

# Gulf of Mexico OCS Oil and Gas Lease Sales 259 and 261

## Final Supplemental Environmental Impact Statement





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## REGIONAL DIRECTOR'S NOTE

This Final Supplemental Environmental Impact Statement (EIS) re-analyzes a Federal action, i.e., a Gulf of Mexico (GOM) Outer Continental Shelf (OCS) lease sale. This document is expected to be used to inform the lease sale processes for GOM Oil and Gas Lease Sales 259 and 261, which the Bureau of Ocean Energy Management (BOEM) is required to hold by the end of March and September 2023, respectively, as directed by the Inflation Reduction Act of 2022 (Public Law No. 117-169, enacted Aug. 16, 2022). This Supplemental EIS tiers from and updates the *Gulf of Mexico OCS Oil and Gas Lease Sales: 2017-2022; Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261; Final Multisale Environmental Impact Statement (2017-2022 GOM Multisale EIS)* and *Gulf of Mexico OCS Lease Sale: Final Supplemental Environmental Impact Statement 2018 (2018 GOM Supplemental EIS)*, and it incorporates by reference all of the relevant material in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

While BOEM has no discretion on whether to hold these sales, BOEM is preparing this Supplemental EIS to follow its normal leasing process to the fullest extent possible and inform the decisionmaker on impacts from a representative lease sale, mitigations, and other action alternatives. Pursuant to the Outer Continental Shelf Lands Act's staged leasing process, BOEM will make an announcement on the first GOM lease sale, i.e., GOM Lease Sale 259, following the completion of this analysis.

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

BOEM's 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. We view the EIS process as providing a balanced forum for early identification, avoidance, and resolution of potential conflicts. It is in this spirit that we welcome comments on this document from all concerned parties.



Michael A. Celata  
Regional Director  
Bureau of Ocean Energy Management  
New Orleans Office



## COVER SHEET

### Final Supplemental Environmental Impact Statement for Gulf of Mexico OCS Oil and Gas Lease Sales 259 and 261

	<b>Draft ( )</b>	<b>Final (x)</b>
<b>Type of Action:</b>	Administrative (x)	Legislative ( )
<b>Area of Potential Impact:</b>	Offshore Marine Environment and Coastal Counties/Parishes of Texas, Louisiana, Mississippi, Alabama, and northwestern Florida	

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## ABSTRACT

This Final Supplemental Environmental Impact Statement (EIS) re-analyzes a proposed Federal action, i.e., a Gulf of Mexico (GOM) Outer Continental Shelf oil and gas lease sale. This document is expected to be used to inform the lease sale processes for GOM oil and gas Lease Sales 259 and 261, which the Bureau of Ocean Energy Management (BOEM) is required to hold by the end of March and September 2023, respectively, as directed in the Inflation Reduction Act of 2022 (Public Law 117-169, enacted August 16, 2022). While BOEM has no discretion on whether to hold these lease sales, BOEM is preparing this Supplemental EIS to follow its normal leasing process to the fullest extent possible and inform the decisionmaker on impacts from a representative lease sale, mitigations, and other action alternatives. This Supplemental EIS contains analyses of the potential environmental impacts that could result from a Gulf of Mexico lease sale, but the analyses may be applied and supplemented as appropriate to inform the lease sale processes for GOM oil and gas Lease Sales 259 and 261 as directed in the Inflation Reduction Act of 2022.

This Final Supplemental EIS provides the following information in accordance with the National Environmental Policy Act and its implementing regulations, and it will be used in the leasing processes for GOM oil and gas Lease Sales 259 and 261. This document includes the purpose of and need for the proposed action, identification of the alternatives, description of the affected environment, and an

analysis of 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.

Hypothetical scenarios were developed 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 Supplemental EIS analyzes the potential impacts of the proposed action on air and water quality, coastal habitats, deepwater benthic communities, *Sargassum*, live bottom habitats, fishes and invertebrates, birds, protected species, commercial and recreational fisheries, recreational resources, archaeological resources, human resources, and land use. It is important to note that this Final Supplemental EIS was prepared using the best information that was publicly available at the time the document was prepared. Where relevant information on 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 Supplemental EIS and the other referenced publications may be obtained from the Bureau of Ocean Energy Management, New Orleans 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 on BOEM's website at <http://www.boem.gov/nepaprocess/>.

## EXECUTIVE SUMMARY

This Final Supplemental Environmental Impact Statement (EIS) analyzes a proposed Federal action, i.e., a Gulf of Mexico (GOM) Outer Continental Shelf (OCS) oil and gas lease sale. This document is expected to be used to inform the lease sale processes for GOM oil and gas Lease Sales 259 and 261, which the Bureau of Ocean Energy Management (BOEM) is required to hold by the end of March and September 2023, respectively, as directed in the Inflation Reduction Act of 2022 (Public Law 117-169, enacted August 16, 2022). This Supplemental EIS incorporates by reference all the relevant material in the *Outer Continental Shelf Oil and Gas Leasing Program: 2017-2022; Final Programmatic Environmental Impact Statement* (BOEM 2016b); *Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261—Final Multisale Environmental Impact Statement* (2017-2022 GOM Multisale EIS; (BOEM 2017b); and *Gulf of Mexico OCS Lease Sale: Final Supplemental Environmental Impact Statement 2018* (2018 GOM Supplemental EIS, BOEM 2017a). This Supplemental EIS has been prepared to aid in the determination of whether or not new available information indicates if either GOM oil and gas Lease Sales 259 or 261 would result in new significant impacts not analyzed in the 2017-2022 GOM Multisale EIS or 2018 GOM Supplemental EIS. This Supplemental EIS also includes an expanded greenhouse gas (GHG) analysis and, in accordance with recent Executive Orders, BOEM also provides an analysis of monetized impacts from these estimated GHG emissions (even though the National Environmental Policy Act (NEPA) does not require such an analysis in the absence of a cost-benefit analysis). **Chapter 4.1** provides an overview of the methodology and results of BOEM's greenhouse gas analysis, which is described more fully in the *Gulf of Mexico OCS Oil and Gas Leasing Greenhouse Gas Emissions and Social Cost Analysis: Addendum to the Gulf of Mexico Lease Sales 259 and 261 Draft Supplemental EIS and Technical Report* (BOEM 2022c), herein referred to as the 2022 Gulf of Mexico GHG Analysis Addendum, which is incorporated by reference into this Supplemental EIS.

### Chapter 1 – Purpose of and Need for the Proposed Action

The proposed action evaluated in this Supplemental EIS is to hold an oil and gas lease sale on the Federal OCS in the GOM. This Supplemental EIS is expected to inform the lease sale processes for GOM oil and gas Lease Sales 259 and 261, which BOEM is required to hold as directed in the Inflation Reduction Act of 2022. This Supplemental EIS will utilize new information to re-analyze a single proposed action (i.e., a single lease sale in the GOM). While BOEM has no discretion on whether to hold either of these two lease sales, BOEM is preparing this Supplemental EIS to follow its normal leasing process to the fullest extent possible and inform the decisionmaker on impacts from a representative lease sale, mitigations, and other action alternatives. BOEM's announcement on GOM Lease Sale 259, will be made following the completion of this NEPA analysis. BOEM's announcement on GOM Lease Sale 261 will be made in the normal course and may be based on additional NEPA review that may update this Supplemental EIS, as appropriate.

The purpose of the proposed Federal action addressed in this Supplemental EIS is to offer for lease those areas that may contain economically recoverable oil and gas resources in order to further the orderly development of OCS oil and gas resources in accordance with the Outer Continental Shelf Lands Act (OCSLA), which specifically states that the OCS "should be made available for expeditious

and orderly development, subject to environmental safeguards” (OCCLA, 43 U.S.C. §§ 1331 *et seq.*), and in accordance with the Inflation Reduction Act of 2022, which requires BOEM to hold both GOM Lease Sales 259 and 261. The need for the proposed action (i.e., a GOM lease sale) is to manage the development of the OCS energy resources in an environmentally and economically responsible manner, as required under Section 18 of the OCCLA. Oil serves as the feedstock for liquid hydrocarbon products, including gasoline, aviation and diesel fuel, and various petrochemicals. Oil from the Gulf of Mexico OCS contributes to meeting domestic demand and enhances national economic security. Since the U.S. is expected to continue to rely on oil and natural gas to meet its energy needs, this proposed action would contribute to meeting domestic demand and to reducing the need for imports of these resources. The relationship between the Inflation Reduction Act, OCS oil and gas leasing, and OCS renewable energy leasing is detailed in **Chapter 1.3**.

## Chapter 2 – Proposed Action and Alternatives

- **Alternative A:** An OCS oil and gas lease sale to include all available unleased blocks in the GOM, with the exception 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 B:** An OCS oil and gas lease sales excluding unleased blocks in the Western Planning Area (WPA) proposed lease sale area, 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:** An OCS oil and gas lease sales excluding unleased blocks in the Central Planning Area/Eastern Planning Area (CPA/EPA) proposed lease sale areas and 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.
- **Alternative D (The Preferred Alternative):** Alternative A, B, or C, excluding the unleased blocks subject to the Topographic Features, Live Bottom (Pinnacle Trend), and Blocks South of Baldwin County, Alabama, Stipulations. Alternative D is the Preferred Alternative. The Preferred Alternative consists of the conditions described for Alternative A with the additional exclusions from leasing, including the Topographic Features Stipulation blocks, the Live Bottom (Pinnacle Trend) Stipulation blocks, and the Blocks South of Baldwin County, Alabama, Stipulation blocks. A potential benefit of this alternative, over Alternative A, is that Alternative D would avoid sensitive benthic and visual resources rather than applying mitigation to protect these resources.
- **Alternative E:** No Action. The cancellation of a single OCS oil and gas lease sale, which would require Congressional action.

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 at the post-lease stage, by applying site-specific mitigating measures to plans, permits, and/or authorizations (refer to Appendix A of the 2017-2022 GOM Multisale EIS). The lease stipulations being considered in this analysis are the Topographic Features; Live Bottom (Pinnacle Trend); Military Areas; Evacuation; Coordination; Blocks South of Baldwin County, Alabama; Protected Species; United Nations Convention on the Law of the Sea Royalty Payment; Restrictions due to Rights-of-Use and Easements for Floating Production Facilities; the Stipulation on the Agreement between the United States of America and the United Mexican States Concerning Transboundary Hydrocarbon Reservoirs in the Gulf of Mexico (Transboundary Stipulation); and the Royalties on All Produced Gas Stipulation. These mitigating measures will be considered for adoption by the decisionmaker, as applicable, under authority delegated by the Secretary of the Interior. The Topographic Features and Live Bottom (Pinnacle Trend) Stipulations were applied as programmatic mitigation in the 2017-2022 National OCS Program EIS (BOEM 2016b) and Record of Decision (BOEM 2017d); therefore, they would apply to all leases issued under the 2017-2022 National OCS Program should Alternative A, B, or C be chosen. Post-lease mitigating measures have been implemented for over 40 years in the Gulf of Mexico region. Following a lease sale, an applicant seeks approvals to develop their lease by preparing and submitting OCS plans. The OCS plans are reviewed by BOEM and the Bureau of Safety and Environmental Enforcement and, depending on what is proposed to take place on a specific lease, plans may be denied, approved, or approved with conditions of approval (COA). The COAs become part of the approved post-lease authorization and include environmental protections, requirements that maintain conformance with law, the requirements of other agencies having jurisdiction, or safety precautions.

This chapter also considers issues identified within the alternatives related to space-use conflicts between BOEM's three Program Areas. Space-use conflicts have been identified between OCS use for OCS oil and gas operations, using OCS sediment for coastal resiliency, and the use of the draft and final identified wind energy areas (WEAs) for wind energy development. Identifying these conflicts early can help to address them in order for BOEM to manage the resources on the OCS most efficiently.

### **Chapter 3 – Impact-Producing Factors and Scenario**

This chapter describes the potentially occurring actions associated with a single lease sale and the cumulative activities that provide a framework for a detailed analysis of the potential environmental impacts. Exploration and development scenarios describe the infrastructure and activities that could potentially affect the biological, physical, and socioeconomic resources in the GOM. They also include a set of ranges for resource estimates, projected exploration and development activities, and impact-producing factors.

Offshore activities are described in the context of scenarios for a proposed action (**Chapter 3.1**) and for the OCS Oil and Gas Program (**Chapter 3.3**). BOEM's New Orleans Office developed these scenarios to provide a framework for detailed analyses of potential impacts of a 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 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.

#### Chapter 4 – Description of the Affected Environment and Impact Analysis

This chapter reexamines and summarizes the affected environment and the potential impacts of a single lease sale under Alternatives A-E. Detailed affected environment descriptions and impact analyses are analyzed by resource in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS, and they are hereby incorporated by reference. Analysis of the alternatives for each resource considers routine activities, accidental events, cumulative impact analysis, incomplete or unavailable information, and conclusions for each resource. This Supplemental EIS also incorporated by reference from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS the baseline data in the assessment of impacts from a proposed action on the resources and the environment (**Chapter 4**). **Table ES-1** provides a list of the resources included in this analysis and a comparison of expected impact levels by alternative (derived from each resource analysis in **Chapter 4**).

A search by BOEM's subject-matter experts was conducted for each resource to consider new information made available since publication of the 2018 GOM Supplemental EIS. 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.

BOEM's subject-matter experts determined through literature searches and communications with other agencies and academia that there was no new information made available since publication of the 2018 GOM Supplemental EIS that would alter the impact conclusions to the potential impacts from a lease sale. Therefore, the analyses and potential impacts for the resources remain the same as those that were presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. These impact conclusions are presented in **Chapter 4** of this Supplemental EIS. The analyses and potential impacts detailed in the previous NEPA documents remain valid and, as such, apply for GOM Lease Sales 259 and 261.

Table ES-1. Alternative Comparison Matrix for a Single Lease Sale.

Impact Level Key <sup>1</sup>					
Beneficial <sup>2</sup>	Negligible	Minor	Moderate	Major	
Alternative					
Resource	A	B	C	D	E
Air Quality	Minor	Minor	Minor	Minor	None
Water Quality	Negligible	Negligible	Negligible	Negligible	None

Impact Level Key <sup>1</sup>					
Beneficial <sup>2</sup>	Negligible	Minor	Moderate	Major	
Alternative					
Resource	A	B	C	D	E
Coastal Habitats					
Estuarine Systems	Moderate	Moderate	Minor	Moderate	Negligible
Coastal Barrier Beaches and Associated Dunes	Minor	Minor	Negligible to Minor	Negligible to Minor	Negligible
Deepwater Benthic Communities	Negligible	Negligible	Negligible	Negligible	None
<i>Sargassum</i> and Associated Communities	Negligible	Negligible	Negligible	Negligible	None
Live Bottoms					
Topographic Features	Negligible	Negligible	Negligible	Negligible	None
Pinnacles and Low-Relief Features	Negligible to Minor	Negligible to Minor	Negligible	Negligible	None
Fishes and Invertebrate Resources	Minor	Minor	Minor	Minor	None
Birds	Moderate	Moderate	Moderate	Moderate	None
Protected Species					
Marine Mammals	Negligible	Negligible	Negligible	Negligible	None
Sea Turtles	Negligible	Negligible	Negligible	Negligible	None
Beach Mice	Negligible	Negligible	Negligible	Negligible	None
Protected Birds	Negligible	Negligible	Negligible	Negligible	None
Protected Corals	Negligible	Negligible	Negligible	Negligible	None
Commercial Fisheries	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible
Recreational Fishing	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible
Recreational Resources	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible
Archaeological Resources	Negligible <sup>3</sup>	Negligible <sup>3</sup>	Negligible <sup>3</sup>	Negligible <sup>3</sup>	None

Impact Level Key <sup>1</sup>					
Beneficial <sup>2</sup>	Negligible	Minor	Moderate	Major	
Alternative					
Resource	A	B	C	D	E
Human Resources and Land Use					
Land Use and Coastal Infrastructure	Minor	Minor	Minor	Minor	None
Economic Factors	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible to Minor
Social Factors (including Environmental Justice)	Minor	Minor	Minor	Minor	None

Note: Some resources have a range for the impact levels to account for certain variables such as the uncertainty of non-OCS oil- or gas-related activities, the level and magnitude of potential accidental events, and the minimization of the OCS oil- or gas-related impacts through lease stipulations, mitigations, and/or regulations. The impact-level ratings have been specifically tailored and defined for each resource within the Chapter 4 impact analysis of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

<sup>1</sup> The findings for Alternatives A-D are the incremental contribution of a proposed action added to what would be expected to occur under the No Action Alternative (i.e., no lease sale). Therefore, each impact determination under Alternatives A-D assumes that the cumulative conditions and impacts (i.e., past, present, and future activities as a result of past lease sales) under the No Action Alternative would still be present.

<sup>2</sup> The level of beneficial impacts is specified in the analysis, which could range from low, medium, or high.

<sup>3</sup> The level of impacts for archaeological resources ranges between negligible to major and is dependent upon whether a survey is performed, mitigation is imposed, mitigation is followed, or a site is identified prior to the activity.

In accordance with CEQ guidelines to provide decisionmakers with a robust environmental analysis, the *Gulf of Mexico Catastrophic Spill Event Analysis* technical report (BOEM 2021d) 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**.

### ***Climate Change***

Issues related to climate change, including global warming, sea-level rise, and programmatic aspects of climate change relative to the environmental baseline for the GOM are discussed in Chapter 4.2.1 of the 2017-2022 National OCS Program EIS and are hereby incorporated by reference. Climate change has led to some recent changes in operations and planned activities in the GOM to help address the impacts of climate change.

Climate change has led to increased numbers and intensity of storms and hurricanes, which have led to greater storm damage and erosion in coastal areas. Erosion of the Nation's beaches, dunes, and coastal wetlands affects natural resources, energy, defense, public infrastructure, and tourism, which are important to healthy ecosystems and the economy at all levels. In order to mitigate these issues, OCS sediment can be used to replenish coastal areas that have experienced storm damage. Storm damage mitigation for coastal resiliency has led to a greater need for OCS sediment,

which, in turn, requires dredging from a greater number of Significant Sediment Resource Areas (SSRAs) in the GOM. In recent years BOEM has experienced an increase in the volume of sediment requested and the number of requests to use OCS sediment resources. This trend is most likely due to a diminishing supply of available material in State waters, increased coastal erosion due to more frequent and intense storms, sea-level rise, and because taking OCS sediment from the Federal OCS is outside the system that allows sediment volume to be added to the system rather than just moving it toward the beach. Using sediment from the OCS for beach nourishment and habitat restoration would help address serious erosion issues and help build coastal resiliency. In addition, there is a potential for space-use conflicts between OCS oil- and gas-related activities and OCS sediment dredging occurring in the same areas. Refer to **Chapter 2.3.4** for more detail on space-use conflicts identified.

Climate change is also the impetus for a transition to a clean energy future. Demand for offshore wind energy has never been greater. Technological advances, falling costs, increased interest, and tremendous economic potential make offshore wind the most promising avenue for diversifying the national energy portfolio. Adding offshore wind to the national energy portfolio will also help in the battle against climate change. Offshore wind is an abundant and efficient alternative domestic energy resource found close to major coastal cities, where more than half of the U.S. population resides and where energy needs are high. Compared to onshore wind, offshore winds are generally stronger and more consistent. Since higher wind speeds can produce significantly more energy and electricity, there is increasing interest in developing offshore wind energy on the OCS. BOEM has an emerging Renewable Energy Program in the GOM and has identified several draft and two final WEAs for future wind energy development. Building renewable energy projects in the draft and final identified WEAs would contribute to the transition to a clean energy future and help to battle climate change. In addition, there is a potential for space-use conflicts between OCS oil- and gas-related activities and OCS wind energy-related activities occurring in the same areas. Refer to **Chapter 2.3.4** for more detail on space-use conflicts identified.

### ***Lifecycle Greenhouse Gas Emissions and Social Cost of Greenhouse Emissions***

This Supplemental EIS includes an expanded GHG analysis. **Chapter 4.1** provides an overview of the methodology and results of BOEM's greenhouse gas analysis, which is described more fully in 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c), and incorporated by reference in this Supplemental EIS. The analysis estimates the GHG emissions from domestically produced or consumed energy that could result from selecting a leasing scenario (using the same exploration and development scenario as Alternative A in this Supplemental EIS) and a No Leasing Alternative (the No Action Alternative). The difference is presented as the incremental GHG emissions attributable to the leasing scenario. This analysis has been expanded to include a quantification of GHG emissions resulting from a shift in foreign oil consumption attributable to the leasing scenario. Additionally, in accordance with recent Executive Orders, BOEM also provides an analysis of monetized impacts from these estimated GHG emissions. The "social cost of carbon" (SCC), "social cost of nitrous oxide" (SCN), and "social cost of methane" (SCM) are collectively referred to as the "social cost of greenhouse gases" (SC-GHG). The SC-GHG is an estimate of the generalized

economic damages associated with an increase in GHG emissions. BOEM applies the SC-GHG to the estimates of GHG emissions. The results are then presented as monetized, potential climate damages attributable to a leasing scenario (analyzed as Alternative A in this Supplemental EIS) or the No Action Alternative.

Such analysis should not be construed to mean that a cost determination is necessary to address potential impacts of GHGs associated with specific alternatives. Although NEPA requires consideration of “effects” that include “economic” and “social” effects (40 CFR § 1508.8(b)), NEPA does not require an economic cost-benefit analysis (40 CFR § 1502.23). The GHG emission estimates were annualized and monetized; however, they do not constitute a complete cost-benefit analysis nor does the cost of GHG numbers present a direct comparison with other impacts analyzed in this Supplemental EIS. For instance, BOEM’s overall economic analysis for a GOM lease sale does not monetize most of the major costs or benefits and does not include all revenue streams from a GOM lease sale but seeks to quantify certain impacts related to employment numbers and labor income. The social cost of GHG analysis is provided only as a useful measure of the benefits of GHG emissions reductions to inform agency decisionmaking. This is a new and evolving approach, and BOEM will continue to evaluate the methodology with input from outside experts and the public. Refer to **Chapter 4.1** and the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c), which is incorporated by reference, for a full description and detailed discussion on the methodology and results of the GHG emissions and social cost of GHG emissions analysis.

