5-2**, meaning recreational fishing would be minimally affected.

Coastal Land Use/Modification: Impacts from coastal land use/modification are expected to be **negligible**, as the development of new coastal oil and gas infrastructure is unlikely (**Chapter 3**). Furthermore, in the rare case of new infrastructure development or expansion of existing infrastructure, substitute recreational sites would likely make up for the reduction of opportunity elsewhere.

Lighting and Visual Impacts: The additional contribution of light pollution resulting from new OCS oil- and gas-related activities, as detailed in **Chapter 3**, could alter how the night sky and natural seascape are perceived by recreators, which could result in reductions in visitation and less desirable visitor experiences at affected sites (e.g., wilderness designated parks). Potential impacts from lighting and visual impacts could be positive or negative, and are often subjective depending on the location and preferences of the viewer in question. Some recreators may find the contrast provided by OCS oil and gas structures to be appealing, while others may see them as detrimental to their viewing experience. For example, Horn and Petit Bois Islands are federally designated wilderness areas and are sensitive to disruptions to nature experiences. In the unlikely event that a block were leased near Horn or Petit Bois Island, it would likely be developed using minimal structures that tie back to existing infrastructure due to cost considerations. This is possibly the case for many future OCS projects in areas visible from shore. BOEM's Information to Lessees and Operators issued at each regional lease sale allows for consultation with the States of Mississippi and/or Alabama and the National Park Service on a lessee's post-lease OCS development plans related to visibility concerns in lease blocks near the Gulf Islands National Seashore.

Regardless, OCS oil- and gas-related activities occur farther from shore than State oil and gas activities, and thus may cause less visual impact for nearshore and onshore recreators than State oil and gas activities. Additionally, these visual impacts are negated at the end of the operation's useful life, when vessel activity has ceased, and the structure is decommissioned. Furthermore, the stipulation for blocks south of Baldwin County, Alabama, aims to limit visual

disturbances from oil and gas structures. Without the stipulation, it is possible that heightened visual impacts would occur from newly installed oil and gas structures south of Baldwin County, Alabama. Because of their distance from OCS oil- and gas-related activities, lighting and visual impacts to other NPS park units and managed areas (**Figure M.5-1**) are expected to be avoided or negligible. As a result of the limited spatial extent of the stipulation, overall impacts from lighting and visual impacts are expected to be **minor beneficial** to **minor adverse** with or without the application of the Blocks South of Baldwin County, Alabama, Stipulation; however, light and visual impacts would be reduced in the area covered by the stipulation.

Offshore Habitat Modification/Space Use: Impacts from offshore habitat modification/space use are expected to be **minor beneficial**, given the levels of activity described in **Chapter 3** and the aforementioned benefits to recreational fishing and diving arising from artificial habitat provided by offshore oil and gas structures, and because impacts would be reduced through the regulatory requirements shown in **Table M.5-2**. These effects are expected to occur across the leased area, where oil and gas structures are established, and to last beyond the life of the oil and gas operations if maintained as artificial habitat or if decommissioning is delayed or completed in place. In addition, given the extensive existing OCS oil and gas industry along the Gulf Coast, it is unlikely that OCS oil- and gas-related activity from a single proposed oil and gas lease sale would substantially add to space-use conflicts. Any potential disruption of recreational vessel activity would likely be temporary.

Socioeconomic Changes and Drivers: Impacts from socioeconomic changes and drivers can be expected to be both positive and negative. On the negative side, increased demand in the area can result in the expansion of urbanized development into current recreational sites. But on the positive end, increased development could favor additional investment in tourism and recreational infrastructure (such as lodging and restaurants). However, since coastal infrastructure is well established and not prone to rapid fluctuations, existing oil and gas infrastructure would likely be sufficient to support future activity (**Chapter 3**) associated with a proposed oil and gas lease sale with no noticeable increase in disruptions to recreational resources. Thus, overall impacts from socioeconomic changes and drivers are expected to be **minor beneficial** to **minor adverse**.

Unintended Releases into the Environment: Impacts from unintended releases into the environment can negatively affect recreational fishing, diving, and boating. For oil spills, given the spill sizes and probabilities described in **Chapter 3.5.1**, most adverse impacts would likely be short term and localized, with larger spills closer to shore more likely to affect recreational resources than spills farther offshore. People may also choose not to visit areas with known or visibly poor air quality as a result of an unintended release, as it may affect their health and enjoyment of the visit. Media coverage of a spill could also have negative effects on nearby coastal areas covered by the media, resulting in disproportionate reductions in recreational activity. Because of their distance from OCS oil- and gas-related activities, oil spill impacts to most NPS park units and managed areas are expected to be avoided or minimal. As outlined in **Table M.5-2**, there are several existing regulatory programs and requirements in place that would reduce or minimize the environmental effects of unintended releases resulting from the proposed action. For example, the likelihood and severity of

oil spills would be mitigated by the Oil Pollution Act and the requirement that newly constructed tankers use double-hulled containments. Furthermore, oil and chemical spills arising from routine OCS oil- and gas-related activities are typically small and localized, leaving numerous substitute recreational areas available. Thus, impacts from unintended releases into the environment are expected to be **minor adverse**.