### ***Air Quality***

The level of impacts to air quality from a single lease sale would be similar for Alternatives A-D. While there are some differences in the number of activities associated with the alternatives, many of the impacts associated with the alternatives are similar because the types of activities that occur are similar and the differences are not large enough to change the range of impact conclusions. There are two versions of the “Air Quality Modeling in the Gulf of Mexico Region” study. The conclusions based on the 2019 report did not change from the conclusions based on the 2018 draft interim assessment. The potential impact of a single lease sale would be **minor** throughout the Gulf of Mexico. Impacts of a single lease sale to the U.S. Department of the Interior, Fish and Wildlife Service’s (FWS), Class I Breton Wilderness Area would be **moderate**. The impacts from a proposed activity are a small addition to the cumulative impacts on air quality when compared with emissions from onshore sources, existing oil and gas activity in State and Federal waters, commercial marine shipping, and other activities conducted in Federal waters. Therefore, the incremental contribution of the routine activities and accidental events associated with a proposed action to the cumulative impacts on air quality is expected to be **minor** to the coastal nonattainment areas. Under Alternative E, there would be no new activities associated with a single lease sale; therefore, the incremental impacts would be **none** because new impacts would be avoided entirely. However, impacts associated with current and past lease sales and non-OCS oil- and gas-related activities would continue.

## **Water Quality**

The impacts on water quality from routine operational discharges associated with a proposed action (i.e., Alternatives A-D) are considered **negligible** (beyond 1,000 m; 3,281 ft) to moderate (within 1,000 m; 3,281 ft) of the source, and the impacts on water quality from oil spills are considered moderate, even with the implementation of safety requirements and mitigating measures. The impacts from a proposed action are a small addition to the cumulative impacts on water quality when compared with inputs from hypoxia, potentially leaking shipwrecks, chemical and weapon dumpsites, natural oil seeps, and natural turbidity. Therefore, the incremental contribution of the routine activities and accidental events associated with a proposed action to the cumulative impacts on water quality is expected to be negligible for any of the action alternatives (i.e., Alternatives A-D). Alternative E, cancellation of a single lease sale, would result in no new activities associated with a lease sale; therefore, the incremental impacts would be **none** because new impacts would be avoided entirely. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under Alternative E.

## **Coastal Habitats**

### *Estuarine Systems*

The impacts to estuarine systems from routine activities associated with a proposed action are expected to be **minor to moderate** depending on the alternative (**none** for Alternative E). The impacts to estuarine systems from accidental events associated with a proposed action are expected to be **minor** for all alternatives (**none** for Alternative E). Cumulative impacts from all sources (including both OCS oil- and gas-related and non-OCS oil- and gas-related) would be **major** for all alternatives (i.e., Alternatives A-D). This major impact is due to cumulative OCS oil- and gas-related spills resulting from all past and present leasing activities, including the millions of barrels that entered the GOM from the *Deepwater Horizon* oil spill. A lease sale would result in a relatively minor addition to existing routine activities and accidental events; therefore, the incremental contribution to the cumulative impacts on estuarine systems would be **minor to moderate** depending on the alternative (**none** for Alternative E).

Under Alternative A, the impacts of a proposed action on estuarine systems are expected to be **moderate**, and the incremental contribution to the cumulative impacts is expected to be **moderate**. The impacts of Alternative B would be **moderate** (like Alternative A), except impacts to estuarine systems in Texas would be **negligible** because no new OCS oil- and gas-related activity is forecasted in the WPA. For this reason, the incremental contribution of Alternative B to the cumulative impacts on estuarine systems is expected to be **moderate**. The impacts of Alternative C would be less than those of Alternative A, as only a fraction of the resulting activity forecast for Alternative A is projected under Alternative C. Under Alternative C, there would be **negligible** impacts to estuarine systems in Louisiana, Mississippi, Alabama, and the panhandle of western Florida while incrementally more impacts to the estuarine systems of Texas. Therefore, because the effects of impact-producing factors on estuarine systems would be less for Alternative C than for Alternative A, the incremental contribution of Alternative C to the cumulative impacts on estuarine systems is expected to be **minor**.

The impacts of Alternative D would be nearly identical to those of the alternative it is combined with because the available unleased blocks with topographic features do not contain wetlands or submerged vegetation (i.e., estuarine systems) and are too distant (over 25 kilometers [km]; 16 miles [mi]) from the coast to have indirect impacts either. Under Alternative E (No Action) there would be no additional impacts to estuarine systems for a single lease sale. There could be some incremental increase in impacts caused by a compensatory increase in imported oil and gas to offset reduced OCS production, but it would likely be **negligible**.

### ***Coastal Barrier Beaches and Associated Dunes***

Impacts to coastal beaches and dunes from routine activities and accidental events related to a proposed action under Alternative A are expected to be **negligible** to **minor** since most routine activities are located far from coastal beaches. The impacts of Alternative B would be **negligible** to **minor** (like Alternative A), except impacts to coastal barrier beaches and dunes in Texas would be **negligible** because no OCS oil- and gas-related scenario activity that would affect coastal barrier beaches and associated dunes is forecasted in the WPA. The impacts of Alternative C would be less than those of Alternative A, as only a fraction of the resulting activity forecast for Alternative A is projected under Alternative C. Under Alternative C, there would be **negligible** incremental impacts to coastal barrier beaches and dunes in Louisiana; zero to **negligible** impacts to Mississippi, Alabama, and the panhandle of western Florida; and incrementally more impacts to the beaches and dunes of Texas. The impacts of Alternative D would be nearly identical to those of the alternative it is combined with because the available unleased blocks with topographic features do not contain coastal barrier beaches and dunes and are too distant (over 25 km; 16 mi) from the coast to have indirect impacts. Under Alternative E (No Action) there would be no additional impacts to coastal barrier beaches and associated dunes for a single lease sale. There could be some incremental increase in impacts caused by a compensatory increase in imported oil and gas to offset reduced OCS production, but it would likely be **negligible**. The incremental contribution of Alternatives A-D to the cumulative impacts to coastal barrier beaches and associated dunes is expected to be **minor** (**none** under Alternative E). Cumulative impacts from all sources (including both OCS oil- and gas-related and non-OCS oil- and gas-related) would be **major** for all alternatives (i.e., Alternatives A-D). This major impact is due to cumulative OCS oil- and gas-related spills resulting from all past and present leasing activities, including the millions of barrels that entered the GOM from the *Deepwater Horizon* oil spill.

### ***Deepwater Benthic Communities***

At the regional scope of this analysis, and assuming adherence to all expected regulations and mitigations, impacts from reasonably foreseeable routine activities are expected to be **negligible** for any of the action alternatives. For Alternative B, proposed OCS oil- and gas-related activities would also contribute incrementally, but only a **negligible** amount, to the overall OCS oil- and gas-related and non-OCS oil- and gas-related cumulative effects experienced by deepwater benthic communities, assuming the continuation of expected mitigation practices. Alternative C would not fundamentally alter the conclusions reached for Alternative A, but it would reduce the potential impacts of a lease sale in the available unleased blocks in the CPA/EPA. Although the area proposed for leasing in the WPA is relatively smaller than the proposed area of the CPA/EPA and would experience less projected

OCS oil- and gas-related activity (refer to **Chapter 3**), deepwater benthic communities are found throughout all deep waters of the GOM and, therefore, the impacts associated with Alternative C could still potentially cause some negative effects. Alternative D would do relatively little to reduce the impacts as a result of the routine activities, accidental events, or cumulative impacts to deepwater benthic communities. Deepwater benthic communities are generally found in depths >300 m (984 ft), and the vast majority of lease blocks covered by the exclusion areas in Alternative D are in shallower waters. Existing mitigation practices would continue to be applied to the proposed activities under Alternatives A-D, reducing the expected level of impacts from a single lease sale to **negligible** for any of the action alternatives. Under Alternative E, a lease sale would be cancelled; therefore, the potential for impacts of that proposed action are **none** because new impacts to deepwater benthic communities related to a cancelled lease sale would be avoided entirely though existing activity would continue. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative.

### ***Sargassum and Associated Communities***

*Sargassum* has a yearly cycle that allows quick recovery from impacts. Therefore, most routine and accidental impact-producing factors for Alternatives A-D would be expected to result in **negligible** impacts because they only impact a small percentage of the population and because impacts would be limited in size and scope as new plants rapidly replace the impacted plants. Under Alternative E, a lease sale would be cancelled and the potential for impacts from routine activities and accidental events would be **none** because new impacts would be avoided entirely. Under Alternative E, impacts to *Sargassum* would be limited to cumulative impacts associated with past, present, and future OCS oil- and gas-related development and non-OCS oil- and gas-related activities.

### ***Live Bottoms***

#### *Topographic Features*

Overall, given adherence to the Topographic Features Stipulation, which is a required mitigation as a result of the 2017-2022 National OCS Program's Record of Decision and will be applied for Lease Sales 259 and 261 under Alternatives A-C, or the exclusion of the areas to which that stipulation is applied from leasing (Alternative D), reasonably foreseeable impacts to topographic features from routine activities, accidental events, and the cumulative impacts for any of the action alternatives (i.e., Alternatives A-D) are expected to be **negligible**. Alternative B or C would not fundamentally alter the conclusions reached under Alternative A. Many OCS lease blocks near the features are already leased, and impacts from non-OCS oil- and gas-related activities are not expected to decrease. Under Alternative D, BOEM could hold a lease sale excluding the leasing of any and/or all blocks subject to the Topographic Features, Live Bottom (Pinnacle Trend), and Blocks South of Baldwin County, Alabama, Stipulations. Topographic features would experience fewer impacts through the additional distancing of OCS oil- and gas-related activities, further reducing the probability of impacts under Alternative D. An accidental spill may still reach a topographic feature, but it is expected that the increased distance would provide more dispersal time, and subsequent time for impact mitigation, as the spill travels the additional distance across unleased blocks. Alternative D

would do little to change the overall cumulative impacts to topographic features. Many OCS lease blocks near the topographic features are already leased, and impacts from non-OCS oil- and gas-related activities are not expected to decrease. Under Alternative E, a lease sale would be cancelled. Therefore, the potential for new incremental impacts is **none** because new OCS oil- and gas-related impacts to topographic features related to the cancelled lease sale would be avoided entirely. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative.

#### *Pinnacles and Low-Relief Features*

Overall, given adherence to the Live Bottom (Pinnacle Trend) Stipulation, which is a required mitigation as a result of the 2017-2022 National OCS Program's Record of Decision and will be applied for Lease Sales 259 and 261 under Alternatives A-C, or the exclusion of the areas to which that stipulation is applied from leasing (Alternative D), reasonably foreseeable impacts to pinnacle and low-relief feature communities from routine activities, accidental events, and the cumulative impacts for any of the action alternatives (i.e., Alternatives A-D) are expected to be **negligible** or **negligible** to **minor**, depending on the alternative. Alternative B would not fundamentally alter the overall conclusion reached under Alternative A for incremental impacts from a lease sale. Many OCS lease blocks near the features are already leased, and non-OCS oil- and gas-related activities are not expected to decrease. Under Alternative C, BOEM could hold a lease sale excluding the CPA/EPA available unleased blocks and would only offer all available unleased blocks in the WPA. Alternative C would not fundamentally alter the conclusions reached under Alternative A or B, but it would reduce the potential impacts of a lease sale on the available unleased CPA/EPA blocks, including known high concentrations of pinnacle and low-relief feature communities in the Pinnacle Trend blocks and other portions of the northeastern CPA (Figure 4-9 of the 2018 GOM Supplemental EIS). Under Alternative D, BOEM could hold a lease sale excluding leasing on any and/or all blocks subject to the Topographic Features, Live Bottom (Pinnacle Trend), and Blocks South of Baldwin County, Alabama, Stipulations. Known pinnacle and low-relief features in the Pinnacle Trend area would be further protected by the increased distancing of OCS oil- and gas-related activities, reducing the probability of impacts under Alternative D. An accidental spill may still reach a feature, but it is expected that the increased distance would provide more dispersal time, and subsequent time for mitigation, as the spill travels the additional distance across unleased blocks. Under Alternative E, a lease sale would be cancelled. Therefore, the potential for new incremental impacts is **none** because new OCS oil- and gas-related impacts to pinnacle and low-relief feature communities related to a cancelled lease sale would be avoided entirely. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative.

#### *Fish and Invertebrate Resources*

As with the previous analyses examining the various proposed alternatives, the distribution of fish and invertebrate species in the GOM is considered to be generally even throughout their range of habitat within the planning areas, and the potential for impacts to populations is considered to be independent of the planning area(s) analyzed. Therefore, at a planning area scale, it is expected that

the relative level of impacts for a single OCS oil and gas lease sale would be the same for Alternatives A-D (**minor**). Alternative E would offer no new lease blocks for exploration and development; therefore, no impacts from a lease sale would occur. However, there would be continuing impacts associated with the existing oil- and gas-related activities from previously permitted activities and previous lease sales. Therefore, for the proposed Alternatives A-D, the expected level of impact associated with routine activities, accidental events, and cumulative impacts from OCS oil- and gas-related and non-OCS oil- and gas-related sources is expected to range from **negligible** to **moderate** and would depend upon the impact-producing factors and the affected species. No impacts would be expected to result from Alternative E due to the cancellation of a single lease sale (excluding cumulative impacts from ongoing and past activities) because new impacts would be avoided entirely. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative.

### ***Birds***

Since Alternative A is regionwide (i.e., includes the WPA, CPA, and EPA portions of the proposed lease sale area), it would have more OCS oil- and gas-related activities than the other alternatives, and thus more potential for impacts. Impacts from the other alternatives would follow in a graded fashion. However, offshore pelagic seabird habitat is distributed throughout the planning areas. Therefore, activities occurring only in specific planning areas pose similar potential impacts to offshore pelagic seabird populations as do activities occurring in all planning areas. Therefore, because of the diversity and distribution of offshore pelagic seabird species in the Area of Interest, the level of impacts for a single OCS oil and gas lease sale would be the same for Alternatives A-D (**moderate**). Alternative E would offer no new lease blocks for exploration and development; therefore, no impacts from a single lease sale would occur because new impacts would be avoided entirely. However, there would be continuing impacts associated with the existing oil and gas activities from previously permitted activities and previous lease sales. For all alternatives (i.e., Alternatives A-D), the cumulative impacts of OCS oil- and gas-related sources would be expected to be **moderate** while the cumulative impacts on non-OCS oil and gas-related would be expected to be **major**.

### ***Protected Species***

#### ***Marine Mammals***

The effects associated with selection of any of the alternatives would be equivalent because of the diversity and distribution of marine mammal species throughout the potential Area of Interest. The analyses assumed a wide distribution of species and considered impacts to marine mammal species occurring in a wide range of habitats across all planning areas. While a WPA lease sale (Alternative C) as described in **Chapter 2** would be in a smaller area with less projected activity than a regionwide (Alternative A) or CPA/EPA lease sale (Alternative B) as described in **Chapter 2**, marine mammal species are widely distributed throughout the planning areas and may travel great distances across the entire GOM. As such, activities isolated to specific areas pose similar potential impacts to populations as do activities occurring in all planning areas. Therefore, a similar mix of species would be exposed to the analyzed impact-producing factors, regardless of the specific action alternative

selected. For example, if a marine mammal species were to be accidentally struck by an OCS vessel, it would have the same impact to that individual and its respective population estimate in the WPA as it would in the CPA or EPA. Although a smaller leased area resulting in less projected OCS oil- and gas-related activity could decrease the likelihood of OCS oil- and gas-related activities impacting marine mammal populations, such as the Rice's whale and coastal bottlenose dolphin, there are not enough conclusive data on the density, general distributions, and possible migratory behaviors of marine mammal populations in the GOM throughout the year to support a reasonable conclusive analysis. Therefore, because of the diversity and wide distribution of species in the Area of Interest, the level of impacts would be the same for Alternatives A-D. Under Alternative E, there would be no new activities associated with a single lease sale; however, impacts associated with past lease sales and non-OCS oil- and gas related activities would continue.

Proposed OCS oil- and gas-related activities would also contribute incrementally to the overall OCS oil- and gas-related and non-OCS oil- and gas-related cumulative effects experienced by marine mammal populations. At the regional, population-level scope of this analysis, impacts from reasonably foreseeable routine activities and accidental events could be **negligible** to **moderate** for Alternative A, B, C, or D. However, the incremental contribution of a proposed action to cumulative impacts to marine mammal populations, depending upon the affected species and their respective population stock estimate, even when taking into consideration potential impacts (*Deepwater Horizon* explosion, oil spill, and response; non-OCS oil- and gas-related activities; and the minimization of the OCS oil- and gas-related impacts through lease stipulations and regulations), is expected to be **negligible**.

The incremental contribution of a lease sale (i.e., Alternative A, B, C, or D) to cumulative impacts to marine mammal populations, depending upon the affected species and their respective population estimate, even when taking into consideration the potential impacts of the *Deepwater Horizon* explosion, oil spill, and response; non-OCS oil- or gas-related factors; and the minimization of OCS oil- or gas-related impacts through lease stipulations and regulations, would be expected to be negligible as a result of a proposed action (i.e., Alternative A, B, C, or D) and the period analyzed. Under Alternative E, cancellation of a lease sale, the impacts on marine mammals within the Gulf of Mexico would be **none** because new impacts would be avoided entirely. However, cumulative impacts from previous lease sales and non-OCS oil- and gas-related activities would remain.

### *Sea Turtles*

The effects associated with selection of any of the action alternatives would be equivalent because of the diversity and random distribution of sea turtles throughout the potential Area of Interest. The analyses assumed a wide distribution of species and considered impacts to sea turtles occurring in a wide range of habitats across all planning areas. While a WPA lease sale (Alternative C) would be in a smaller area with less projected activity than a regionwide (Alternative A) or CPA/EPA lease sale (Alternative B) as described in **Chapter 2**, sea turtles are distributed throughout the planning areas. As such, activities isolated to specific planning areas pose similar potential impacts to populations as do activities occurring in all planning areas. Therefore, because of the free-swimming ability and wide distribution of species across the Area of Interest, the level of impacts would be the

same for Alternatives A-D. At the regional, population-level scope of this analysis, impacts from reasonably foreseeable routine activities and accidental events could be **negligible to moderate** for all action alternatives. However, the incremental contribution of a proposed action to cumulative impacts to sea turtle populations, depending upon the affected species and their respective population stock estimate, even when taking into consideration potential impacts (i.e., the *Deepwater Horizon* explosion, oil spill, and response; non-OCS oil- and gas-related activities; and the minimization of the OCS oil- and gas-related impacts through lease stipulations and regulations), is expected to be **negligible**. However, Alternative E, cancellation of a lease sale, would avoid impacts from a lease sale and the related post-lease activities as the lease sale would not be held; only impacts from past lease sales and associated post-lease activities or other geological and geophysical permits would continue.

#### *Beach Mice*

Because of the distribution of species in the Area of Interest, the level of impacts would be generally the same for Alternatives A, B, and D. Alternative C would have no impacts since no beach mice habitat exists near the WPA proposed lease sale area. The WPA is approximately 380 mi (612 km) from known beach mouse habitat; Oil-Spill Risk Analysis (OSRA) modeling calculated a <0.05 to 1 percent chance of oil from a catastrophic spill contacting beach mouse habitat 30 days post-spill. Alternative E, cancellation of a lease sale, would be **none** because new impacts would be avoided entirely, and only impacts associated with ongoing activities from past lease sales and non-OCS oil- and gas-related activities would occur. Overall, the incremental contribution of impacts from reasonably foreseeable routine activities and accidental events to the overall cumulative impacts on beach mice is from Alternatives A, B, and D expected to be **negligible**.

#### *Protected Birds*

Due to the precautionary requirements and monitoring discussed in **Chapter 4.9.4**, the impacts to protected birds would be **negligible** for any of the action alternatives (i.e., Alternatives A-D). The impacts of Alternative B would be the same as Alternative A for all previously specified protected bird species, except for the whooping crane with the listed population in Texas (i.e., only in the WPA). The Cape Sable seaside sparrow, roseate tern, and the Mississippi sandhill crane are not found off Texas; therefore, they would not be impacted by a lease sale in the WPA (i.e., Alternative C). The impacts of Alternative D would be the same as Alternative A, B, or C because the areas of potential exclusion are specific to areas that do not have any impact on Endangered Species Act (ESA)-protected bird species or their habitats. The impacts of Alternative E, the cancellation of a single lease sale, would yield no additional incremental impacts to ESA protected birds or their habitats because new impacts would be avoided entirely. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative.

### *Protected Corals*

Under Alternatives A and C, the proposed activities would have the same impact levels to protected corals whether they occur in the WPA, CPA, or EPA. While the WPA is a smaller area with less projected activity than is proposed for the CPA/EPA (refer to **Chapter 3**), many of the protected corals either occur on the East and West Flower Garden Banks, all of which are part of the Flower Garden Banks National Marine Sanctuary. 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 are not available for leasing and are not proposed for leasing under any alternative, or are far from the area of proposed activities. Additional protection is provided through lease stipulations and post-lease activity reviews and associated site-specific information requirements and (when necessary) mitigations. Because of these protective measures and because protected corals occur generally far from areas of proposed activities, impacts from reasonably foreseeable routine activities and accidental events are both expected to be **negligible**. A negligible impact would be largely undetectable and may cause slight, localized changes to a protected coral species community in which recovery from the impact is expected. No mortality or injury to an individual or group would be expected to occur. Under Alternative B, a lease sale would not occur in the WPA; therefore, impacts to protected corals in the WPA as a result of a lease sale would not be reasonably foreseeable to occur. Under Alternative B there would, however, be ongoing cumulative impacts to the resources associated with ongoing OCS oil- and gas-related activities resulting from previous lease sales and from non-OCS oil- and gas-related activities and conditions. If Alternative B were selected, some reduction in impacts to protected corals found within the WPA may occur. However, this reduction may take years to be realized as it would likely be many years before production on existing leases will end. Since post-lease activities occur over decades, it would take several years before there would likely be a noticeable decrease in post-lease activities from previous oil and gas lease sales. Under Alternative D, should the blocks subject to the Topographic Features Stipulation be excluded, protected corals would be further protected by distancing OCS oil- and gas-related activities farther from these habitats, thereby reducing the probability of potential impacts from routine activities or accidental events. Under Alternative E, the cancellation of a single lease sale, there would be no new activities associated with a lease sale and, therefore, no associated impacts; however, impacts from activities associated with past lease sales and non-OCS oil- and gas-related activities and conditions would continue.

### **Commercial Fisheries**

The level of impacts to commercial fisheries would range from **beneficial** to **minor** for Alternatives A-D. While there are some differences in the number of activities associated with the alternatives, many of the impacts associated with the alternatives are similar because the types of activities that occur are similar and the differences are not large enough to change the range of impact conclusions. The exact 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. Alternative E, the cancellation of a single lease sale, would prevent these impacts from occurring, except for potential **negligible** impacts arising from adjustments to incomes in the economy. Under

Alternative E, fisheries would still be subject to the impacts from current and past activities from the OCS Oil and Gas Program, as well as the impacts from non-OCS oil- and gas-related activities.