Response Activities: In the unlikely event of a large oil spill near recreational resources, oiled beach regions and the resulting cleanup effort could cause reduced visits to beaches and use of recreational areas, depending on the location and cleanup methods deployed (e.g., in-situ burning). As evidenced by the large oil spill that occurred off the coast of Louisiana on November 16, 2023, in many cases even larger oil spills do not contact the shoreline. As of February 2024, there has been no reported use of dispersants during response activities (NOAA 2023) and there have been no reported wildlife or shoreline impacts (USCG 2023); however, investigation of that spill is ongoing. Impacts from response activities are thus expected to be **negligible** given the likely small, localized scope of unintended releases near recreational resources (**Chapter 3.5.1**), low level of necessary response activity, and low likelihood of impacting existing recreational resources, and because impacts would be reduced through the regulatory requirements shown in **Table M.5-2**.

Strikes and Collisions: Impacts from strikes and collisions can negatively affect the recreationists directly involved in the collision, as well as those indirectly affected by restrictions to recreational access produced by the direct impacts, both of which are unlikely to occur given the distance between common recreational locations and oil and gas operations. Given this low likelihood, impacts from strikes and collisions are expected to be **negligible**.

Based on the description of the IPFs above and the scenario projections for a single oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative B from routine OCS oil- and gas-related activity on recreational resources would be **minor beneficial** to **minor adverse**. Additionally, impacts from IPFs from accidental events on recreational resources would be **minor adverse**.

Alternative C – Targeted OCS Lease Sale Area

Alternative C aims to concentrate leasing activities into a smaller footprint to potentially reduce impacts to ecologically sensitive areas and to preserve additional flexibility for marine spatial planning. These geographic constraints could change the spatial distribution of activities when compared to Alternative B but would not be expected to meaningfully change the types of activities or their overall levels. Therefore, based on the description of the IPFs above and the scenario projections for a single oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative C from routine OCS oil- and gas-related activity on recreational resources would be **minor beneficial** to **minor adverse**, similar to those under Alternative B. Although the removal of the SSRA blocks would provide a buffer to the Gulf Islands National Seashore (GUIS) viewshed, that buffer would still allow for minor visual impacts. Additionally, impacts from accidental events on recreational resources would be **minor adverse**, although the

removal of the wind energy areas, SSRAs, and other blocks (**Figure 2.2-2** of **Chapter 2** of this Programmatic EIS) could reduce the probability of some accidental events being experienced in adjacent recreational areas, especially in Texas and western Louisiana.

Alternative D – Targeted OCS Lease Sale Area with Additional Exclusions

Due to the removal of much of the lease sale area from the recreational area near the coastline, the IPFs from the oil and gas leasing under Alternative D would result in **negligible** impacts, both from routine oil- and gas-related activity and accidental events.

Therefore, based on the description of the IPFs above and the scenario projections for a single proposed OCS oil and gas lease sale provided in **Chapter 3**, the overall impacts from IPFs associated with Alternative D from routine OCS oil- and gas-related activity on recreational resources would be **negligible**. Additionally, adverse impacts from IPFs from accidental events on recreational resources would be **negligible**.

M.5.2.5 Cumulative Impacts

Past and present impacts were considered as part of the baseline environmental conditions and evaluation of impacts under the No Action Alternative (Alternative A). This cumulative analysis incorporates those effects and also considers the potential effects from reasonably foreseeable future OCS oil and gas lease sales, as well as reasonably foreseeable non-OCS oil- and gas-related activities.