### ***Recreational Fishing***

The level of impacts to recreational fishing would range from **beneficial** to **minor** for Alternatives A-D. While there are some differences in the number of activities associated with the alternatives, many of the impacts associated with the alternatives are similar because the types of activities that occur are similar and the differences are not large enough to change the range of impact conclusions. Alternative E, the cancellation of a single lease sale, would prevent these impacts from occurring, except for **negligible** changes to recreational fishing due to changes in income patterns in the economy. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative.

### ***Recreational Resources***

Because of the relatively small contribution of any given lease sale under any of the action alternatives (i.e., Alternatives A-D) to the overall OCS Oil and Gas Program, in addition to other non-OCS oil- and gas-related activities, the incremental impacts of a proposed action to recreational resources are expected to be **beneficial (low)** to **minor** adverse effects. There could be **negligible** impacts to recreational resources due to the small economic adjustments that would occur in light of Alternative E, the cancellation of a single lease sale. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative. A detailed analysis of recreational resources can be found in Chapter 4.12 of the 2017-2022 GOM Multisale EIS and a summary in Chapter 4.12 of the 2018 GOM Supplemental EIS. Onshore and offshore OCS oil- and gas-related activities are expected to be the same for Alternatives A-D.

### ***Archaeological Resources***

For the purposes of this analysis, all alternatives may be assumed to have effectively similar potential impacts to archaeological resources. Therefore, the level of impacts would be the same for Alternatives A-D. When archaeological resources are identified, evaluated, and avoided or mitigated, the potential impact of a proposed action under Alternatives A-D is expected to be **negligible**. However, if an archaeological site were to be impacted due to a failure to properly identify, evaluate, and avoid or mitigate it, those impacts may range from **negligible** to **major**. Under Alternative E, the cancellation of a single lease sale, there would be no new activities associated with a lease sale, and impacts would be **none**; however, impacts associated with past lease sales and non-OCS oil- and gas-related activities would continue.

## ***Human Resources and Land Use (Including Environmental Justice)***

### *Land Use*

For any of the action alternatives (i.e., Alternatives A-D), the *incremental contribution* of a proposed action to cumulative impacts is expected to be **minor**. The cumulative impacts on land use and coastal infrastructure could range from **beneficial** to **moderate** for OCS oil- and gas-related activities and **beneficial** to **major** for non-OCS oil- and gas-related activities, depending on the specifics of each situation, whether the impacts are measurable, how long the impacts would last, and the size of the affected geographic area as defined in Chapter 4.14.1 of the 2017-2022 GOM Multisale EIS. Alternative E would result in no lease sale and, thus, the direct impacts as a result of a lease sale would be **none**, and there would be no incremental contribution of impacts to land use and coastal infrastructure beyond a temporary negative economic impact for the oil and gas industry and coastal states, such as Louisiana, that are more dependent on oil and gas revenues. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative.

### *Economic Factors*

The alternatives should be viewed in light of the OCS Oil and Gas Program, as well the numerous forces that can affect energy markets and the overall economy. Most of the incremental economic impacts of a proposed action are forecast to be **beneficial**, although there would be some **minor** adverse impacts that may occur as a result of accidental events. The exact impacts will be roughly proportional to the amount of resulting oil and gas industry activity that occurs as a result of a proposed action. There are some differences in the number of activities associated with the alternatives. However, except for Alternative E, any differences are small, and since the types of activities associated with the alternatives are the same, these small differences are not sufficient to change the range of impact conclusions. Alternative E, cancellation of a lease sale, would negatively impact firms and employees that depend on recurring leases; therefore, the impacts of Alternative E would be **negligible** to **minor**, with some partially offsetting **beneficial** impacts. Cumulative impacts of current and past activities (i.e., OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative.

### *Social Factors (Including Environmental Justice)*

The impacts for social factors would be similar for Alternatives A-D; however, the level of impacts would be directly related to the level of OCS oil- and gas-related activity in the Gulf of Mexico. Alternative B would produce proportionately smaller OCS oil- and gas-related activity than Alternative A, and Alternative C would result in less OCS oil- and gas-related activity than Alternatives A or B. The impacts of Alternative D could be less than Alternative A, B, or C, but this difference would likely be indiscernible. The *incremental contribution* of a proposed action to cumulative impacts of a single lease sale under Alternatives A-D would be **minor** for communities and people in the Gulf Coast region. Under Alternative E, the cancellation of a single lease sale, there would be no new activities associated with a lease sale; however, impacts associated with past lease sales and non-OCS oil- and gas-related activities would continue.

*Environmental Justice Determination:* The oil and gas industry in the GOM region is expansive and long-lived, developing over 80 decades with substantial infrastructure in place to support both onshore and offshore activities. BOEM's scenario estimates call for 0-1 new gas processing plant and 0-1 new pipeline landfall over the 50-year life of a single proposed action. Impacts to GOM populations from a proposed action would be immeasurably small for environmental justice since these low-income and minority communities are located onshore and distant from Federal OCS oil- and gas-related activities. Also, since these vulnerable populations are located within the larger context of onshore and State-regulated nearshore oil and gas activities that are connected to downstream infrastructure over which BOEM has no regulatory authority, BOEM has determined that a proposed action would not produce added environmental justice impacts in the GOM region.

## **Chapter 5 – Consultation and Coordination**

This chapter summarizes the ongoing consultation and coordination efforts used in preparing this Supplemental EIS. This includes a description of the Call for Information, Area ID Memorandum, Development of the Draft Supplemental EIS, and Development of the Final Supplemental EIS processes. A summary of past scoping efforts for the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS was included since scoping is not required for a Supplemental EIS under 40 CFR § 1502.9(c)(4). Additionally, summaries of consultations with Federal and State agencies under the Coastal Zone Management Act, Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, and National Historic Preservation Act, and government-to-government consultation and coordination were included.

## **Chapter 6 – References**

This chapter includes all the citations referenced throughout this Supplemental EIS.

## **Chapter 7 – List of Preparers**

This chapter provides a list of all the preparers of this Supplemental EIS.

## **Chapter 8 – Glossary**

This chapter is a glossary of the terms used throughout this Supplemental EIS.

## **Appendix A – Proposed Lease Mitigating Measures (Stipulations)**

This appendix details the proposed lease stipulations.

## **Appendix B – Consultation Correspondence**

This appendix collects the letters associated with the various consultations.

## **Appendix C – Responses to Comments on the Draft Supplemental EIS**

This appendix includes comments on the Draft Supplemental EIS and BOEM's responses.



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## ABBREVIATIONS AND ACRONYMS

µg	microgram
µm	micrometer
2017-2022 National OCS Program	<i>2017-2022 Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program</i>
2017-2022 National OCS Program EIS	<i>Outer Continental Shelf Oil and Gas Leasing Program: 2017-2022, Final Programmatic Environmental Impact Statement</i>
2017-2022 GOM Multisale EIS	<i>Gulf of Mexico OCS Oil and Gas Lease Sales: 2017-2022; Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261—Final Multisale Environmental Impact Statement</i>
2018 GOM Supplemental EIS	<i>Gulf of Mexico OCS Lease Sale: Final Supplemental Environmental Impact Statement 2018</i>
2019-2024 Draft Proposed Program	<i>2019-2024 National Outer Continental Shelf Oil and Gas Leasing: Draft Proposed Program</i>
2019-2024 National Program	National Outer Continental Shelf Oil and Gas Leasing Program for 2019-2024
2022 Gulf of Mexico GHG Analysis Addendum	<i>Gulf of Mexico OCS Oil and Gas Leasing Greenhouse Gas Emissions and Social Cost Analysis: Addendum to the Gulf of Mexico Lease Sales 259 and 261 Draft Supplemental EIS and Technical Report</i>
2D	two dimensional
3D	three dimensional
ac	acre
Agreement	Agreement between the United States of America and the United Mexican States Concerning Transboundary Hydrocarbon Reservoirs in the Gulf of Mexico
Area ID	Area Identification
AQRV	air quality-related value
bbl	barrel
Bbbl	billion barrels
Bcf	billion cubic feet
BBO	billion barrels of oil
BiOp	Biological Opinion
BOE	billion barrels of oil equivalent
BOEM	Bureau of Ocean Energy Management
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
B.P.	before present
BSEE	Bureau of Safety and Environmental Enforcement
BTEX	benzene, toluene, ethylbenzene, and xylene
Call	Call for Information

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CAMx	Comprehensive Air-quality Model with extensions
CD	Consistency Determination
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CG	Coast Guard (also: USCG)
CH <sub>4</sub>	methane
CMAQ	Community Multiscale Air Quality
CMP	Coastal Management Program
CO	carbon monoxide
COA	conditions of approval
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> -e	CO <sub>2</sub> -equivalent
COE	Corps of Engineers (U.S. Army)
CPA	Central Planning Area
CZMA	Coastal Zone Management Act
DOCD	development operations coordination document
DOI	Department of the Interior (U.S.) (also: USDOl)
DOT	Department of Transportation (U.S.) (also: USDOT)
DPP	development and production plan
EFH	essential fish habitat
e.g.	for example
EIA	Economic Impact Area
EIS	environmental impact statement
EP	exploration plan
EPA	Eastern Planning Area
ESA	Endangered Species Act of 1973
et al.	and others
<i>et seq.</i>	and the following
FGBNMS	Flower Garden Banks National Marine Sanctuary
FPSO	floating production, storage, and offloading system
FR	<i>Federal Register</i>
ft	feet
FWS	Fish and Wildlife Service
G&G	geological and geophysical
GAO	Government Accountability Office
GHG	greenhouse gas
GOADS	Gulfwide Offshore Activity Data System

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GOM	Gulf of Mexico
GOMESA	Gulf of Mexico Energy Security Act
GUIS	Gulf Islands National Seashore
Gulf of Mexico G&G Programmatic EIS	<i>Gulf of Mexico OCS Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas – Final Programmatic Environmental Impact Statement</i>
GWEI	Gulfwide Emission Inventory
GWP	Global Warming Potential
H <sub>2</sub> S	hydrogen sulfide
ha	hectare
HRG	high-resolution geophysical
Hz	Hertz
i.e.	that is
IRA	Inflation Reduction Act of 2022
km	kilometer
LA	Louisiana
LCA	Louisiana Coastal Area
LNG	liquefied natural gas
LOOP	Louisiana Offshore Oil Port
m	meter
MAG-PLAN	MMS Alaska-GOM Model Using IMPLAN
MARAD	Maritime Administration (U.S. Department of Transportation)
MATS	Modeled Attainment Test Software
MC20	Mississippi Canyon Block 20
mg/L	milligrams/liter
mi	m
mm	millimeter
MMbbl	million barrels
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MODU	mobile offshore drilling unit
N.	North
N <sub>2</sub> O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
nmi	nautical mile

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NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRDA	Natural Resource Damage Assessment
NTL	Notice to Lessees and Operators
O <sub>3</sub>	ozone
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OSHA	Occupational Safety and Health Administration
OSRA	Oil Spill Risk Analysis
OSRP	oil-spill response plan
OSV	offshore support vessel
Pb	lead
PBR	Potential Biological Removal
PDARP/PEIS	<i>Deepwater Horizon Oil Spill: Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement</i>
PM	particulate matter
PM <sub>2.5</sub>	particulate matter less than or equal to 2.5 mm
PM <sub>10</sub>	particulate matter less than or equal to 10 mm
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCP	Representative Concentration Pathways
ROD	Record of Decision
SC-GHG	social cost of greenhouse gases
SC	source category
SCC	social cost of carbon
SCM	social cost of methane
SCN	social cost of nitrous oxide
SCTLD	stony coral tissue loss disease
SO <sub>2</sub>	sulphur dioxide
SO <sub>x</sub>	sulphur oxides
SSRA	Significant Sediment Resource Area
Tcf	trillion cubic feet

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TPY	tons per year
Trustees	Natural Resource Damage Assessment Trustees
U.S.	United States
U.S.C.	United States Code
UME	unusual mortality event
USCG	U.S. Coast Guard (also: CG)
USDHS	U.S. Department of Homeland Security
USDOC	U.S. Department of Commerce
USDOE	U.S. Department of Energy
USDOI	U.S. Department of the Interior (also: DOI)
USDOT	U.S. Department of Transportation (also: DOT)
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UTRR	undiscovered technically recoverable resources
VGP	Vessel General Permit
VOC	volatile organic compound
VSP	vertical seismic profiling
W.	West
WEA	wind energy area
WPA	Western Planning Area
WRF	Weather and Research Forecasting
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 <sup>2</sup> (m <sup>2</sup> )	foot <sup>2</sup> (ft <sup>2</sup> )	10.76
meter <sup>2</sup> (m <sup>2</sup> )	yard <sup>2</sup> (yd <sup>2</sup> )	1.196
meter <sup>2</sup> (m <sup>2</sup> )	acre (ac)	0.0002471
meter <sup>3</sup> (m <sup>3</sup> )	foot <sup>3</sup> (ft <sup>3</sup> )	35.31
meter <sup>3</sup> (m <sup>3</sup> )	yard <sup>3</sup> (yd <sup>3</sup> )	1.308
kilometer (km)	mile (mi)	0.6214
kilometer <sup>2</sup> (km <sup>2</sup> )	mile <sup>2</sup> (mi <sup>2</sup> )	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 (nmi) = 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 OF AND NEED FOR THE PROPOSED ACTION**



# 1 THE PROPOSED ACTION

## 1.1 INTRODUCTION

This Supplemental Environmental Impact Statement (Supplemental EIS) re-analyzes a proposed Federal action, i.e., a Gulf of Mexico (GOM) Outer Continental Shelf (OCS) oil and gas lease sale previously analyzed in *Gulf of Mexico OCS Oil and Gas Lease Sales: 2017-2022; Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261—Final Multisale Environmental Impact Statement (2017-2022 GOM Multisale EIS)* (BOEM 2017b); and *Gulf of Mexico OCS Lease Sale: Final Supplemental Environmental Impact Statement 2018 (2018 GOM Supplemental EIS)* (BOEM 2017a). This document is expected to be used to inform lease sale processes for GOM oil and gas Lease Sales 259 and 261, which BOEM is required to hold by the end of March and September 2023, respectively, as directed in the Inflation Reduction Act of 2022 (IRA) (Public Law 117-169, enacted August 16, 2022). While BOEM has no discretion on whether to hold these lease sales, BOEM is preparing this Supplemental EIS to follow its normal leasing process to the fullest extent possible and inform the decisionmaker on impacts from a representative lease sale, mitigations, and other action alternatives. The remaining proposed lease sale areas are comprised of the Western, Central, and a small portion of the Eastern Planning Areas (WPA, CPA, and EPA, respectively) not subject to Presidential withdrawal. These planning areas are located off the States of Texas, Louisiana, Mississippi, Alabama, and Florida (**Figure 1-1**).

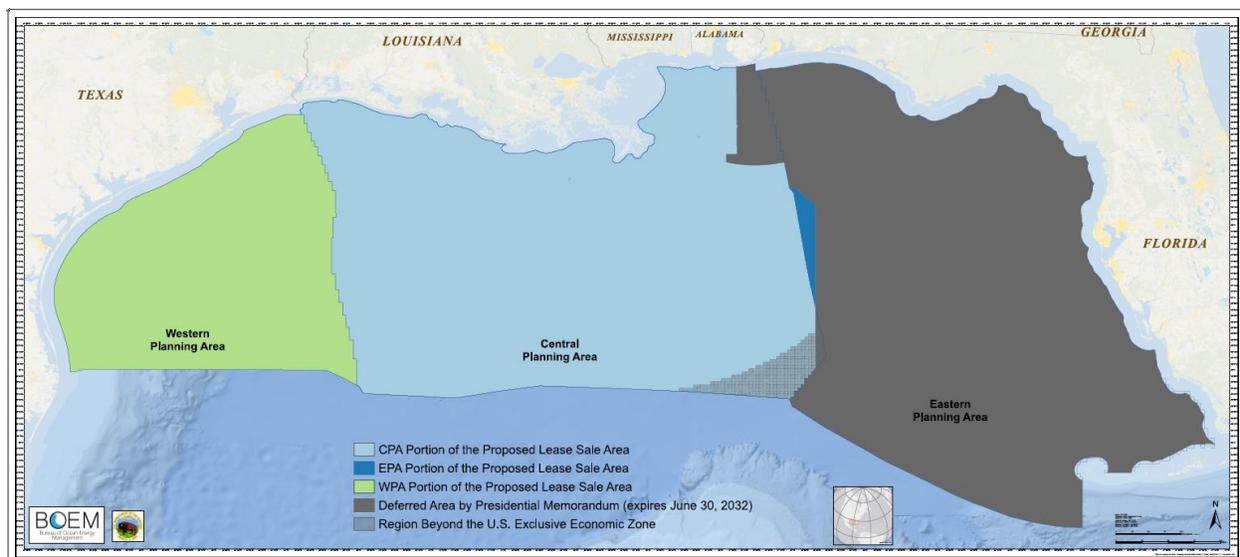


Figure 1-1. Proposed Lease Sale Area.

In addition to preparing this Supplemental EIS to supplement the prior analyses with new information to support individual lease sale decisions for Lease Sales 259 and 261, BOEM is also preparing this Supplemental EIS to align its analyses with recent court decisions. Refer to, for example, *Gulf Restoration Network v. Haaland*, 47 F.4th 795 (D.C. Cir. 2022). This analysis also includes an updated GHG emissions estimate, addressing Plaintiffs' claims pending in the *Friends of the Earth* appeal. Refer to *Friends of the Earth v. Haaland*, 583 F. Supp. 3d 113 (D.D.C. 2022), on

appeal to the D.C. Cir. Thus, this Supplemental EIS will be available to provide additional analysis regarding those challenged lease sales, as necessary.

The Bureau of Ocean Energy Management (BOEM) issued the *2017-2022 Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program* (BOEM 2016a), which proposed 10 GOM oil and gas lease sales, with 2 lease sales to be held each year in 2018-2021 and one lease sale to be held in 2017 and 2022. While the National OCS Oil and Gas Program provides a framework and general guide for leasing during the Program's term, the Secretary of the Interior has discretion under the Outer Continental Shelf Lands Act (OCSLA) and other applicable laws to determine whether and when to hold individual lease sales (refer to 43 U.S.C. § 1344(e)). Although the 2017-2022 National OCS Oil and Gas Program has expired and the final two lease sales in the GOM (i.e., GOM Lease Sales 259 and 261) were not held, the Inflation Reduction Act of 2022 requires that BOEM hold Lease Sale 259 for the Gulf of Mexico by March 31, 2023, and Lease Sale 261 for the Gulf of Mexico by September 30, 2023. In addition, the Inflation Reduction Act of 2022 requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres" (IRA, Section 50265(b)(2)). During the development of the 2017-2022 National OCS Program, BOEM conducted region-specific reviews by Program Areas (i.e., the portions of the OCS planning areas that remained in consideration for leasing during the 2017-2022 National OCS Program development process); consequently, BOEM prepared the following analyses to support individual lease sale decisions, and these will be used for this analysis:

- *Outer Continental Shelf Oil and Gas Leasing Program: 2017-2022; Final Programmatic Environmental Impact Statement* (BOEM 2016c; 2016d);
- *Gulf of Mexico OCS Oil and Gas Lease Sales: 2017-2022; Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261—Final Multisale Environmental Impact Statement* (2017-2022 GOM Multisale EIS) (BOEM 2017b); and
- *Gulf of Mexico OCS Lease Sale: Final Supplemental Environmental Impact Statement 2018* (2018 GOM Supplemental EIS) (BOEM 2017a).

This Supplemental EIS tiers from, updates, and incorporates by reference all relevant material in the 2017-2022 National OCS Program EIS, 2017-2022 GOM Multisale EIS, and 2018 GOM Supplemental EIS. This Supplemental EIS contains analyses of the potential environmental impacts that could result from GOM Lease Sale 259 in the GOM, but the analyses may be supplemented as appropriate to prior to GOM Lease Sale 261.

## The Proposed Action

The Proposed Action evaluated in this Supplemental EIS is to hold an oil and gas lease sale on the Federal OCS in the GOM. This Supplemental EIS will inform the lease sale processes for GOM Lease Sales 259 and 261, which BOEM must hold by the end of March and September 2023, respectively, as directed in the Inflation Reduction Act of 2022. It analyzes a single Proposed Action (i.e., a single lease sale in the GOM). Pursuant to the OCSLA staged leasing process, BOEM typically must make an individual decision on whether and how to proceed with each lease sale; however, as noted above, BOEM is required to hold GOM Lease Sales 259 and 261 by March and September 2023, respectively, under the Inflation Reduction Act of 2022. While BOEM does not have any discretion in holding either of these two lease sales, BOEM has prepared this Supplemental EIS to follow its normal leasing process to the fullest extent practicable and inform the decisionmaker on impacts from a representative lease sale, mitigations, and other action alternatives. BOEM's announcement of GOM Lease Sale 259 will be made following the completion of this NEPA analysis. The announcement on GOM Lease Sale 261 will be made in the normal course and may include additional NEPA review that may update this Supplemental EIS, as appropriate.

### 1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of and need for the proposed Federal action (i.e., a GOM lease sale) is to offer for lease those areas that may contain economically recoverable oil and gas resources in order to further the orderly development of OCS oil and gas resources in accordance with the OCSLA. The Outer Continental Shelf Lands Act statute specifically states that the OCS "should be made available for expeditious and orderly development, subject to environmental safeguards" (43 U.S.C. §§ 1331 *et seq.*). On August 16, 2022, President Biden signed the Inflation Reduction Act of 2022, which requires BOEM to hold GOM Lease Sale 259 by March 31, 2023, and GOM Lease Sale 261 by September 31, 2023. Each individual lease sale will provide qualified bidders the opportunity to bid upon and lease available acreage in the Gulf of Mexico OCS in order to explore, develop, and produce oil and natural gas. Oil serves as the feedstock for liquid hydrocarbon products, including gasoline, aviation and diesel fuel, and various petrochemicals.

Although the United States relies on 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 and gas production and consumption, however, contribute to climate change, which poses a significant global threat. The long-term goal of the Biden Administration is to reach net-zero greenhouse gas (GHG) emissions by 2050 and to limit global warming to less than 1.5° Celsius (2.7° Fahrenheit). The Administration also established goals of a 50 percent reduction of 2005 emissions by 2030 and a carbon pollution-free power sector by 2035 (The White House 2021). To meet these targets and to reduce reliance on and demand for oil and gas, the U.S. would have to drastically change the way it consumes and supplies energy, requiring an increase in renewable energy production, electrification, energy efficiency, and reduced consumption.

### **1.3 RELATIONSHIP BETWEEN THE INFLATION REDUCTION ACT OF 2022, OCS OIL AND GAS LEASE SALES, AND OCS RENEWABLE ENERGY LEASE SALES**

As noted earlier, the IRA was enacted on August 16, 2022. In accordance with the IRA, BOEM is required to hold GOM Lease Sale 259 by the end of March 2023 and GOM Lease Sale 261 by the end of September 2023 (Public Law No. 117-169, Sections 50264(d) and (e)). This Supplemental EIS is intended to update prior analyses and inform the decisionmaker on issues left unresolved by the IRA, i.e., the particular attributes of each lease sale required by the Act.

In addition to requiring Interior to hold these two lease sales, the IRA implements new requirements for OCS oil and gas leasing during the 10 years after the statute's enactment, including making issuance of renewable energy leases on public lands contingent on the holding of oil and gas lease sales. The IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres" (IRA, Section 50265(b)(2)).

In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Halting oil and gas leasing on the OCS would also halt OCS renewable energy leasing, which has otherwise accelerated sharply in recent years. For purposes of calculating the 1-year period contemplated by the IRA, the oil and gas lease sales aggregating to at least 60 million acres must have been *held* within the 12 months preceding *issuance* of the renewable energy lease. This has substantial economic implications for the OCS renewable energy economy, as illustrated by the recent California OCS renewable energy lease sale held in December 2022, which brought in \$757,100,000 in high bids to the Federal Government. Five OCS renewable energy leases were awarded in California, two in northern California, totaling \$331,500,000, and three in southern California totaling \$425,600,000. However, there has not been an OCS oil and gas lease sale or lease sales of sufficient acreage *held* within the past 12 months. GOM Lease Sale 257 was held more than 12 months ago on November 17, 2021, and included approximately 80 million acres, whereas Cook Inlet Sale 258 was held December 30, 2022, but included less than 1 million acres. Therefore, leases from the December 2022 California wind energy auction cannot be issued until a new OCS oil and gas lease sale of sufficient acreage is held. Either of GOM Lease Sales 259 or 261 could be configured to include the acreage necessary to allow Interior to issue the California wind energy leases from the December auction in compliance with the IRA.

Among other provisions, the IRA also includes provisions aimed at furthering progress in achieving net-zero greenhouse gas emissions. These include provisions that increase the minimum royalty rate and introduce a maximum royalty rate charged on offshore and onshore oil and gas produced from leases on Federal land for the next 10 years, include most methane waste emissions from oil and gas production in the calculation of royalties, and provide personal and business tax credits for investment in energy efficiency and renewable energy sources. For example, the IRA

includes an increase in the minimum offshore oil and gas royalty rate (from 12.5% to 16 2/3%) and setting a maximum royalty rate of 18 3/4% for the next 10 years (IRA, Section 50261). As of now, however, there is limited information about how the IRA will impact oil and gas supply and demand in the coming decades. Most published reports on the IRA's impact on energy markets focus on the electricity sector. There is one report by the Rhodium Group (Larsen et al. 2022) that quantifies the potential impacts of the IRA on the domestic oil and gas market. When comparing the IRA with laws and policies in effect prior to passage of the IRA, Larsen et al. projects a decrease in consumption of petroleum of less than 1 percent, and the supply of crude oil remains relatively flat. Additional information and analysis on the impacts of the IRA are forthcoming, with the U.S. Energy Information Agency expected to provide additional data and information in 2023.

#### **1.4 GULF OF MEXICO POST-LEASE ACTIVITIES**

BOEM and BSEE are responsible for managing, regulating, and monitoring oil and natural gas exploration, development, and production 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 parts 550, 551, 554, and 556. BSEE's regulations for oil, gas, and sulphur operations are specified in 30 CFR parts 250 and 254. Refer to Appendix A of the 2017-2022 GOM Multisale EIS for descriptions of post-lease activities. 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. Mitigating measures, or conditions of approval, are incorporated and documented in plans and permit applications submitted to BOEM. Conditions of approval are 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. Refer to Appendix B of the 2017-2022 GOM Multisale EIS ("Commonly Applied Mitigating Measures") 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 onsite 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 Gulf of Mexico OCS region's NTLs is available through BOEM's New Orleans Office's website at <http://boem.gov/Regulations/Notices-Letters-and-Information-to-Lessees-and-Operators.aspx> or through the Region's Public Information Office at 504-736-2519 or 1-800-200-GULF. A detailed listing of BSEE's Gulf of Mexico OCS Region's current NTLs is available through BSEE's website at <https://www.bsee.gov/guidance-and-regulations/guidance/notice-to-lessees>.

#### **1.5 REGULATORY FRAMEWORK**

Federal laws mandate the preparation of a national OCS oil and gas leasing program (i.e., OCSLA) and the environmental review process (e.g., OCSLA and NEPA). Implementing regulations

encourage orderly, safe, and environmentally responsible development of oil, natural gas, alternative energy sources, and other mineral resources on the OCS. BOEM consults with numerous Indian Tribes 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 Indian Tribes, and Federal, State, and local agencies, refer to Chapter 1.5 of the 2017-2022 GOM Multisale EIS. 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 Mexico OCS Regulatory Framework* technical report, which can be found on BOEM's website (BOEM 2020a).

## 1.6 OTHER PERTINENT ENVIRONMENTAL REVIEWS OR DOCUMENTATION

On August 3, 2015, the USEPA announced the Clean Power Plan, which is a step towards reducing carbon pollution from power plants. The final rule for the *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units* was published in the *Federal Register* on October 23, 2015 (80 FR 64662). On February 9, 2016, the Supreme Court stayed implementation of the Clean Power Plan pending judicial review. On June 19, 2019, the USEPA issued the Affordable Clean Energy rule to replace the Clean Power Plan. On January 19, 2021, the United States Court of Appeals for the D.C. Circuit vacated the Affordable Clean Energy rule and remanded it to the USEPA for further proceedings. On February 12, 2021, the USEPA published a memo to assist USEPA staff to answer questions from the states about the court's decision (Goffman 2021). The Clean Power Plan was vacated by the Supreme Court on June 30, 2022, in *West Virginia v. Environmental Protection Agency*, 142 S. Ct. 2587 (2022). Regardless, BOEM's analyses in the 2017-2022 National OCS Program, 2017-2022 GOM Multisale EIS, and 2018 GOM Supplemental EIS would not be affected or changed by the USEPA's actions related to the regulation of GHG emissions from power plants. The range of activity described by the scenarios in these NEPA documents represents BOEM's best estimate of the range of possible production volumes and associated activity that can reasonably be expected from the acreage leased during a single lease sale. The range provides subject-matter experts the flexibility to develop impact analyses for the full array of potential activity that can be expected from an individual lease sale regardless of changing policies. BOEM is confident that the scenario development methodology used in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS analyses adequately projects Gulf of Mexico OCS oil- and gas-related activities in both the short term and long term.

In February 2016, the GAO prepared a report called *Oil and Gas Management: Interior's Bureau of Safety and Environmental Enforcement Restructuring Has Not Addressed Long-Standing Oversight Deficiencies* (GAO 2016). This report examined the extent to which BSEE's ongoing (at the time) restructuring had enhanced its capabilities for (1) investigations, (2) environmental compliance, and (3) enforcement. The GAO reviewed laws, regulations, and policies related to BSEE's restructuring and oversight activities. The GAO had nine recommendations, including that BSEE (1) complete and update its investigative policies and procedures, (2) conduct and document a risk analysis of the regional-based reporting structure, and (3) develop procedures for enforcement actions. BSEE began addressing the recommendations in 2016 and according to GAO, as of 2021,

all recommendations related to restructuring of offshore oil and gas oversight have been closed and implemented (GAO 2022). The GAO removed the segment from its High Risk Series. After independently reviewing the GAO reports, including the updates on the GAO website closing out the recommendations on oversight and restructuring, BOEM has determined that the GAO report and the recommendations that have now been implemented by BSEE do not change the reasonably foreseeable environmental impacts that may result from an oil and gas lease sale and that were evaluated in the 2017-2022 GOM Multisale EIS or 2018 GOM Supplemental EIS. In those analyses, BOEM continued to acknowledge that, while industry practices and government regulations and oversight minimize the risk of oil spills and other accidental events, there is no way to guarantee that accidental events will not occur, as evidenced by historical data. Balancing the presumption in NEPA reviews that agencies are entitled to rely on a presumption of regularity in compliance and enforcement while also acknowledging accidental events are unauthorized, BOEM has examined the potential for reasonably foreseeable accidental events separately (refer to **Chapter 3.3**) due to their potential to occur and lead to significant and severe environmental impacts. The potential impact of accidental events is considered for each resource in **Chapter 4**. As noted above, BOEM has also considered a catastrophic spill analysis technical report (BOEM 2021d), which is incorporated by reference.

On August 4, 2017, a Notice of Availability was published in the *Federal Register* for BOEM's *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 2017c). A Record of Decision (ROD) was subsequently published on December 4, 2020 (BOEM 2020c). The ROD does not authorize any geological and geophysical (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 Programmatic EIS and which can be found online at <https://www.boem.gov/gulf-mexico-geological-and-geophysical-gg>. As new scientific information becomes available, these additional findings can be incorporated into the survey-specific environmental reviews through an adaptive management approach.

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), and on May 2, 2019, BSEE published revisions for the 2019 Well Control and Blowout Preventer Rule, which became effective on July 15, 2019 (84 FR 21908). BOEM has independently reviewed BSEE's Final Environmental Assessment and Finding of No Significant Impact (FONSI) for the 2019 Well Control and Blowout Preventer Proposed Rule and the Final Environmental Assessment and FONSI for the 2018 Oil and Gas Production Safety Systems Rule (BSEE 2018c; 2018d; 2019b; 2019c). The analyses in those environmental assessments and FONSI are incorporated by reference herein. For purposes of this supplemental analysis, BOEM agrees with BSEE's conclusions that the rule changes do not change or increase environmental risks from what they were under the 2016 rules. BOEM concludes that the final changes to the rules do not change the conclusions of the 2017-2022 GOM Multisale EIS or 2018 GOM Supplemental EIS. BOEM agrees with the conclusions because the changes to the rules carefully removed unnecessary burdens while leaving critical safety provisions

intact, did not change the overall risks related to oil and gas activities on the OCS, and did not change the potential impacts that may result from OCS oil and gas activities in the Gulf of Mexico, as evaluated in the 2017-2022 GOM Multisale EIS, 2018 GOM Supplemental EIS, and BOEM's *Gulf of Mexico OCS Catastrophic Spill Event Analysis* technical report (BOEM 2021d) and incorporates by reference in those EISs.

On May 14, 2020, BOEM announced final revisions on the Air Quality Control, Reporting, and Compliance Rule. As discussed in BOEM (2020a), the final rule ensures that BOEM's air quality regulations remain in compliance with the OCSLA requirements. Specifically, 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 would not result in any different or additional environmental impacts. The new rule does not affect the Bureau of Ocean Energy Management's NEPA analyses and conclusions found in the 2018 GOM Supplemental EIS.

On February 1, 2021, BOEM published an update to the *Gulf of Mexico OCS Catastrophic Spill Event Analysis* technical report (BOEM 2021d). In 2017, BOEM prepared the *Catastrophic Spill Event Analysis* technical report as a standalone report in support of the 2017-2022 GOM Multisale EIS and subsequent 2018 GOM Supplemental EIS. In 1986, the Council on Environmental Quality (CEQ) regulations were amended to rescind the requirement to prepare a "worst-case analysis" for an EIS (refer to 40 CFR § 1502.22(b)(4)). The regulation, as amended, states that catastrophic, low-probability impacts must be analyzed if the analysis is "supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." The August 16, 2010, CEQ report prepared following the *Deepwater Horizon* explosion, oil spill, and response in the GOM, recommended that the Bureau of Ocean Energy Management, formerly the Minerals Management Service and Bureau of Ocean Energy Management, Regulation and Enforcement, should "Ensure that NEPA [National Environmental Policy Act] documents provide decisionmakers with a robust analysis of reasonably foreseeable impacts, including an analysis of reasonably foreseeable impacts associated with low-probability catastrophic spills for oil and gas activities on the Outer Continental Shelf" (CEQ 2010). This 2021 updated evaluation is a robust analysis of the impacts from low-probability catastrophic spills and is made available to all applicable decisionmakers including, but not limited to, the Secretary of the U.S. Department of the Interior, the Assistant Secretary of Land and Minerals Management for an oil and gas lease sale, and the New Orleans Office's Regional Supervisors of the Office of Environment and Office of Leasing and Plans. 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 Gulf of Mexico, which is not reasonably foreseeable nor a part of the Proposed Action, but has been evaluated nonetheless and is incorporated by reference herein.

## 1.7 FORMAT AND ORGANIZATION OF THIS SUPPLEMENTAL EIS

The remaining chapters in this Supplemental EIS are described below.

- **Chapter 2** describes the Proposed Action, including the potential lease sale options and the alternatives, being analyzed in this Supplemental EIS; discusses 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 GOM lease sale and the cumulative activities that provide a framework for detailed analyses of the potential impacts analyzed in **Chapter 4**.
- **Chapter 4** summarizes the affected environment and the potential impacts of a GOM lease sale and each alternative by resource, focusing on any new information that may affect previous conclusions for each resource since publication of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.
- **Chapter 5** describes the consultation and coordination efforts used in preparing this Supplemental EIS.
- **Chapter 6** includes all of the citations referred to throughout this Supplemental EIS.
- **Chapter 7** is a list of the preparers of this Supplemental EIS.
- **Chapter 8** is a glossary of terms.
- **Appendix A** includes the proposed lease mitigating measures (stipulations).
- **Appendix B** includes the consultation coordination letters.
- **Appendix C** includes comments on the Draft Supplemental EIS and BOEM's responses.



## **CHAPTER 2**

### **ALTERNATIVES INCLUDING THE PROPOSED ACTION**



## **2 ALTERNATIVES INCLUDING THE PROPOSED ACTION**

### **2.1 INTRODUCTION**

One presiding principle of NEPA is that alternatives analyzed can accomplish the purpose of and need for the Proposed Action, with the exception of the required No Action Alternative. This chapter presents a reasonable range of alternatives to the Proposed Action and also summarizes the alternatives that were considered but eliminated from further analysis. Specifically, four action alternatives (Alternatives A-D) and a No Action Alternative (Alternative E) are described in this chapter, which are similar to the alternatives considered in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. 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 stage. Finally, this chapter presents the issues and resources to be analyzed and summarizes the potential impacts by alternative. This comparison will sharply define the issues and provide the decisionmaker and the public a clear analysis of the options.

### **2.2 SUPPLEMENTAL EIS NEPA ANALYSIS**

This Supplemental EIS is intended to focus on any relevant significant new information, methodologies, and/or issues since publication of the previous lease sale NEPA documents from which it tiers. Since GOM Lease Sales 259 and 261 and their projected activities are very similar to all other GOM lease sales proposed under the 2017-2022 National OCS Program, the impacts from a single GOM lease sale (i.e., GOM Lease Sale 259) reanalyzed in this Supplemental EIS may be applied to GOM Lease Sale 261, as authorized under 40 CFR § 1502.4, which allows related or similar proposals to be analyzed in one EIS. This Supplemental EIS tiers from, updates, summarizes, and incorporates by reference the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. This Supplemental EIS also includes an expanded GHG analysis and, in accordance with recent Executive Orders, BOEM also provides an analysis of monetized impacts from these estimated GHG emissions. **Chapter 4.1** provides an overview of the methodology and results of BOEM's greenhouse gas analysis, which is described more fully in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c), which is incorporated by reference in this Supplemental EIS.

### **2.3 ALTERNATIVES, MITIGATING MEASURES, AND ISSUES**

In this Supplemental EIS, BOEM will analyze five alternatives for the Proposed Action, i.e., four action alternatives and a No Action Alternative. Through the scoping efforts for the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, numerous issues and topics were identified for consideration. During the scoping period for the 2017-2022 GOM Multisale EIS, a number of alternatives or deferral options were suggested by commenters and examined for inclusion in Chapter 2.2.2 of the 2017-2022 GOM Multisale EIS. Scoping for the 2018 GOM Supplemental EIS provided additional alternative and deferral options described in Chapter 2.2.2 of the 2018 GOM Supplemental EIS, which were reexamined during the preparation of this Supplemental EIS. The suggestions for the 2017-2022 GOM Multisale EIS and the 2018 GOM Supplemental EIS included additional deferrals, policy changes, and suggestions beyond the scope of this Supplemental EIS. BOEM has not identified any new significant information that changes its conclusions in the 2017-2022

GOM Multisale EIS and 2018 GOM Supplemental EIS or that indicates that those previously excluded proposed alternatives or deferral options are appropriate for further in-depth analysis. The justifications for not carrying those suggestions through detailed analyses in this Supplemental EIS are the same as those used in the 2012-2017 GOM Multisale EIS and 2018 GOM Supplemental EIS, and are incorporated here by reference.

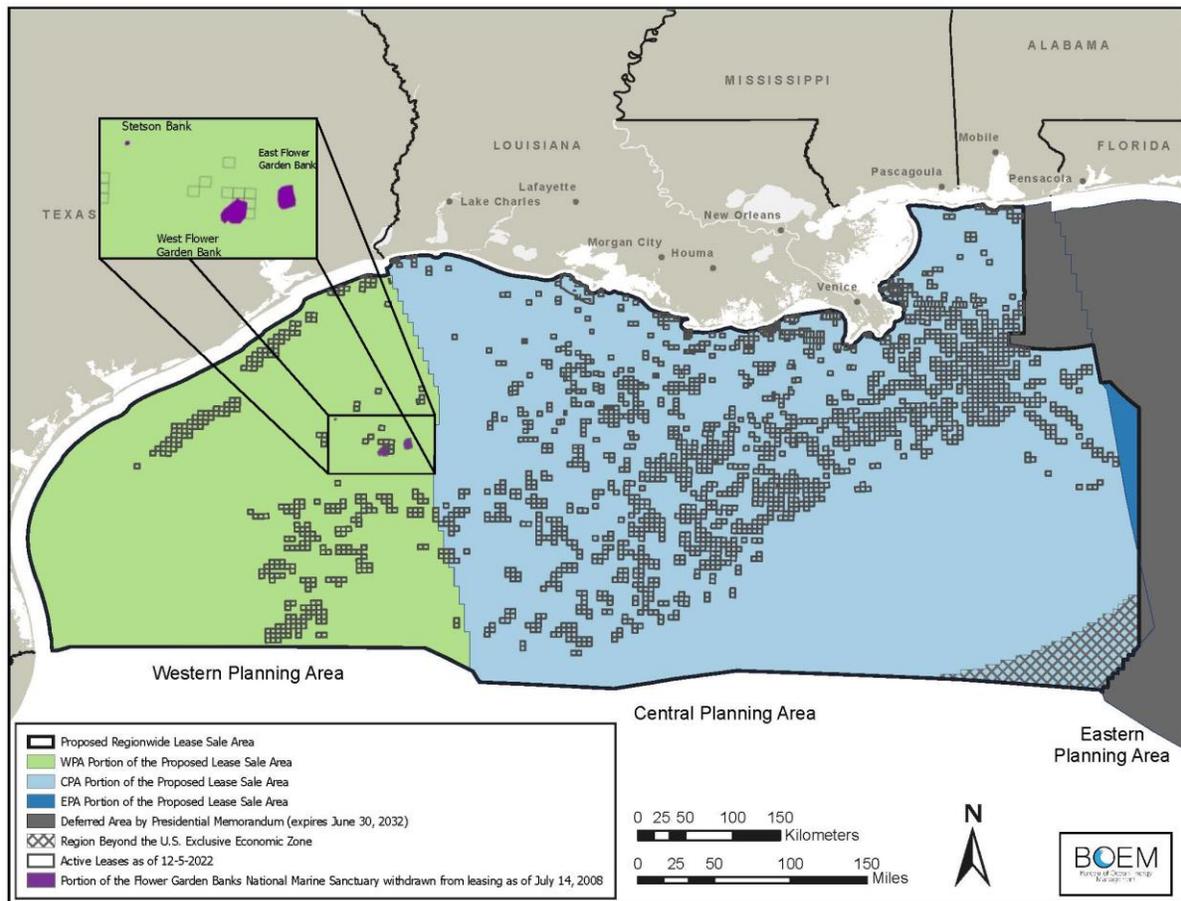
### **2.3.1 Alternatives Considered**

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 lease sale area, with the exceptions as outlined for each alternative below, are being considered for each representative lease sale. The mitigating measures (pre- and post-lease), including the proposed stipulations, are fully described in **Chapter 2 and Appendix A** of this Supplemental EIS. Alternatives A-E have been previously analyzed in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, and their conclusions have been verified in this Supplemental EIS.

#### **2.3.1.1 Alternative A – Gulf of Mexico OCS Lease Sale**

Alternative A would allow for a GOM lease sale encompassing all three planning areas within the U.S. portion of the Gulf of Mexico OCS. This alternative would allow for a GOM lease sale encompassing the three GOM planning areas of the WPA, CPA, and EPA not currently under Presidential withdrawal. Under Section 12(a) of the OCS Lands Act, 43 U.S.C. § 1341(a), the President may “withdraw from disposition any of the unleased lands of the Outer Continental Shelf.” On September 8, 2020, the areas of the OCS designated by Section 104(a) of the Gulf of Mexico Energy Security Act of 2006, Public Law 109-432, were withdrawn from disposition by leasing for 10 years, beginning on July 1, 2022, and ending on June 30, 2032 (The White House 2020). BOEM is analyzing this approach to provide greater flexibility, including more frequent opportunity to bid on rejected, relinquished, or expired OCS lease blocks in all three GOM planning areas. More frequent lease sales in the planning areas (through biannual GOM leasing) may also expedite and increase the present value of leasing and tax revenues. For a lease sale, all available unleased blocks within the WPA, CPA, and EPA portions of the proposed lease sale area for oil and gas operations (**Figure 2-1**) would be available for lease, with the following exceptions:

- (1) whole and portions of blocks currently under Presidential withdrawal (The White House 2020);
- (2) 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; and
- (3) 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.



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Figure 2-1. Proposed Lease Sale Area for Alternative A, Encompassing the Available Unleased Blocks within All Three Planning Areas (a total of approximately 91.90 million acres with approximately 80.51 million acres available for lease as of December 2022).

Under Alternative A, a GOM lease sale, would include all three BOEM planning areas not under Presidential withdrawal, encompassing a total of approximately 91.90 million acres with approximately 80.51 million acres available for lease as of December 2022. Leasing information related to all three planning areas is updated monthly and can be found on BOEM's website at <http://www.boem.gov/Gulf-of-Mexico-Region-Lease-Map/>.

In general, a GOM lease sale under Alternative A would represent an incremental contribution of 1.2-4.2 percent of the total Cumulative OCS Oil and Gas Program production scenario in the GOM based on barrels of oil equivalent resource estimates (**Table 3-2**). The estimated amounts of resources projected to be leased, discovered, developed, and produced as a result of a typical GOM lease sale under Alternative A are 0.211-1.118 billion barrels of oil (BBO) and 0.547-4.424 trillion cubic feet (Tcf) of gas (refer to **Table 3-3**).