Cumulative OCS Oil and Gas Program: Cumulative OCS Oil and Gas Program related activities (**Table 3.3-2**), which includes ongoing OCS oil- and gas-related activities, could potentially affect recreational resources through air emissions and pollution, bottom disturbance, coastal land use/modification, lighting and visual impacts, offshore habitat modification/space use, unintended releases into the environment, response activities, and strikes and collisions as described above in **Sections M.5.2.1** and **M.5.2.2**. The ongoing impacts would occur in addition to the existing baseline (which includes impacts from past OCS oil and gas lease sales). The baseline is described in **Section M.5.1** and in further detail in Chapter 4.4.5.1 of the GOM Oil and Gas SID. These ongoing impacts would be **minor beneficial to minor adverse**. Future lease sales would add small but measurable impacts to the past and present impacts. Furthermore, as explained in **Chapter 3.2.5**, wells and structures are being decommissioned at rates higher than installations, and this trend is expected to continue for the next 20 years. As a result of this trend, lighting and visual effects, one of the most notable IPFs, are expected to decrease with future OCS oil and gas lease sales for the foreseeable future. However, because the impacts from lighting and visual effects are both minor overall and either positive or negative, depending on the tastes of the individual recreator, future impacts are not expected to differ substantially from ongoing OCS oil- and gas-related activity. Moreover, socioeconomic changes and drivers for recreational resources resulting from future OCS oil and gas lease sales also are not expected to change substantially, given the incremental nature of additional sales to existing activity. Therefore, impacts from cumulative OCS oil and gas activities are expected to be similar to effects experienced from ongoing oil and gas activities

(minor beneficial to minor adverse), with no notable effects to overall recreationist levels and minor impacts to their enjoyment of those resources.

Non-OCS Oil- and Gas-Related Activities: Other IPFs or programmatic concerns that are reasonably foreseeable and could contribute to cumulative impacts to recreational resources are sea-level rise, increasing temperatures, ocean acidification, coastal erosion/subsidence, more numerous or stronger tropical storms and hurricanes, and severe flooding. The potential impacts from these factors are discussed in **Section M.5.1** and are expected to continue. Each of these environmental factors threatens the availability of recreational resources in the future. Sea-level rise, coastal erosion, severe flooding, and more frequent and stronger tropical storms, risk destroying recreational areas and infrastructure outright. Additionally, ocean acidification can lead to a substantial reduction in coral reefs and fish populations, affecting both recreational divers and fishers alike. These impacts from climate-related factors would have a greater impact on recreational resources than the OCS Oil and Gas Program cumulatively.

Incremental Contribution of the Proposed Action: A single proposed OCS oil and gas lease sale, regardless of alternative, would represent only a small portion of activity when compared to the existing OCS Oil and Gas Program in the GOA (**Table 3.3-2**). BOEM has assessed past, present, and reasonably foreseeable OCS and non-OCS oil- and gas-related activities in the GOA as not having a substantial effect on recreational resources. The incremental contribution of impacts from one lease sale to those cumulative effects would not increase the level of impacts to a detectable level. Therefore, the *incremental contribution* of a proposed GOA oil and gas lease sale to cumulative impacts on recreational resources would be **negligible**. An OCS oil and gas lease sale would not be expected to result in a notable increase to any ongoing or reasonably foreseeable cumulative impacts experienced by recreational resources in the area of analysis.

The cumulative effects on recreational resources would not differ between action alternatives. While the distribution of areas offered for leasing vary among alternatives, the total amount of activity would not, and the use of recreational areas would largely be expected to be the same among alternatives with only minor substitutions among recreationists. Cancellation of a proposed lease sale (i.e., No Action) would not stop all OCS oil- and gas-related activities. Activities related to previously issued leases and permits, as well as those that may be issued in the future under separate decisions related to the OCS Oil and Gas Program, would continue and could have impacts similar to those described in **Sections M.5.2.1** through **M.5.2.4** above.

M.5.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information regarding the full likelihood of impacts on recreational resources from Alternatives B and C. In particular, the likelihood of impacts from routine OCS oil- and gas-related activity are not fully known, given that much of the recreational activity occurs near the coastline. BOEM has determined that such information is not essential to a reasoned choice among alternatives because much of this uncertainty relates to the inherent uncertainty regarding where (and what types) of structures would arise from a representative oil and

gas lease sale. In addition, existing information allows for sufficient and reasonable estimates of the overall impacts given these constraints. BOEM used generally accepted scientific principles to best estimate the impacts of each proposed action, including literature sources, data sources, and photographic evidence. Therefore, the incomplete or unavailable information, while relevant, would not substantially change the impact conclusions reached in this analysis and is not essential to a reasoned choice among alternatives.

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The Department of the Interior Mission

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, Native Hawaiians, and affiliated Island Communities.

BOEM
BUREAU OF OCEAN ENERGY MANAGEMENT

The Bureau of Ocean Energy Management Mission

The Bureau of Ocean Energy Management (BOEM) is to manage development of U.S. Outer Continental Shelf energy, mineral, and geological resources in an environmentally and economically responsible way.