### 2.3.1.2 Alternative B – Gulf of Mexico OCS Lease Sale Excluding Available Unleased Blocks in the WPA Portion of the Proposed Lease Sale Area

Alternative B would allow for a lease sale encompassing the CPA and a portion of the EPA not currently under Presidential withdrawal within the U.S. portion of the Gulf of Mexico OCS (**Figure 2-2**). Available blocks within the WPA would **not** be considered under this alternative. This alternative would offer for lease all available unleased blocks within the CPA and EPA portions of the proposed lease sale area for oil and gas operations, with the following exceptions:

- (1) whole and portions of blocks currently under Presidential withdrawal; and
- (2) 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.

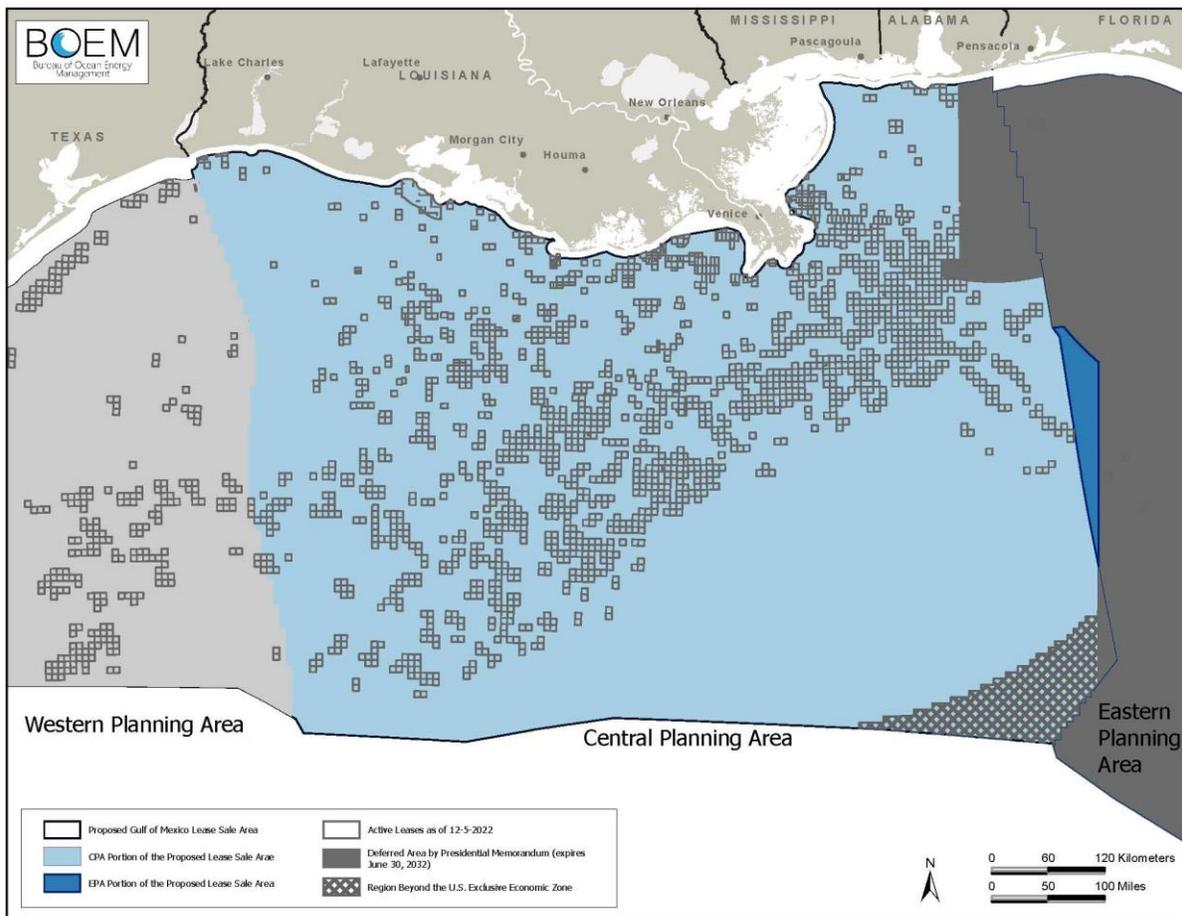


Figure 2-2. Proposed Lease Sale Area for Alternative B, Excluding the Available Unleased Blocks in the WPA (a total of approximately 63.36 million acres with approximately 53.76 million acres available for lease as of December 2022).

In general, a lease sale that would include all available unleased blocks in the CPA and a portion of the EPA not under Presidential withdrawal would represent an incremental contribution of

1.0-3.6 percent of the total Cumulative OCS Oil and Gas Program production scenario in the GOM based on barrels of oil equivalent resource estimates (**Table 3-2**). The estimated amounts of resources projected to be leased, discovered, developed, and produced because of a lease sale under Alternative B are 0.185-0.970 BBO and 0.441-3.672 Tcf of gas (**Table 3-3**).

### **2.3.1.3 Alternative C – Gulf of Mexico OCS Lease Sale Excluding Available Unleased Blocks in the CPA/EPA Portions of the Proposed Lease Sale Area**

Alternative C would allow for a lease sale encompassing the WPA within the U.S. portion of the Gulf of Mexico OCS (**Figure 2-3**). Available blocks within the CPA and EPA would *not* be considered under this alternative. This alternative would offer for lease all available unleased blocks within the WPA portion of the proposed lease sale area for oil and gas operations, with the following exception:

- (1) 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.

The proposed Alternative C lease sale area encompasses virtually all the WPA's approximately 28.54 million acres as that planning area is described as a subset of Alternative A. In general, a lease sale that would include all available unleased blocks in the WPA would represent an incremental contribution of 0.2-0.6 percent of the total Cumulative OCS Oil and Gas Program production scenario in the GOM based on barrels of oil equivalent resource estimates (**Table 3-2**). The estimated amounts of resources projected to be leased, discovered, developed, and produced because of a lease sale offering only WPA available blocks are 0.026-0.148 BBO and 0.106-0.752 Tcf of gas (**Table 3-3**).

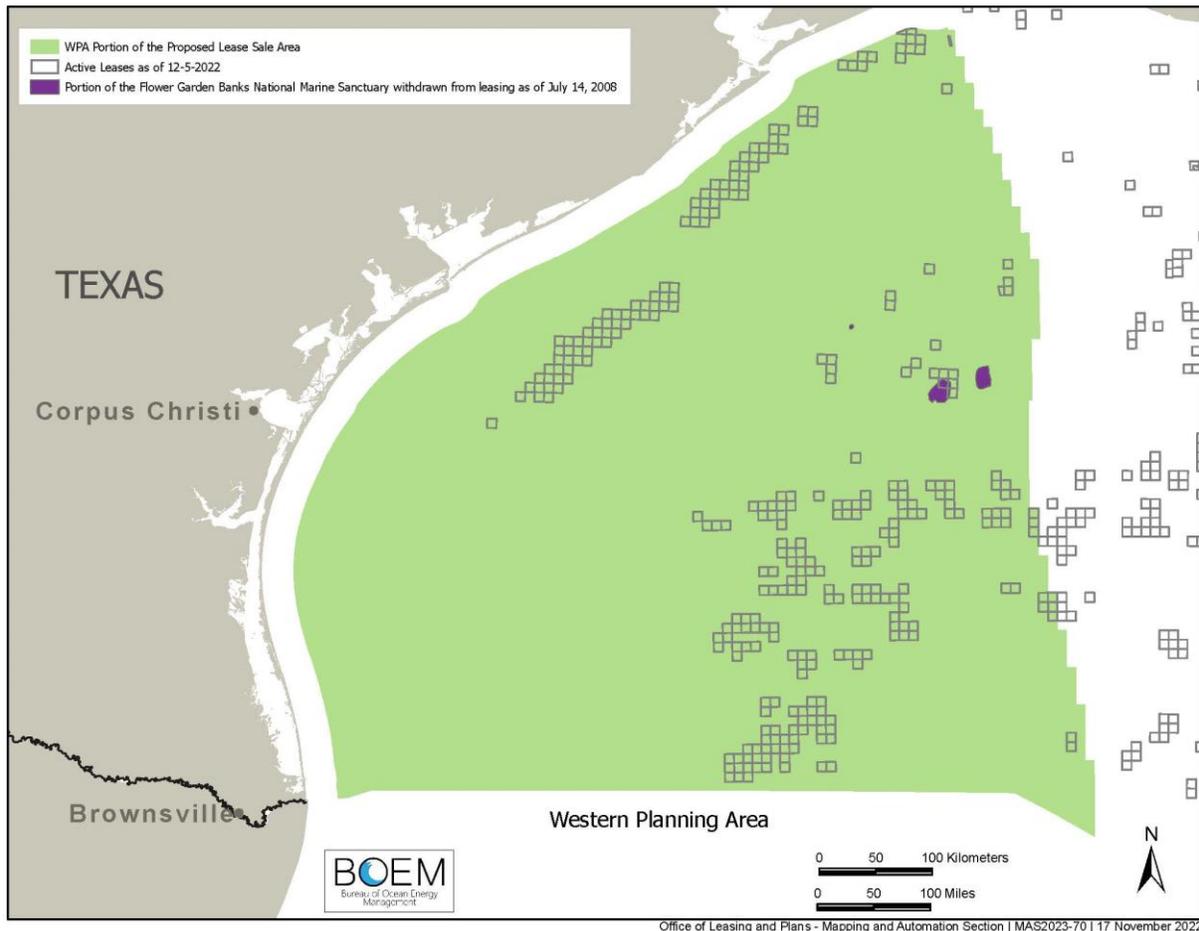


Figure 2-3. Proposed Lease Sale Area for Alternative C, Excluding the Available Unleased Blocks in the CPA and EPA (a total of approximately 28.54 million acres with approximately 26.74 million acres available for lease as of December 2022).

#### 2.3.1.4 Alternative D – Alternative A, B, or C, with the Option to Exclude Available Unleased Blocks Subject to the Topographic Features, Live Bottom (Pinnacle Trend), and/or Blocks South of Baldwin County, Alabama, Stipulations (The Preferred Alternative)

Alternative D could be combined with any of the action alternatives above (i.e., Alternative A, B, or C) and would allow the flexibility to offer leases under any alternative with additional exclusions. Under Alternative D, the decisionmaker could exclude from leasing any available unleased whole or partial blocks that would otherwise have been subject to any one and/or a combination of the following stipulations:

- Topographic Features Stipulation;
- Live Bottom (Pinnacle Trend) Stipulation; and
- Blocks South of Baldwin County, Alabama, Stipulation (not applicable to Alternative C).

This alternative considered blocks subject to these stipulations because these areas have been emphasized in scoping for previous NEPA documents, can be geographically defined, and adequate information exists regarding their ecological importance and sensitivity to OCS oil- and gas-related activities. Figure 2-5 of the 2017-2022 GOM Multisale EIS illustrates one example of the blocks that could be excluded under this alternative (shaded in blue).

A total of 207 blocks within the CPA and 160 blocks in the WPA would be affected by the Topographic Features Stipulation (**Figure 2-4**). There are currently no identified topographic features protected under this stipulation in the EPA. The Live Bottom (Pinnacle Trend) Stipulation covers the pinnacle trend area of the CPA, affecting a total of 74 blocks (**Figure 2-4**). More details on the blocks affected by the Topographic Features Stipulation and the Live Bottoms (Pinnacle Trend) Stipulation can be found at <http://www.boem.gov/Biologically-Sensitive-Areas-List/>. Maps indicating the areas affected by the Topographic Features Stipulation can be found at <http://www.boem.gov/Topographic-Features-Stipulation-Map-Package/>.

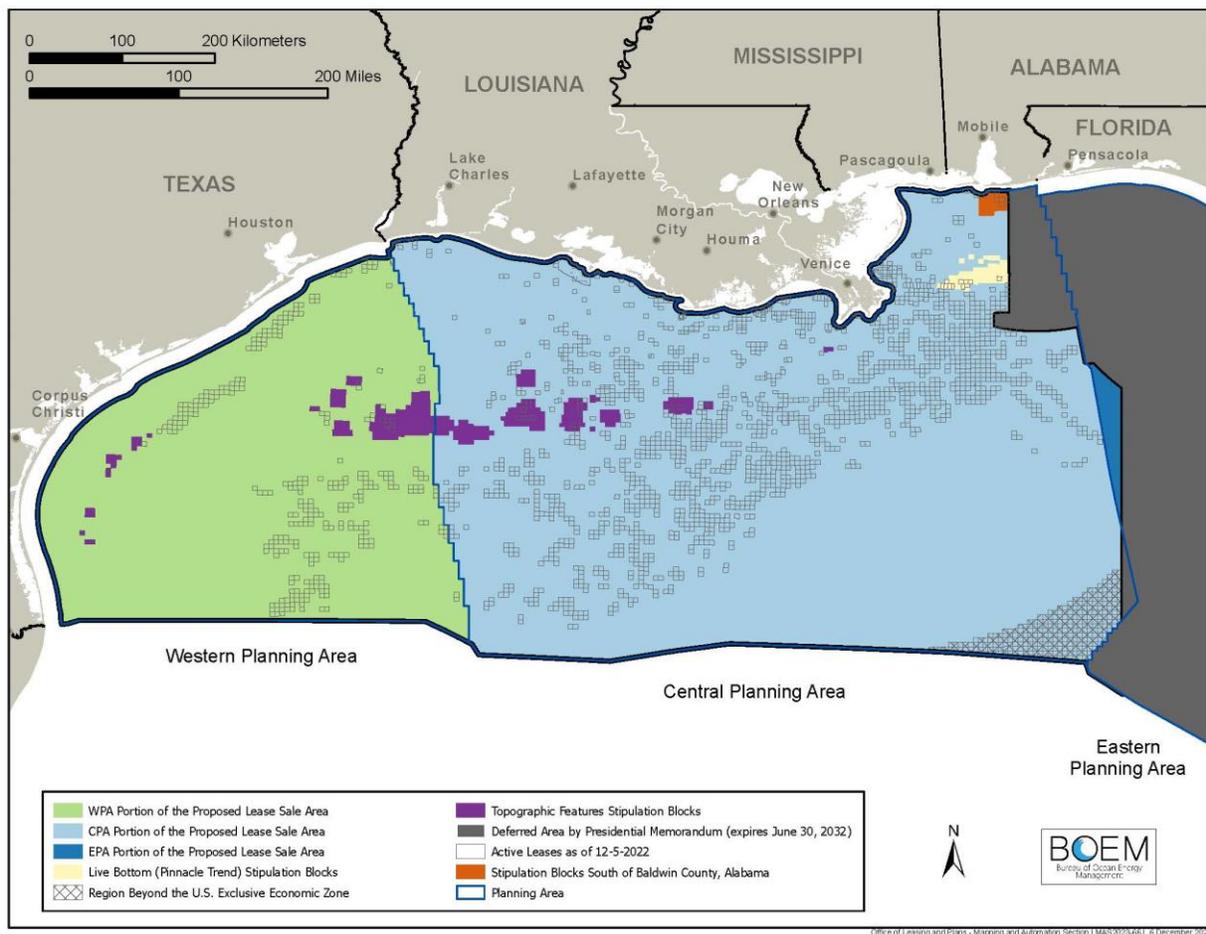


Figure 2-4. Identified Topographic Features, Pinnacle Trend, and Blocks South of Baldwin County, Alabama, Stipulation Blocks in the Gulf of Mexico (a total of approximately 91.90 million acres with approximately 78.54 million acres available for lease as of December 2022).

As of the publication of this Supplemental EIS, the Blocks South of Baldwin County, Alabama, Stipulation (herein referred to as the Baldwin County Stipulation Blocks) would apply to a total of 32 blocks (Mobile Blocks 826-830, 869-874, 913-918, 957-962, 1001-1006; and Viosca Knoll Blocks 33-35) within 15 miles (mi) (24 kilometer [km]) of Baldwin County, Alabama (representing less than 1% of the total number of blocks to be offered under Alternative A or B). The Blocks South of Baldwin County, Alabama, Stipulation was first created in response to a proposal raised by a prior Governor of Alabama on previous EISs and which would exclude the above-listed blocks from OCS oil and gas leasing to mitigate visual impacts of concern. Rather than remove the OCS blocks from leasing, the Blocks South of Baldwin County, Alabama, Stipulation requires subsea development technology, shared surface production structures, distancing, and camouflage of structures within 15 mi (24 km) of Baldwin County, Alabama. The stipulation has been continually adopted in annual CPA lease sales since 1999 and has effectively mitigated visual impact. The stipulation specifies requirements for consultation that lessees must follow when developing plans for fixed structures (refer to **Appendix A** of this Supplemental EIS) while still allowing leasing and OCS oil- and gas-related operations in the area, which could not occur with the complete removal of these OCS blocks from leasing. If any of the other action alternatives are selected, BOEM expects this stipulation to be included in the Final Notice of Sale; therefore, visual impacts would be reduced to the greatest extent practicable should the stipulation be applied.

The Preferred Alternative is Alternative D. The form of Alternative D that is the Preferred Alternative consists of the conditions described for Alternative A with the additional exclusions described here for Alternative D (i.e., the Topographic Features Stipulation Blocks, the Live Bottom (Pinnacle Trend) Stipulation Blocks, and the Blocks South of Baldwin County, Alabama, Stipulation Blocks excluded from leasing). If adopted, Alternative D would prevent any OCS oil and gas post-lease-related activity whatsoever in the affected blocks as a result of a lease sale; thus, it would eliminate any potential direct impacts to the biota within and visual resources surrounding those blocks from OCS oil- and gas-related activities, which otherwise could be conducted within the blocks. A potential benefit of this alternative over Alternative A is that Alternative D would avoid sensitive benthic and visual resources rather than applying mitigation to protect the resources. Under Alternative D, the number of blocks that would become unavailable for lease represents only a small percentage of the total number of blocks to be offered under Alternative A, B, or C (<4%, even if blocks subject to all three stipulations were excluded). Therefore, Alternative D could reduce offshore infrastructure and activities, or it may just delay activity or shift the location of offshore infrastructure and activities farther from these sensitive zones. The regional impact levels for all resources, except for the topographic features and live bottoms, would be similar to those described under Alternative A, B, or C. All of the assumptions (including the proposed stipulations and other potential mitigating measures designed to reduce environmental risk) and estimates would remain the same as described for Alternatives A, B, or C. The exclusion of this small subset of available unleased blocks could reduce exploration, development, and production flexibility and, therefore, could result in adverse economic effects (e.g., reduced royalties). A detailed discussion of the development and exploration scenarios and related impact-producing factors is included in **Chapter 3**.

### 2.3.1.5 Alternative E – No Action

Alternative E is the cancellation of a single GOM lease sale, which would require Congressional action. Although the Inflation Reduction Act of 2022 requires that both Lease Sales 259 and 261 be held, this alternative is being included for comparative purposes and because NEPA's implementing regulations provide that an EIS must include the analysis of a No Action Alternative (40 CFR § 1502.14). The opportunity for development of the estimated oil and gas that could have resulted from the Proposed Action alternatives, as described above, would be precluded or postponed to a future lease sale. Any potential environmental impacts resulting from a lease sale would not occur. Activities related to previously issued leases and permits (as well as those that may be issued in the future under a separate lease sale decision) related to the OCS Oil and Gas Program would continue. If a single lease sale were to be cancelled, the resulting development of oil and gas would most likely be postponed; therefore, the overall level of OCS oil- and gas-related activity would only be reduced by a small percentage, if any. Therefore, the cancellation of a single lease sale would not significantly change the environmental impacts of overall OCS oil- and gas-related activity over the short or long term. In the short term, activities from existing leases would continue; only after not holding several lease sales would there likely be any noticeable drop in exploration and development activities as older leases reach the end of their production and new leases are not issued to replace those activities. However, the cancellation of a single lease sale may result in direct economic impacts to the individual companies, and revenues collected by the Federal Government (and thus revenue disbursements to the States) could also be adversely affected. If future lease sales were to occur, the impacts from the cancellation of a single lease sale to individual companies and Federal revenues would likely be minor.

BOEM has received comments in the past to consider a No Action Alternative that includes no lease sales at all. The *Outer Continental Shelf Oil and Gas Leasing Program: 2017-2022; Final Programmatic Environmental Impact Statement* (BOEM 2016c; 2016d) discusses the impacts of no future OCS oil and gas leasing in detail, and that analysis is hereby incorporated by reference. Given the Gulf of Mexico's OCS oil and gas leasing history and the recent enactment of the Inflation Reduction Act of 2022, it seems unlikely that no future leasing is reasonably foreseeable in the short term (at least the next 10 years). Over the next 10 years, under the Inflation Reduction Act of 2022, the IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres." In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. In the short term BOEM anticipates continued leasing because of the passage of the Inflation Reduction Act of 2022 and its stipulation that oil and gas lease sales be offered prior to renewable energy leases being issued. In addition, BOEM is currently preparing the *Outer Continental Shelf Oil and Gas Leasing Program: 2023-2028, Final Programmatic Environmental Impact Statement*, which includes a No Action Alternative that analyzes the impacts of not scheduling new leasing for all GOM lease

sales in the Program. The Draft EIS has gone through public review, and a decision will likely be made in 2023.

## **2.3.2 Other Alternatives and Deferrals Considered But Not Analyzed in Detail**

### **2.3.2.1 Areas Excluded from Leasing Based on Sensitive Biological Habitat and Reduced Leasing Activity**

BOEM considered a reduced lease sale area alternative for GOM Lease Sales 259 and 261 that would have allowed for a lease sale encompassing portions of the CPA and WPA within the U.S. portion of the Gulf of Mexico OCS. Available blocks within the EPA would **not** be considered under this alternative. This alternative would have offered for lease all available unleased blocks within the WPA and CPA portions of the reduced lease sale area for oil and gas operations, with the following exceptions:

- (1) whole and portions of blocks not currently under Presidential withdrawal (The White House 2020);
- (2) 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;
- (3) 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;
- (4) whole and partial blocks that are proposed to be subject to the Topographic Features Stipulation (and whose exclusion was analyzed in Alternative D);
- (5) whole and partial blocks that are proposed to be subject to the Live Bottom (Pinnacle Trend) Stipulation (and whose exclusion was analyzed in Alternative D);
- (6) whole and partial blocks in coastal OCS waters shoreward of the 20-meter (m) (66-foot [ft]) isobath; and
- (7) whole and partial blocks that have not, in the last 5 years, had extensive bidding activity, actively pursued geologic plays, areas of recent seismic acquisition and processing, or exploration and development activity.

This alternative considered removing whole or partial blocks subject to the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations because these areas have been emphasized in scoping for previous NEPA analyses, can be geographically defined, and adequate information exists regarding their ecological importance and sensitivity to OCS oil- and gas-related activities. This alternative also considered removing whole or partial blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath. The restriction is intended to avoid additional stressors to coastal stocks of bottlenose dolphin (*Tursiops truncatus*). In addition, this alternative considers removing whole and partial blocks that have not, in the last 5 years, had extensive bidding activity, actively pursued geologic plays, areas of recent seismic acquisition and processing, or exploration and development activity, in

order to make available for lease areas of recent and concentrated industry activity while encouraging lease sale bidding competition in a smaller footprint, as well as reducing the impact to the environment by focusing leasing activity in areas of concentrated industry activity in the last 5 years near existing infrastructure within that footprint.

This alternative was developed to analyze a potential reduction in impacts to the environment by (1) avoiding areas that are otherwise proposed for protection from bottom disturbance from OCS oil- and gas-related activity by BOEM through lease stipulations (for analysis on excluding these blocks, refer to Alternative D), (2) avoiding coastal OCS waters shoreward of the 20-m (66-ft) isobath, and (3) focusing leasing on areas of concentrated industry activity in the last 5 years that have existing infrastructure.<sup>1</sup> This alternative was eliminated from further consideration because it does not include additional environmental benefits over Alternative D, in that it has the same three stipulation blocks eliminated from leasing (the Topographic Features Stipulation blocks, the Live Bottom [Pinnacle Trend] Stipulation blocks, and the Blocks South of Baldwin County, Alabama, Stipulation blocks). Because the same level of activities (given industry activity in the area) are expected and the same areas are eliminated from leasing under both alternatives, the same environmental effects would be expected to occur (or be avoided) under both alternatives. Although this alternative considered the additional removal of blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath, impacts to marine mammals would be the same for this alternative as it would be for Alternative D because, given leasing interest in deeper waters, the activity levels would be similar and most marine mammal species tend to be widely and randomly distributed throughout the planning areas and may travel great distances across the entire GOM. As such, activities isolated to specific planning areas pose similar potential impacts to individuals as do activities occurring in all planning areas. Therefore, a similar mix of species would be exposed to the analyzed impact-producing factors regardless of the specific action alternative selected. In addition, because this alternative had no additional environmental benefits over Alternative D and because it did not meet the IRA's 60 million acre requirement for an offshore oil and gas lease sale necessary to issue an offshore wind lease within the following year, it was eliminated from further analysis.

### **2.3.2.2 Eliminated Alternatives and Deferrals Detailed in Previous NEPA Documents**

Chapter 2.2.3 of the 2017-2022 GOM Multisale EIS and Chapter 2.2.2 of the 2018 GOM Supplemental EIS includes detailed descriptions of alternatives previously considered, but not analyzed in detail in this Supplemental EIS, including the following:

- previous multisale approach, which consisted of a total of 12 proposed lease sales, including 5 annual proposed lease sales in the WPA, 5 annual proposed lease sales in the CPA, and 2 proposed lease sales in the EPA;

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<sup>1</sup> As a result of the removal of whole and partial blocks in coastal OCS waters shoreward of the 20-m (66-ft) isobath, whole and partial blocks south of Baldwin County, Alabama, subject to the Blocks South of Baldwin County, Alabama, Stipulation, as analyzed in Alternative D, as well as Significant Sand Resource Blocks in the WPA and CPA, are also removed from leasing.

- exclude blocks subject to Flower Garden Banks National Marine Sanctuary expansion;
- additional buffer zones around potential areas of concern (e.g., the blocks subject to Congressional moratorium pursuant to the Gulf of Mexico Energy Security Act of 2006 [which is not under Presidential withdrawal] and the Gulf Islands National Seashore);
- proposed lease sale offering only available unleased blocks in the EPA;
- proposed lease sale with additional mitigating measures for sperm whale high-use areas;
- Gulf of Mexico OCS proposed lease sale excluding blocks within the De Soto Canyon area;
- Gulf of Mexico OCS proposed lease sale excluding blocks within loggerhead sea turtle critical habitat;
- delay leasing until the state of the Gulf of Mexico's environmental baseline since the *Deepwater Horizon* explosion, oil spill, and response is better understood; and
- use renewable energy in place of oil and gas.

The justifications for not engaging in detailed analysis of these alternatives and deferrals are provided in the 2017-2022 GOM Multisale EIS, and BOEM has identified no new information that changes these conclusions.

### **2.3.3 Mitigating Measures**

Agencies are required to identify and include in an EIS those appropriate mitigating measures not already included in the Proposed Action or alternatives. 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 at the post-lease stage by applying site-specific mitigating measures to plans, permits, and/or authorizations (refer to Appendix A of the 2017-2022 GOM Multisale EIS).

#### **2.3.3.1 Proposed Lease Mitigating Measures (Stipulations)**

The potential lease stipulations and mitigating measures included for analysis in this Supplemental EIS were developed as a result of numerous scoping efforts for the continuing OCS Oil and Gas Program in the Gulf of Mexico (**Appendix A**). The 11 lease stipulations being considered are as follows:

- Topographic Features Stipulation;
- Live Bottom (Pinnacle Trend) Stipulation;

- Military Areas Stipulation;
- Evacuation Stipulation;
- Coordination Stipulation;
- Blocks South of Baldwin County, Alabama, Stipulation;
- Protected Species Stipulation;
- United Nations Convention on the Law of the Sea Royalty Payment Stipulation;
- Restrictions due to Rights-of-Use and Easements (RUE) for Floating Production Facilities 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 (Transboundary Stipulation); and
- Royalties on All Produced Gas.

These mitigating measures will be considered for adoption by the decisionmaker, as applicable, under authority delegated by the Secretary of the Interior. The Topographic Features and Live Bottom (Pinnacle Trend) Stipulations were applied as programmatic mitigation in the 2017-2022 National OCS Oil and Gas Program EIS (BOEM 2016c; 2016d) and Record of Decision (BOEM 2017d); therefore, they would apply to all leases issued under the 2017-2022 National OCS Oil and Gas Program should Alternative A, B, or C be chosen. The Topographic Features and Live Bottom (Pinnacle Trend) Stipulations would not apply under Alternative E, as that is the cancellation of a lease sale, or Alternative D, because those stipulation blocks would be removed from leasing under Alternative D. The analysis of the other nine stipulations for any particular alternative does not ensure application of the stipulations to leases that may result from any 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. Any stipulations or mitigation requirements to be included in a lease sale will be described in the Record of Decision and Final Notice of Sale for that lease sale. BSEE has the authority to monitor and enforce these conditions under 30 CFR part 250 subpart N and may seek remedies and penalties from any operator that fails to comply with those conditions, stipulations, and mitigating measures.

### **2.3.3.2 Prelease Mitigating Measures (Stipulations) by Alternative**

**Table 2-1** indicates what stipulations could be applied for each alternative. Alternative D would consider the same stipulations as Alternative A, B, or C, as applicable, with the exception of removing the Topographic Features and Live Bottoms (Pinnacle Trend) Stipulations since all blocks subject to these stipulations would not be made available. Since Alternative E is the cancellation of a lease sale, no stipulations would apply.

Table 2-1. Applicable Stipulations by Alternative.

Stipulation	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E <sup>1</sup>
Topographic Features	X <sup>2</sup>	X	X	– <sup>3</sup>	–
Live Bottoms	X	X	–	–	–
Military Areas	X	X	X	X	–
Evacuation	X	X	–	See A, B, or C	–
Coordination	X	X	–	See A, B, or C	–
Blocks South of Baldwin County, Alabama	X	X	–	See A, B, or C	–
Protected Species	X	X	X	X	–
United Nations Convention on the Law of the Sea Royalty Payment	X	X	X	X	–
Restrictions due to RUE for Floating Production Facilities	X	X	–	See A, B, or C	–
Transboundary	X	X	X	X	–
Royalties on All Produced Gas	X	X	X	X	–

Note: RUE = rights-of-use and easements.

<sup>1</sup> Alternative E would cancel a lease sale and no new leasing activities would occur; therefore, no stipulations would apply.

<sup>2</sup> Stipulations that would apply to specific lease blocks under any given alternative are marked with an X.

<sup>3</sup> Stipulations that would not apply, because the stipulation blocks or areas are not within the proposed sale area for that alternative, are marked “–”.

### 2.3.3.3 Post-lease Mitigating Measures

Post-lease mitigating measures have been implemented for over 40 years in the Gulf of Mexico region. Following a lease sale, an applicant seeks approvals to develop their lease by preparing and submitting OCS plans. The OCS plans are reviewed by BOEM and, depending on what is proposed to take place on a specific lease, plans may be denied, approved, or approved with conditions of approval (COA). The COAs become part of the approved post-lease authorization and include environmental protections, 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. Mitigating measures are an integral part of BOEM’s program to 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). Operational compliance of the mitigating

measures is enforced through BSEE's onsite inspection program. BOEM is continually revising applicable mitigations to allow the Gulf of Mexico Regional Office to more easily and routinely track mitigation compliance and effectiveness. Appendix A of the 2017-2022 GOM Multisale EIS discusses BOEM's rigorous post-lease processes and Appendix B of the 2017-2022 GOM Multisale EIS 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 Mexico OCS region.

### **2.3.4 Issues Identified**

BOEM has identified some space-use conflicts or competing interests between BOEM's three Program Areas within the OCS oil and gas lease sale areas considered under the Proposed Action alternatives (Alternatives A-D). When considering all available unleased blocks within the WPA, CPA, and EPA portions of the proposed lease sale area for OCS oil and gas leasing that are not under Presidential withdrawal, are beyond the United States' Exclusive Economic Zone in the area known as the northern portion of the Eastern Gap, or are within the boundaries of the Flower Garden Banks National Marine Sanctuary as identified in the July 2008 Memorandum on Withdrawal of Certain Areas of U.S. OCS from Leasing Disposition, there could be space-use conflicts within blocks that may contain Significant Sediment Resource Areas (SSRAs), and the draft and final identified Wind Energy Areas (WEAs) considered in the GOM. Additionally, the National Park Service (NPS) has requested a no-leasing buffer within 15 mi (24 km) of the Gulf Islands National Seashore (GUIS). All of the blocks within the NPS request are also blocks that may contain SSRAs except for one block in State waters.

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 GOM identified as potentially containing significant sediment resources, as well as their respective data layers, is available on BOEM's website 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 from SSRAs for coastal resiliency. Because some SSRAs may be in the area available for OCS oil and gas leasing, BOEM uses Information to Lessees and NTLs to inform lessees of SSRAs and areas of active dredging. 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. Any activity that lasts more than 180 days and is located within 305 lateral meters (1,000 ft) and 20 vertical meters (65 ft) below the natural seafloor of any designated sediment resources is considered bottom disturbing and inconsistent with BOEM's NTL No. 2009-G04. BOEM has implemented measures to prevent obstructions to the use of the most significant OCS sediment resources, reduce multiple-use conflicts, and minimize interference with OCS oil and gas operations. In addition, BOEM may require OCS oil and gas lessees to undertake measures deemed economically, environmentally, and technically feasible to protect the SSRA resources to the maximum extent practicable. Measures may include modification of operations and monitoring of pipeline locations after installation.

In addition, the placement of OCS oil and gas infrastructure, including the burial of pipelines in nearshore areas designated for sand dredging, can cause long term impediments to other uses of the OCS. BSEE will not approve future requests for in-place decommissioning of pipelines in these designated areas unless BSEE's Gulf of Mexico Regional Supervisor 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. If it is deemed necessary, pipelines previously decommissioned in place may be required to be removed if BSEE's Gulf of Mexico Regional Supervisor determines that the pipeline is an obstruction.

Space-use conflicts between renewable energy activities in the draft identified WEAs (i.e., Areas A, B, C, D, E, F, G, H, J, K, L, and N) and the final identified WEAs (i.e., Areas I and M), and the placement of OCS oil and gas infrastructure could also occur. The draft and final identified WEAs are available in the Memorandum for Area ID, which can be found on BOEM's website at <https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/4683-Memorandum-for-Area-ID-GOM.pdf>. With an emerging Renewable Energy Program in the GOM, this raises complexities about whether the infrastructure can coexist. There could be incompatibility between the renewable energy and OCS oil and gas infrastructure in the same area. Renewable energy infrastructure occupies large areas and consists of many umbilicals on the seafloor that connect the turbines and offshore substations. 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. In addition, there could be increased safety issues from increased vessel traffic if renewable energy and OCS oil and gas infrastructure are placed near each other. BOEM is currently studying whether these areas are compatible and is working on guidance for the distancing of OCS oil and gas infrastructure from renewable energy projects.

During their review of the Draft Supplemental EIS, NPS commented that BOEM's development of an Information to Lessees and assurances that development on the OCS near the GUIs is unlikely in the 2012-2017 GOM Multisale EIS, does not alleviate their concern that such development may still occur. The NPS strongly encourages BOEM to exclude unleased blocks within 15 mi (24 km) of the GUIs. Specifically, requesting that CPA Mobile Blocks 810-825, 854-869, and 899-913 be removed from consideration for future leasing. All of these blocks, with the exception of Mobile Block 825, have also been designated in the list of OCS blocks in the GOM that may contain SSRAs. BOEM and its predecessors have proactively developed a suite of mitigating measures that are applied at the pre-lease or post-lease phases of the OCS Oil and Gas Program to avoid and protect fixed biologically and culturally sensitive features, which includes the GUIs Information to Lessees. This Information to Lessees ensures that post-lease plans submitted by lessees of whole and partial lease blocks within the first 12 mi (19 km) of Federal waters near the GUIs are reviewed by BOEM in order to minimize visual impacts from development operations on these blocks. Protective measures are also in place to mitigate potential impacts from seismic activities, marine debris, vessel traffic, structure-removal activities, and vessel traffic to mobile resources such as marine mammals and sea turtles (e.g., NTL No. 2016-G02, NTL No. 2012-G01, and NTL No. 2010-G05).

Alternative E would limit adding more space-use conflicts that could occur with other OCS activities, including in the SSRA blocks, draft and final identified WEAs considered in the GOM, and the GUIs. 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. 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 E, space-use conflicts and potential infrastructure incompatibility between renewable energy activities in the draft and final identified WEAs and the placement of OCS oil and gas infrastructure would not occur. Renewable energy infrastructure could be placed in the draft and final identified WEAs without the need for bottom-disturbing activity setbacks in the draft and final identified WEAs for OCS oil and gas infrastructure and activities. In addition, there would not be increased vessel traffic in the area due to both renewable energy and OCS oil- and gas-related activities in the same area. However, as noted above, Interior is required to hold Lease Sales 259 and 261 under the Inflation Reduction Act. Nevertheless, BOEM is including Alternative E, the No Action Alternative, for analytical and informational purposes, consistent with the regulations implementing NEPA.

### **2.3.5 Primary Topics and Resources Evaluated**

Issues are defined by the Council on Environmental Quality (CEQ) to represent those principal “effects” that an EIS should evaluate in-depth. Scoping identifies specific environmental resources and/or activities rather than “causes” as significant issues (CEQ 1981). The analysis in the EIS can then show the degree of change from the present conditions for each issue to the actions arising from the Proposed Action.

#### **2.3.5.1 Issues to be Analyzed**

Chapter 2.2.5.1 of the 2017-2022 GOM Multisale EIS addresses 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 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS describes the resources and activities that could be affected by the impact-producing factors described in Chapter 3 of those documents and that are summarized in this Supplemental EIS and incorporated by reference. In addition, **Chapter 4** of this Supplemental EIS describes the resources and activities that could be affected by the impact-producing factors described in **Chapter 3** and include the following resource topics:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>– Air Quality (including greenhouse gas emissions)</li> <li>– Water Quality (Coastal and Offshore)</li> <li>– Coastal Habitats (Estuarine Systems and Coastal Barrier Beaches and Associated Dunes)</li> <li>– Deepwater Benthic Communities (Chemosynthetic and Deepwater Coral)</li> <li>– <i>Sargassum</i> and Associated Communities</li> <li>– Live Bottom Habitats (Topographic Features, Pinnacles, and Low-Relief Features)</li> <li>– Fishes and Invertebrate Resources</li> </ul> | <ul style="list-style-type: none"> <li>– Birds</li> <li>– Protected Species (Marine Mammals, Sea Turtles, Beach Mice, Protected Birds, and Protected Corals)</li> <li>– Commercial Fisheries</li> <li>– Recreational Fishing</li> <li>– Recreational Resources</li> <li>– Archaeological Resources (Historic and Prehistoric)</li> <li>– Human Resources and Land Use (Land Use and Coastal Infrastructure, Economic Factors, and Social Factors, Including Environmental Justice)</li> </ul> |
|--|---|

As previously noted, the CEQ regulations for implementing NEPA instruct agencies to adopt an early process (termed “scoping”) for determining the scope of issues to be addressed and for identifying significant issues related to a proposed action. Under 40 CFR § 1502.9, a supplemental EIS is not required to perform additional scoping activities. The scoping efforts of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS have been deemed adequate for the scope of issues addressed in this Supplemental EIS.

Comments received during scoping were analyzed in detail in Chapters 4 and 5.6.2.2 of the 2017-2022 GOM Multisale EIS and discussed, summarized, and/or updated as needed in Chapters 4 and 5.6.2.2 of the 2018 GOM Supplemental EIS and **Chapter 4** of this Supplemental EIS. These issues include the following:

- cumulative impacts to coastal resources, including wetlands;
- downstream and life cycle greenhouse gas emissions from lease sales;
- climate change on GOM environmental resources, including warmer oceans, increased storms and flood events, and land loss;
- economic impacts as a result of canceling or holding a proposed lease sale; and
- oil and chemical spills, including continued effects from past spills and leaking wells and pipelines.

Since publication of the 2018 GOM Supplemental EIS, additional analysis for life cycle GHG emissions are published in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c). BOEM's greenhouse gas analysis has been updated to include a newly developed quantitative analysis of the Proposed Action's impact on foreign oil consumption and the resulting GHG emissions under the No Action Alternative. Additionally, the updated GHG analysis in **Chapter 4.1** provides estimates of the monetary value of changes in GHG emissions that could result from holding the Proposed Action. This is an emerging methodology that BOEM is looking to refine and expand for future NEPA analyses in response to modeling improvements, increased data availability, expert input, and feedback from the public.

### 2.3.5.2 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.

Comments received during scoping for the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS were analyzed in detail in Chapter 5.6.2.2 of the 2017-2022 GOM Multisale EIS and summarized and/or updated as needed in Chapter 5.6.2.2 of the 2018 GOM Supplemental EIS. The issues raised by these comments included the following:

- compensatory mitigation;
- updates and safety improvements implemented by regulators and industry;
- well-stimulation activities and associated environmental impacts;
- substitution effects of renewable energy sources in place;
- environmental justice concerns related specifically to those living near petrochemical facilities.

## 2.4 COMPARISON OF IMPACTS BY ALTERNATIVE

The full analyses of the potential impacts of routine activities and accidental events associated with a Proposed Action and a Proposed Action's incremental contribution to the cumulative impacts are described in the individual resource discussions in Chapter 4 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, and summarized in **Chapter 4** of this Supplemental EIS. **Table 2-2** provides a comparison of expected impact levels by alternative and is derived from the analysis of each resource in Chapter 4 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS for Alternatives A-E. The findings for Alternatives A-E represent the *incremental contribution* of a lease sale to the cumulative impacts from past, present, and future activities in the GOM. These activities include both OCS oil- and gas-related and non-OCS oil- and gas-related activities that would be expected regardless of whether a lease sale were to occur. Cumulative impacts of current, past, and reasonably foreseeable future activities would continue to occur under

Alternative E. As a result, a separate treatment of the cumulative effects under Alternative E is not considered here, and the cumulative impacts analysis under Alternative A remains applicable.

Table 2-2. Alternative Comparison Matrix.

Impact Level Key <sup>1</sup>					
Beneficial <sup>2</sup>	Negligible	Minor	Moderate	Major	
Alternative					
Resource	A	B	C	D	E
Air Quality	Minor	Minor	Minor	Minor	None
Water Quality	Negligible	Negligible	Negligible	Negligible	None
Coastal Habitats					
Estuarine Systems	Moderate	Moderate	Minor	Moderate	Negligible
Coastal Barrier Beaches and Associated Dunes	Minor	Minor	Negligible to Minor	Negligible to Minor	Negligible
Deepwater Benthic Communities	Negligible	Negligible	Negligible	Negligible	None
<i>Sargassum</i> and Associated Communities	Negligible	Negligible	Negligible	Negligible	None
Live Bottoms					
Topographic Features	Negligible	Negligible	Negligible	Negligible	None
Pinnacles and Low-Relief Features	Negligible to Minor	Negligible to Minor	Negligible	Negligible	None
Fishes and Invertebrate Resources	Minor	Minor	Minor	Minor	None
Birds	Moderate	Moderate	Moderate	Moderate	None
Protected Species					
Marine Mammals	Negligible	Negligible	Negligible	Negligible	None
Sea Turtles	Negligible	Negligible	Negligible	Negligible	None
Beach Mice	Negligible	Negligible	Negligible	Negligible	None
Protected Birds	Negligible	Negligible	Negligible	Negligible	None
Protected Corals	Negligible	Negligible	Negligible	Negligible	None
Commercial Fisheries	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible
Recreational Fishing	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible

Recreational Resources	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible
Archaeological Resources	Negligible <sup>3</sup>	Negligible <sup>3</sup>	Negligible <sup>3</sup>	Negligible <sup>3</sup>	None
Human Resources and Land Use					
Land Use and Coastal Infrastructure	Minor	Minor	Minor	Minor	None
Economic Factors	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible to Minor
Social Factors (including Environmental Justice)	Minor	Minor	Minor	Minor	None

Note: Some resources have a range for the impact levels to account for certain variables such as the uncertainty of non-OCS oil- or gas-related activities, the level and magnitude of potential accidental events, and the minimization of the OCS oil- or gas-related impacts through lease stipulations, mitigations, and/or regulations. The impact-level ratings have been specifically tailored and defined for each resource within the Chapter 4 impact analysis of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

<sup>1</sup> The findings for Alternatives A-D are the incremental contribution of a Proposed Action added to what would be expected to occur under the No Action Alternative (i.e., no lease sale). Therefore, each impact determination under Alternatives A-D assumes that the cumulative conditions and impacts (i.e., past, present, and future activities as a result of past lease sales) under the No Action Alternative would still be present.

<sup>2</sup> The level of beneficial impacts is specified in the analysis, which could range from low, medium, or high.

<sup>3</sup> The level of impacts for archaeological resources ranges between negligible to major and is dependent upon whether a survey is performed, mitigation is imposed, mitigation is followed, or a site is identified prior to the activity.

## 2.5 SUMMARY OF IMPACTS

A search by BOEM’s subject-matter experts was conducted for each resource to consider new information made available since publication of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. 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.

BOEM’s subject-matter experts determined through literature searches and communications with other agencies and academia that there was no new information made available since publication of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS that would alter the impact conclusions to the potential impacts from a lease sale. Therefore, the analyses and potential impacts for the resources remain the same as those that were presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. These impact conclusions are summarized in **Chapter 4** of this Supplemental EIS and are incorporated by reference. The analyses and potential impacts detailed in the previous NEPA documents remain valid and, as such, apply for GOM Lease Sales 259 and 261.

In accordance with CEQ guidelines to provide decisionmakers with a robust environmental analysis, the *Gulf of Mexico Catastrophic Spill Event Analysis* technical report (BOEM 2021d) 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**.

## **CHAPTER 3**

### **IMPACT-PRODUCING FACTORS AND SCENARIO**



## 3 IMPACT-PRODUCING FACTORS AND SCENARIO

### 3.1 INTRODUCTION

Chapters 3.1 and 3.2 of the 2017-2022 GOM Multisale EIS describe in detail the routine and accidental impact-producing factors and activity scenarios associated with Alternatives A-D that could potentially affect the biological, physical, and socioeconomic resources of the Gulf of Mexico. Routine and accidental impact-producing factors and activity scenarios are described in **Chapters 3.2 and 3.3** below. Under Alternative E, no activity from a lease sale would occur; however, activities from prior lease sales, which are described in cumulative activities, are anticipated to continue. The cumulative impact-producing factors and activity scenarios resulting from past and future lease sales that are relevant to all alternatives are described in detail in Chapter 3.3 of the 2017-2022 GOM Multisale EIS and are summarized in the 2018 GOM Supplemental EIS, and have been updated with any new activities in **Chapter 3.4** of this Supplemental EIS. The following information is a summary of the impact-producing factors from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, as well as updated scenario information, in particular for lease sale changes in royalty rates and lease terms.

### 3.2 ROUTINE ACTIVITIES

#### 3.2.1 Resource Estimates

A scenario describes the offshore activities that could occur for a single lease sale under each alternative. BOEM's Gulf of Mexico Regional Office reanalyzed trends since the development of the scenarios for the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS to determine if the trends are within the forecasted ranges for GOM Lease Sales 259 and 261. Ranges of activity within the scenarios are developed to provide the ability to characterize the full range of potential environmental impacts that could be possible from a single lease sale. BOEM continually updates models and formulas used to develop these scenarios. The Proposed Action scenarios presented herein were updated based on the following factors:

- recent trends in the amount and location of leasing, exploration, and development activity;
- estimates of undiscovered, unleased, conventionally recoverable oil and gas resources in the planning area;
- existing offshore and onshore oil and/or gas infrastructure;
- industry information; and
- oil and gas technologies, and the economic considerations and environmental constraints of these technologies.

The OCS oil and gas operations on a lease generally occur in four phases: (1) exploration to locate viable oil or natural gas deposits; (2) development well drilling, platform construction, and pipeline infrastructure; (3) operation (oil or gas production and transport); and (4) decommissioning of

facilities once a reservoir is no longer productive or profitable. Detailed descriptions of these activities can be found in Chapter 3.1 of the 2017-2022 GOM Multisale EIS. Under a Proposed Action, activities would occur on OCS leases only after a lease sale is held. Although unusual cases exist where activity on a lease may continue beyond 50 years, forecasts indicate that the significant activities associated with exploration, development, operation, and decommissioning of leases in the GOM occur well within the 50-year analysis period of a single lease sale. Note that subsea activity may take place on a lease without additional platforms being built. In these instances, a subsea structure may be built on a lease acquired during the lease sale but tied back to a platform on a lease acquired during a previous lease sale. This could potentially increase the lifespan of a platform built as a result of a previous lease sale.

The major impact-producing factors of a single lease sale projected to develop and produce the estimated oil and gas resources for Alternatives A, B, and C are given in **Table 3-1**, including estimates of the major impact-producing factors related to the projected levels of exploration, development, and production activity. Alternatives D and E are not presented in the **Table 3-1** for the following reasons. Alternative D could reduce offshore production when chosen in conjunction with Alternative A, B, or C. However, it is also possible that Alternative D would only shift the location of offshore infrastructure and activities farther from sensitive topographic zones and not lead to a reduction in production. Refer to **Chapter 2.3.1.4** for more information on Alternative D. Under Alternative E, no activity from the lease sale would occur, but activity from prior lease sales is anticipated to continue; this is further discussed in **Chapter 3.4.1** below. Estimates of resources and facilities are distributed into subareas based on water depth. The activities found in **Table 3-1** would occur within the 50-year analysis period of 2017-2066. When analyzing hydrocarbon resources by planning area across the GOM, the majority of oil and gas resources are located within the boundaries of the CPA; therefore, the majority of activity is expected to occur in the CPA.

### **Expected Activity by Alternative**

To analyze the estimated hydrocarbon resources and associated activities and infrastructure (including the number of exploration and delineation wells, production platforms, and development wells) and resulting impact-producing factors for each alternative, the geographic ranges of each alternative were divided into offshore subareas based upon ranges in water depth. **Figure 3-1** depicts the location 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.

Table 3-1. Offshore Scenario Activities Related to a Single Lease Sale for Alternative A, B, or C from 2017 through 2066.

Activity	Alternative <sup>1</sup>	Offshore Subareas (m) <sup>2</sup>						Totals <sup>3</sup>
		0-60	60-200	200-800	800-1,600	1,600-2,400	>2,400	
Exploration and Delineation Wells	A	24-634	8-300	5-11	6-15	5-8	5-16	53-984
	B	20-570	5-293	2-8	2-10	2-2	2-10	33-893
	C	4-64	2-7	2-3	3-5	3-6	3-6	17-91
Development and Production Wells <sup>4</sup>	A Total	14-326	7-220	7-95	13-51	10-37	10-38	61-767
	B Total	10-282	4-211	4-78	10-35	9-31	9-34	46-671
	C Total	4-44	4-9	4-17	4-16	3-6	3-4	22-96
	A Oil	1-35	0-23	3-46	6-22	5-19	4-19	19-164
	B Oil	1-32	0-23	2-38	5-18	4-16	4-17	16-144
	C Oil	0-5	0-1	2-9	1-5	1-4	1-3	5-27
	A Gas	1-35	0-23	3-46	6-22	5-19	4-19	19-164
	B Gas	5-169	2-120	0-17	1-7	1-6	1-7	10-326
C Gas	2-27	2-6	0-4	1-7	0-1	0-1	5-46	
Installed Production Structures	A	8-183	4-85	1-4	1-3	1-2	1-3	16-280
	B	7-158	3-81	1-3	1-2	1	1-2	14-247
	C	3-25	2-4	1	1	1	1	9-33
Production Structures Removed Using Explosives	A	6-130	3-63	0	0	0	0	9-193
	B	5-112	2-60	0	0	0	0	7-172
	C	2-18	2-3	0	0	0	0	4-21
Total Production Structures Removed	A	8-183	4-85	1-4	1-3	1-2	1-3	16-280
	B	7-158	3-81	1-3	1-2	1	1-2	14-247
	C	3-25	2-4	1	1	1	1	9-33
Length of Installed Pipelines (km) <sup>5</sup>	A	59-527	53-417	53-327	78-358	59-275	53-240	355-2,144
	B	40-395	34-336	33-240	55-233	50-227	42-210	254-1,641
	C	20-132	20-81	20-88	24-125	10-48	11-31	105-505
Service-Vessel Trips (1,000's round trips)	A	9-265	4-126	6-51	7-38	7-26	7-36	43-541
	B	8-229	3-120	6-39	6-26	6-15	6-25	38-452
	C	3-36	2-6	6-13	6-13	6-12	6-11	30-89
Helicopter Operations (1,000's trips) <sup>6</sup>	A	52-2,131	34-1,409	8-71	8-53	8-36	8-53	122-3,750
	B	43-1,848	26-1,426	8-53	8-36	8-18	8-36	105-3,415
	C	17-299	17-71	8-18	8-18	8-18	8-18	70-440

<sup>1</sup> Alternative D could reduce activity values of the combined Alternative A, B, or C; however, it is expected to have the same production and related activities as Alternative A, B, or C. Refer to **Chapters 2.3.1.4** for more information. Alternative A would be a nationwide lease sale, Alternative B would be the CPA/EPA portions of the proposed lease sale area, and Alternative C would be the WPA portion of the proposed lease sale area.

<sup>2</sup> Refer to **Figure 3-2**.

<sup>3</sup> Subareas totals may not add up to the planning area total because of rounding.

<sup>4</sup> 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.

<sup>5</sup> Projected length of pipelines does not include length in State waters.

<sup>6</sup> Helicopter trips 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 within a water depth.

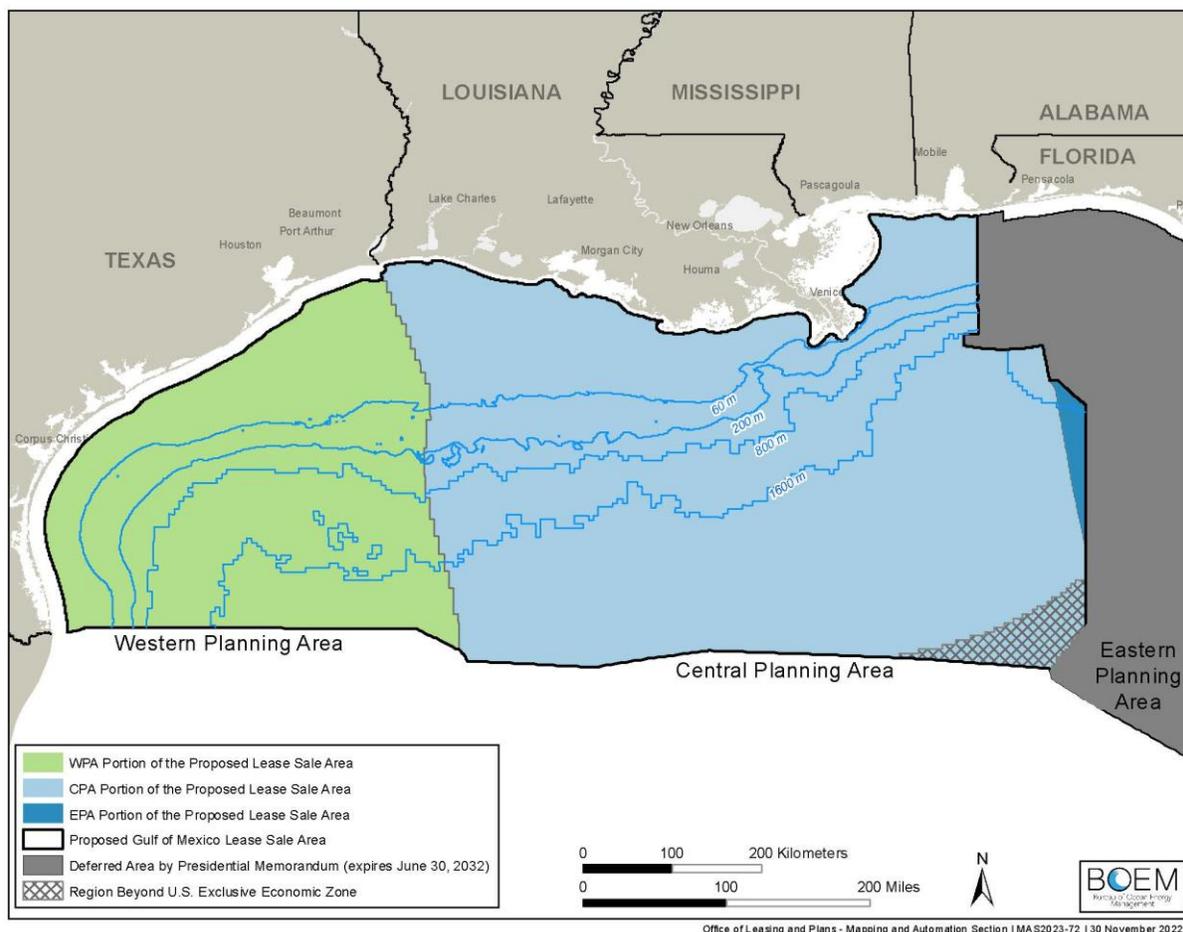


Figure 3-1. Offshore Subareas in the Gulf of Mexico.

Estimates of associated activities and infrastructure or the major impact-producing factors related to the projected levels of exploration, development, and production activity were developed for each of the subareas (water-depth ranges) for Alternatives A, B, and C, and are presented in **Table 3-1**.

The scenario forecast is developed from historical lease sales and activity data covering a wide range of acres offered, oil/gas price regimes, economic conditions, and more. Should any areas of space-use conflict (refer to **Chapter 2.3.4**) be removed from leasing, including blocks that may contain SSRAs and draft and final identified WEAs, OCS oil- and gas-related activity may decrease. The potential decrease in the average level of OCS oil- and gas-related activities would still fall within the range of the scenario forecast. Current bidding and activity trends are in line with the projected OCS oil- and gas-related activity resulting from a lease sale of which such acreage is removed.

### 3.2.2 Inflation Reduction Act of 2022 and the Scenario

As discussed in **Chapter 1.3**, the Inflation Reduction Act of 2022 (IRA) contains many provisions that aim to reduce GHG emissions by providing incentives for renewable energy and energy

efficiency. Many of these provisions are expected to alter the composition of supply and demand within energy markets over the coming decades. Below, BOEM discusses the potential impact of provisions within the IRA to the scenario analyzed in this Supplemental EIS.

### **3.2.2.1 BOEM's 2021 Assessment, the Exploration and Development Scenario, and the Inflation Reduction Act of 2022**

BOEM's assessment of undiscovered oil and gas resources on the Nation's OCS informed BOEM's development of the exploration and development scenario analyzed in this Supplemental EIS and does not account for potential declines in demand for OCS oil and natural gas either due to the IRA or various net-zero goals (BOEM 2021c). In 2021, BOEM completed its most recent assessment of undiscovered oil and gas resources of the Nation's OCS, which updated the Gulf of Mexico OCS region's resource potential (BOEM 2021c). In a comparison to the 2000, 2006, 2011, 2016, and 2021 undiscovered technically recoverable resources (UTRR) assessment results in the GOM, the UTRR mean estimate for oil dropped 38 percent to 29.59 BBO, while the estimate for gas decreased 61 percent from 141.76 Tcf of gas to 54.84 Tcf of gas. The overall decrease in UTRR is due in part to the refinement of field-size distributions and the estimated number of prospects for some mature geologic plays in the Gulf of Mexico OCS, particularly on the shallow-water shelf. BOEM's quantitative analysis assumes the development scenario as described in **Chapter 3** of this Supplemental EIS and in more detail in the 2017-2022 GOM Multisale EIS. The estimated impacts to the environment and economy from the Proposed Action and No Action Alternative rely on this scenario. This scenario does not incorporate expected impacts from the recently passed IRA.

The IRA is not necessarily incompatible with ongoing oil and gas production. While the IRA contains provisions aimed at achieving net-zero greenhouse gas emissions, there are many potential pathways to successfully achieve net-zero. Many net-zero pathways also include some level of oil and natural gas consumption (Larson et al. 2021).<sup>2</sup> Gulf of Mexico produced oil and gas tends to have less upstream greenhouse gas intensity when accounting for production and transport to shore compared with the likely substitute resources. Additionally, a recent report by Rhodium Group suggests that the impact to the domestic petroleum market would be very small (a decrease of less than 1% in demand) and minimal change supply (Larsen et al. 2022), i.e., the report stands for the proposition that, even when accounting for the minor decrease in demand due to the IRA and other potential pathways to net-zero, the OCS may continue to contribute to energy needs. Thus, the scenario of anticipated activity and production analyzed for this Supplemental EIS is still appropriate, even accounting for the reasonably foreseeable impacts to energy markets that may result from the IRA.

### **3.2.2.2 Royalty Rates and Lease Terms**

The Inflation Reduction Act of 2022 requires that BOEM issue leases with a minimum royalty rate of 16 2/3 percent and a maximum rate of 18 3/4 percent. This will require an increase in the

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<sup>2</sup> On July 2, 2022, BOEM published the 2023-2028 National OCS Oil and Gas Leasing Proposed Program (BOEM 2022a). Refer to **Chapter 1.2** for more updated details on energy needs in the United States, and **Chapter 6** for details on national and regional energy markets.

royalty rate for leases in less than 200 m (656 ft) of water depth as GOM Lease Sales 251, 252, 253, 254, 256, and 257 had shallow water rates of 12.5 percent. BOEM may also consider changes to the minimum bonus bid and annual rental rate as a result of this lease sale(s).

The forecasted scenario presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS included a royalty rate of 18 3/4 percent throughout the GOM. BOEM modeled the range of anticipated oil and natural gas production volumes and associated levels of exploration, development, and decommissioning activity on a per lease sale basis under varying economic conditions; segregated anticipated production volumes into water depth categories; and compared the high case forecasted for wells drilled to leases sold. Through this analysis, BOEM has verified that the effective change in activity due to any royalty rate allowed by the Inflation Reduction Act of 2022 is within the range of the forecast scenarios presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. BOEM also finds that any change in activity due to a 16 2/3 percent shallow-water royalty rate would also be within that range. BOEM's analysis further indicates that changes to the minimum bonus bid and the annual rental rate would similarly not result in activity changes outside the range presented in the Supplemental EIS. Any additional activity that could occur as a result of the change in fiscal terms is still expected to be within the range of the reasonably foreseeable activity scenario under which the impact analysis was performed.

BOEM adjusted primary lease terms in the 800-m to less than 1,600-m (2,625- to 5,249-ft) water-depth range for GOM Lease Sales 256 and 257 from 7 to 10 years. Prior to Lease Sale 256, the primary term for a lease issued in water depths ranging from 800 m to less than 1,600 m (2,625 to 5,249 ft) as a result of a lease sale was 7 years. If the lessee spuds a well within the 7-year primary term, the lessee would earn an additional 3 years, resulting in a 10-year extended primary term. BOEM recognizes that many of the remaining resources left to find and produce in this water-depth range of the GOM present significant technical and economic challenges. This has been the finding of several studies recently completed by BOEM. Prior to GOM Lease Sale 256, BOEM completed a review of the anticipated oil and gas production volumes and associated estimates of anticipated exploration and development activity levels developed for the 2017-2022 National OCS Program. The review process was focused on (1) identifying and analyzing new information that has become available since our estimates were originally published, (2) integrating the new information into our forecast models, and (3) reviewing model output data to ensure that the new information does not generate activity-level estimates that are outside the range of what was anticipated. The results of this analysis showed that the range of anticipated production volumes and activity-level estimates remain current and that no changes to these parameters are required as a result in the change in lease terms for the 800- to 1,600-m (2,625 to 5,249-ft) water depth. Due to the previous lease term having the option of 10 years (7 years + 3 years), a change in lease term to a simple 10 year primary term would fall within the range of the forecasted activity (Riches 2020). Since the range of potential activity remains the same, the range of potential impacts also remains the same for either lease term.

BOEM acknowledges that recent significant fluctuations in oil prices due to the global demand, as well as other factors, may affect the number of leases sold in Lease Sales 259 and 261. However, operators make their leasing decisions on a 5- to 10-year timeframe, and those with a strong financial

structure may see a lease sale as an opportunity to build their leasehold inventory for greater upside potential when prices increase. Lessees would likely place a higher weight on future price forecasts than prices at any one point in time. Industry and the futures market anticipate higher prices in the future when the potential leases would be developed. BOEM also assesses receipt of fair market value for oil and gas leases issued from this lease sale. Energy production and consumption levels have been gradually recovering from the pandemic. The volatility in energy markets continues though as supply and demand patterns adjust to these changing conditions. Energy markets are expected to eventually stabilize, and the long-term trends for oil and gas markets are not likely to substantially change due to the pandemic. Considering the current status of the oil market, BOEM has reviewed the anticipated oil and gas production volumes and associated estimates of anticipated exploration and development activity levels developed for the 2017-2022 National OCS Program. BOEM's review process was focused on (1) identifying and analyzing new information that has become available since our estimates were originally published, (2) integrating the new information into our forecast models, and (3) reviewing model output data to ensure that the new information does not generate activity-level estimates that are outside the range of what was anticipated. This analysis showed that the range of anticipated production volumes and activity-level estimates remain current and that no changes to these parameters are required as a result of the COVID-19 pandemic (Riches 2020). Since the range of potential activity remains the same, the range of potential impacts also remains the same.

### 3.2.3 Exploration and Delineation

While the activities associated with exploration, development, production, and decommissioning of leases in the GOM are expected to occur during the 50-year analysis period of 2017-2066, the Cumulative OCS Oil and Gas Program scenario has an analysis period of 70 years or 2017-2086. The Cumulative OCS Oil and Gas Program scenario includes the 50-year analysis period for a single lease sale. It is important to note that a single lease sale, no matter which alternative is selected, would represent only a small portion of activity and a small incremental contribution to the overall Cumulative OCS Oil and Gas Program activity forecasted to occur between 2017 and 2086 (refer to **Table 3-2**). Further information about the Cumulative OCS Oil and Gas Program scenario can be found in **Chapter 3.4.1** below.

Table 3-2. Incremental Contribution (expressed as a percent) of Each Alternative of a Single Lease Sale (2017-2066) in Relation to Each Cumulative Production Scenario.

Single Lease Sale (2017-2066)	Percent of Production of a Single Lease Sale in Relation to		
	Cumulative Production in the GOM (2017-2086)	Cumulative Production in the CPA/EPA (2017-2086)	Cumulative Production in the WPA (2017-2086)
Alternative A	1.2-4.2%	–	–
Alternative B	1.0-3.6%	1.2-4.4%	–
Alternative C	0.2-0.6%	–	1.2-3.5%

Note: Alternative D could reduce production values of the combined Alternative A, B, or C. Refer to **Chapter 2.3.1.4** for more information on Alternative D.

**Table 3-3** presents the projected oil and gas production for a single lease sale under each alternative (2017-2066) and for the Cumulative OCS Oil and Gas Program (2017-2086). Refer to **Table 3-1** above for the offshore scenario activities related to a single lease sale for Alternative A, B, or C from 2017 through 2066, which are associated with these projected oil and gas volumes in the Gulf of Mexico OCS.

Table 3-3. Projected Oil and Gas in the Gulf of Mexico OCS.

Reserve/Resource Production	Lease Sale (2017-2066)	OCS Cumulative (2017-2086)
Alternative A		
Oil (BBO)	0.211-1.118	15.482-25.806
Gas (Tcf)	0.547-4.424	57.875-108.513
Alternative B		
Oil (BBO)	0.185-0.970	13.707-22.152
Gas (Tcf)	0.441-3.672	46.328-84.009
Alternative C		
Oil (BBO)	0.026-0.148	1.775-3.654
Gas (Tcf)	0.106-0.752	11.547-24.504

Note: Alternative D could reduce production values of the combined Alternative A, B, or C. Refer to **Chapter 2.3.1.4** for more information on Alternative D.

BBO = billion barrels of oil.

Tcf = trillion cubic feet.

Regardless of the alternative, the majority of oil and gas resources are located within the boundaries of the CPA. Therefore, for a Proposed Action under Alternative A, which would encompass all acreage available for lease within the WPA, CPA, and EPA, the majority of the activity would still be located in the CPA. Relatively more exploration and development drilling and structure installation would occur on the shelf (in depths <200 m [660 ft]) than in deep water, regardless of the production case scenario; however, more total volume of oil and gas is expected from deep water than on the shelf. **Figure 3-2 (A, B)** gives the reader an idea of within which water-depth category the majority of GOM production would occur; however, production would not be equally distributed across water-depth categories and would have geographic specificity based on geology. The highest production in a given year would be 0.051 billion barrels of oil equivalent (BOE), and the highest production in any given 5-year span would be 0.246 BOE (averaging 0.049 BOE per year when producing), demonstrating that the forecasted production occurs throughout the 40 years and is not consolidated into a narrow timeframe, i.e., a single year.

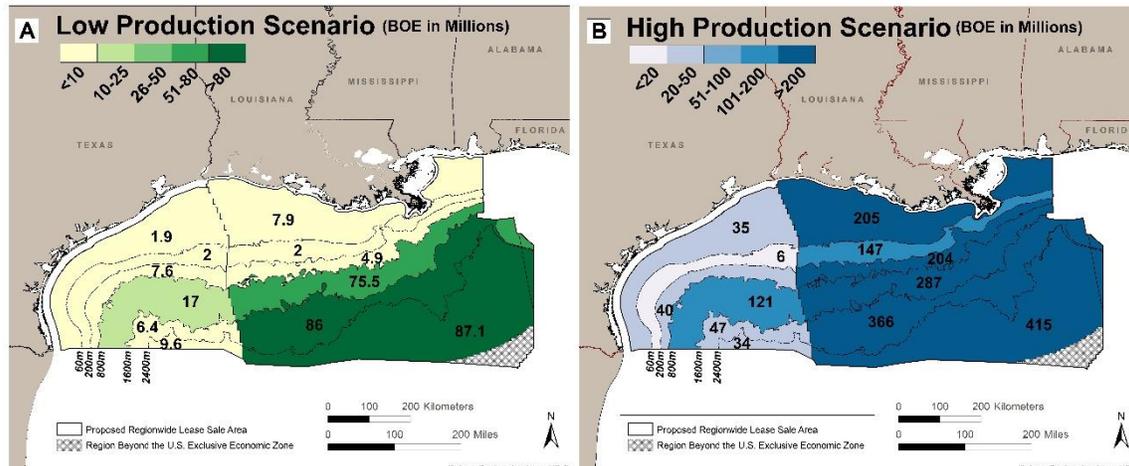


Figure 3-2. Total Oil and Gas Production (BOE) in the Gulf of Mexico in the Low and High Production Scenario by Water Depth.

### 3.2.4 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 produced water, produced sand, and well-treatment, workover, and completion fluids. Minor additional discharges occur from numerous sources. The USEPA, through general permits issued by the USEPA Region that has jurisdictional oversight, regulates all waste streams generated from offshore oil and gas activities. Permits issued under Section 402 of the Clean Water Act for offshore activities must comply with any applicable water quality standards and/or Federal water quality criteria, as well as Section 403 of the Clean Water Act.

BOEM has reexamined the information for discharges and wastes presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the list of references searched and provided below. New information was found for discharges and wastes after a search of relevant information. This new information updates BOEM's knowledge of the potential impacts of contaminants in produced water and discharges on organisms in the environment or the buildup of contaminants in marine sediments.

On September 19, 2017, USEPA Region 6 released the new version of its National Pollutant Discharge Elimination System Permit (NPDES) for "New and Existing Sources and New Dischargers 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 (GMG290000)" (USEPA 2017b). However, the general permit governing the USEPA Region 6 National Pollutant Discharge Elimination System (NPDES) has expired, and it is being administratively continued. The USEPA Region 4 NPDES General Permit (GEG460000) for "New and Existing Sources in the Offshore Subcategory of the Oil and Gas Extraction Category for the Eastern Portion of the Outer Continental Shelf of the Gulf of Mexico" went into effect on January 20, 2018. The Region 4 NPDES permit is due to expire in

January 2023. The publication of the updated permits and their expiration does not change the conclusions of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Farkas et al. (2020) examined the impact of anionic polyacrylamides (APAM) on multiple developmental stages of two marine copepod species in Norway, with the expectation that the application of APAM for enhanced oil recovery may increase going forward. The early developmental stages of these copepod species were most sensitive to APAM exposure. However, the lowest observed lethal concentration (LC<sub>50</sub>), at 144 mg/L, is expected by the authors to be significantly below what would occur in seawater contaminated with produced water. This is due to the rapid dilution of produced water from the point source. Additionally, this was only investigated with two marine copepod species and is narrow in scope.

The potential for <sup>226</sup>Ra (the most common radioactive isotope of the element radium) contamination in marine sediments was examined in Ahmad et al. (2021). The researchers collected marine sediments close to a nearshore water discharge site and produced water from an active oil field site in the United Kingdom, as well as a nearby beach. Radium co-precipitated with barite (as radiobarite) in the marine sediment samples, resulting in measurable activities of <sup>226</sup>Ra in these samples that were downstream of a produced-water discharge site. However, the question of the long-term and acute impacts of these radiobarite particles in marine sediments was not examined and remains to be resolved.

In a Brazilian study (Bento and Campos 2020), researchers evaluated the acute (15-minute exposure) toxic effects on a luminescent bacteria species (*Vibrio fischeri*) from nine different chemicals that could be expected to be found in produced water. These chemicals include diethylene glycol, an H<sub>2</sub>S scavenger (glycol derivative), a corrosion inhibitor, and others. Their experiments were not *in-situ* experiments (i.e., using collected seawater), but rather they used synthetic produced water wherein they exposed the bacterium to the chemicals. By themselves, several of these chemicals were moderately toxic, but their toxicity can increase substantially after mixing with crude oil. However, this study is focused specifically on effects, does not address either long-term or cumulative impacts, is limited to one bacterium species, and only used synthetically produced water. These four studies are useful; however, due to their narrow scopes and methodological limitations, their results do not change the conclusions in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### 3.2.5 Coastal Infrastructure

The extensive presence of coastal infrastructure is not subject to rapid fluctuations and results from long-term industry trends. Existing oil and gas infrastructure is expected to be sufficient to handle development associated with a Proposed Action. 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 GOM (**Table 3-4**). Historically, less than 1 percent of oil produced from the GOM is transported via barge. BOEM assumes barging will continue to account for less than 1 percent of oil transportation in the future for the activities analyzed under each alternative. 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 (LOOP); the percentage of oil tankered is provided in **Table 3-4**. The FPSOs are only projected to occur in water depths >1,600 m (5,250 ft). Because only one structure is projected to be installed in the >1,600-m (5,250-ft) water depth (refer to **Table 3-1**), this structure may be either a FPSO or another type of floating platform (refer to Chapter 3.1.3.2 of the 2017-2022 GOM Multisale EIS). As a result, the oil from this structure is expected to be 100 percent piped or 100 percent tankered.

Table 3-4. Oil Transportation Scenario under Alternative A, B, or C.

Activity	Alternative <sup>1</sup>	Offshore Subareas (m) <sup>2</sup>					Totals <sup>3</sup>
		0-60	60-200	200-800	800-1,600	>1,600	
Percent Oil Piped <sup>4</sup>	A	72-94%	100%	100%	100%	100%	100-66%
	B	70-94%	100%	100%	100%	100%	100-50%
	C	100%	100%	100%	100%	100%	100%
Percent Oil Barged	A	28-6%	0%	0%	0%	0%	0%
	B	30-6%	0%	0%	0%	0%	0%
	C	0%	0%	0%	0%	0%	0%
Percent Tankered <sup>5</sup>	A	0%	0%	0%	0%	0%	0-34%
	B	0%	0%	0%	0%	0%	0-50%
	C	0%	0%	0%	0%	0%	0%

<sup>1</sup> Alternative D could reduce activity values of the combined Alternative A, B, or C. Refer to Chapter 2.3.1.4 for more information on Alternative D. Percentage values indicated here would not change.

<sup>2</sup> Refer to Figure 3-1. Ranges are reported from the low production case scenario to the high production case scenario.

<sup>3</sup> Subareas totals may not add up to the planning area total because of rounding.

<sup>4</sup> 100% of gas is assumed to be piped.

<sup>5</sup> Tankering is forecasted to occur only in water depths >1,600 m (5,250 ft).

### 3.2.6 Air Emissions

BOEM has reexamined the information for air emissions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. New information was found for air emissions after a search of relevant information and contributes to BOEM's understanding of air emissions.

New information was found for air emissions via the *Year 2017 National Emissions Inventory Report* (USEPA 2020) and *Year 2017 Emission Inventory Study* (Wilson et al. 2019a). These documents are the most recent inventory reports. These two emission inventory reports indicate that most of the criteria air pollutants, criteria precursor air pollutants, hazardous air pollutants, and greenhouse gas emissions come from onshore sources.

On May 14, 2020, the U.S. Department of the Interior and BOEM announced a final rule to update air quality regulations for activities BOEM authorizes in the CPA and WPA in the Gulf of Mexico. Among other things, the final rule updated the Significance Levels in 30 CFR § 550.303(e), which are based on the values currently set forth in USEPA regulations at 40 CFR § 51.165(b)(2). This rulemaking makes other improvements to the regulations to clarify and correct inconsistencies but will

not result in any different or additional environmental impacts. The projected scenarios, such as the amount and location of activities and projected air pollutant emissions that were evaluated in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS and used to reach the lease sale conclusions, have not changed.

### **3.3 ACCIDENTAL EVENTS**

As a consequence of routine activities or operations assumed to occur routinely throughout the lifetime of a lease, the potential for accidents exists. Accidental events are unauthorized but are examined separately due to their potential to occur and lead to significant and severe environmental impacts. Industry practices and government regulations minimize the risk of oil spills and other accidental events. Despite these efforts, there is no way to guarantee that accidental events will not occur and industry and government entities prepare to respond to a spill or other accident. The types of reasonably foreseeable accidental events include releases into the environment (e.g., oil spills, loss of well control, accidental air emissions, pipeline failures, and chemical and drilling fluid spills), collisions (e.g., helicopter, service vessels, and platforms), and spill-response activities. Substantial preventative measures and Federal regulatory requirements from prevention to spill response, which are summarized below and described in greater detail in Chapter 3.2 of the 2017-2022 GOM Multisale EIS, are in place to mitigate these events.

#### **3.3.1 Oil-Spill**

##### **Spill Events**

###### ***Shell Offshore Pipeline Spill in Green Canyon Block 248***

On May 12, 2016, the United States Coast Guard (USCG) responded to an offshore oil spill that discharged from a Shell subsea wellhead flow line, approximately 90 mi (145 km) south of Timbalier Island, Louisiana, in Green Canyon Block 248. The release came from the Glider subsea system, which ties back to the Brutus platform in Green Canyon Block 158. The volume of the release was estimated at 2,100 barrels (bbl). Response efforts included on-water recovery vessels and skimming operations. At the time of the spill, there were no reported impacts to wildlife or fisheries, and the sheen did not make contact with the shoreline.

Following the spill, NOAA and co-trustees completed a Natural Resources Damage Assessment (NRDA), to evaluate the spill's environmental impacts. On August 27, 2018, Shell Offshore Inc., as the responsible party, entered into a consent decree to settle injuries to impacted natural resources. Shell agreed to pay approximately \$3.6 million to fund affected natural resource restoration strategy and implementation efforts. NOAA and co-trustees submitted a Final Restoration Plan and Environmental Assessment, March 3, 2021, detailing projects to restore resources and compensate those impacted by this oil spill event (NOAA 2022).

### **Taylor Energy Company Oil Discharge in the Mississippi Canyon Area Block 20 Site**

In September 2004, Hurricane Ivan caused a massive undersea mudslide just south of the Mississippi River Delta that toppled Taylor Energy Company's Platform A in Mississippi Canyon Area Block 20 (MC20), which is located about 9 mi (14 km) southeast of the nearest Louisiana shoreline in about 134-143 m (440-470 ft) of water (**Figure 3-3**).



Figure 3-3. MC20 Location. Photo credit: Google.

The mudflow lobe that toppled the platform also sheared the eight jacket piles and bent/pulled the conductors from the jacket while depositing an average of 45 m (150 ft) of sediments on the site (Fugro-McClelland Marine Geosciences Inc. 2007). As a result, the mostly intact platform jacket and deck moved 137-213 m (450-700 ft) downslope from its original location and lies partially buried in a horizontal position on the seabed (**Figure 3-4**).

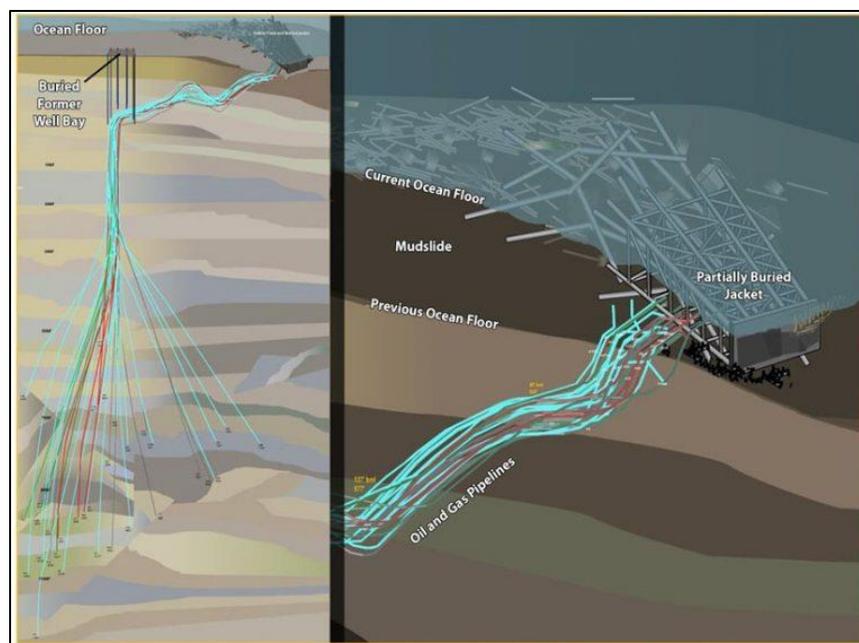


Figure 3-4. Illustration of the Collapsed Well Jacket and Damaged Pipes from Taylor Energy Company's Mississippi Canyon Area Block 20 Platform (Photo credit: Mason et al. (2019)).

Prior to the storm and mudslide event, the platform's well bay contained 28 separate, 30-in diameter well conductors; however, none of the wells were permanently abandoned in accordance with OCSLA regulations. Post-storm surveying indicates that the conductors were possibly bent near the original well bay location and pulled in the direction of the jacket and are currently buried 21-45 m (70-150 ft) below the mudline. During early recovery efforts, Taylor Energy

Company tried to excavate sediments from the former platform site to gain access to the wells; however, the volume of sediments made the jetting efforts ineffective.

As a result of the impacts from the oil-spill event, on December 22, 2021, a Federal District Court found Taylor Energy liable for well decommissioning and affected environment restoration. Taylor has been ordered to provide DOI \$432 million towards decommissioning efforts. The settlement was finalized on March 18, 2022, and includes \$16.5 million to fund coastal natural resource restoration projects. In an effort to manage the restoration projects, BOEM, BSEE, and the USCG signed a memorandum of agreement on December 6, 2022.

As a part of the natural resource restoration efforts, PanGeo Subsea conducted a Full-Field Subsurface Survey to determine the extent, expanse, orientation, and characteristics of the well conductors and other below mudline components from at the MC20 site. Data collected from the survey will be used to outline phase(s) of the MC20 project and help develop options/plan for decommissioning. Subsurface scanning was completed on July 9, 2022.

### Oil-Spill Analysis Summary

The ranges presented in this oil-spill analysis summary were derived from the scenarios presented in the 2017-2022 GOM Multisale EIS. Upon evaluation of Alternative D, oil spill figures are anticipated to be similar to, but no greater than, Alternative A. The proposed lease sale area for this alternative is smaller than Alternative A and may reduce the area of potential impact. The reduction to the proposed lease sale area does not directly correlate to OCS oil- and gas-related activity, which is projected to shift to the proposed lease sale area.

#### ***Analysis of Offshore Spills $\geq 1,000$ bbl***

The mean number of spills estimated to occur as a result of each alternative is provided in **Table 3-5**. The range of the mean number of spills reflects the range of oil production volume estimated as a result of each alternative. The mean number of future spills  $\geq 1,000$  bbl is calculated by multiplying the spill rate by the volume of oil estimated to be produced as a result of each alternative. Spill rates were calculated based on the assumption that spills occur in direct proportion to the volume of oil handled and are expressed as the number of spills per billion barrels of oil handled (spills/BBO).

Table 3-5. Mean Number and Sizes of Spills Estimated to Occur in OCS Offshore Waters from an Accident Related to Rig/Platform and Pipeline Activities Supporting Each Alternative Over a 50-Year Time Period.

Spill Size Group	Spill Rate (spills/BBO) <sup>1</sup>	Number of Spills Estimated			Estimated Median Spill Size (bbl) <sup>1</sup>
		Alternative A	Alternative B	Alternative C	
0-1.0 bbl	2,020	424-2,258	374-1,959	51-290	<1
1.1-9.9 bbl	57.4	12-64	11-56	2-9	3
10.0-49.9 bbl	17.4	4-20	3-17	1-3	
50.0-499.9 bbl	11.3	2-13	2-11	<1-2	126
500.0-999.9 bbl	1.63	<1-2	<1-2	<1	

Platforms					
≥1,000-9,999 bbl	0.25	<1	<1	<1	5,066
≥10,000 bbl	0.13	<1	<1	<1	
Pipelines					
≥1,000-9,999 bbl	0.88	<1-1	<1	<1	1,720
≥10,000 bbl	0.18	<1	<1	<1	

Notes: The number of spills estimated is derived by application of the historical rate of spills (1996-2010) per volume of crude oil handled based on the projected production for each alternative (**Table 3-3**). The actual number of spills that may occur in the future could vary from the estimated number.

<sup>1</sup> The spill rates presented are a sum of rates for United States OCS platforms/rigs and pipelines. The average (vs. the median) spill sizes for a larger number of spill size categories can also be found in the original source (Anderson et al. 2012).

The probabilities for oil-spill occurrence resulting from each alternative (2017-2066) and the Cumulative OCS Oil and Gas Program (2017-2086) for offshore spills ≥1,000 bbl can be found in **Table 3-6** and for spills ≥10,000 bbl in **Table 3-7**. The Oil-Spill Risk Analysis (OSRA) model estimates the chance of oil spills occurring during the production and transportation of a specific volume of oil over the lifetime of the scenario being analyzed. The estimation process uses a spill rate constant, based on historical accidental spills ≥1,000 bbl and ≥10,000 bbl, expressed as a mean number of spills per billion barrels of oil handled. For this analysis, the low estimate and high estimate of projected oil production for a single lease sale for each alternative and for the Cumulative OCS Oil and Gas Program (2017-2086) are used. For more information on OCS spill-rate methodologies and trends, refer to Anderson et al. (2012). A discussion of how the range of resource estimates was developed is provided in Chapter 3.1.2 of the 2018 GOM Supplemental EIS.

Table 3-6. Oil-Spill Occurrence Probability Estimates for Offshore Spills ≥1,000 Barrels Resulting from Each Alternative (2017-2066) and the Cumulative OCS Oil and Gas Program (2017-2086).

	Forecasted Oil Production (Bbbl) <sup>1</sup>	Mean Number of Spills Estimated to Occur				Estimates of Probability (% chance) of One or More Spills			
		Platforms	Pipelines	Tankers	Total	Platforms	Pipelines	Tankers	Total
<b>Single Lease Sale Alternatives</b>									
Alternative A <sup>2</sup>	0.210	0.05	0.19	0	0.24	5	17	<0.5	21
	1.118	0.28	0.98	0.01	1.27	24	63	<0.5	72
Alternative B <sup>3</sup>	0.185	0.05	0.16	0	0.21	5	15	<0.5	19
	0.970	0.24	0.85	0	1.10	22	57	<0.5	67
Alternative C <sup>4</sup>	0.026	0.01	0.02	0	0.03	1	2	<0.5	3
	0.148	0.04	0.13	0	0.17	4	12	<0.5	15
<b>Cumulative OCS Oil and Gas Program</b>									
GOM	15.482	3.87	13.62	0.08	17.57	98	>99.5	7	>99.5
	25.806	6.45	22.71	0.13	29.29	>99.5	>99.5	12	>99.5
CPA/EPA	13.590	3.40	11.96	0.07	15.42	97	>99.5	7	>99.5
	22.381	5.60	19.70	0.11	25.40	>99.5	>99.5	11	>99.5
WPA	1.892	0.47	1.66	0	2.14	38	81	<0.5	88
	3.425	0.86	3.01	0	3.87	58	95	<0.5	98

Notes: Bbbl = billion barrels.

"Platforms" refers to facilities used in exploration, development, or production.

<sup>1</sup> Values represent the low and high resource estimates. Refer to **Table 3-1** for more information on resource estimates.

<sup>2</sup> A lease sale in the WPA, CPA, and the areas of the EPA not under Presidential withdrawal.

<sup>3</sup> A lease sale excluding blocks in the WPA.

<sup>4</sup> A lease sale excluding blocks in the CPA/EPA.

Source: Ji et al. (2017).

Table 3-7. Oil-Spill Occurrence Probability Estimates for Offshore Spills  $\geq 10,000$  Barrels Resulting from Each Alternative (2017-2066) and the Cumulative OCS Oil and Gas Program (2017-2086).

	Forecasted Oil Production (Bbbl) <sup>1</sup>	Mean Number of Spills Estimated to Occur				Estimates of Probability (% chance) of One or More Spills			
		Platforms	Pipelines	Tankers	Total	Platforms	Pipelines	Tankers	Total
<b>Single Lease Sale Alternatives</b>									
Alternative A <sup>2</sup>	0.210	0.03	0.04	0	0.07	3	4	<0.5	6
	1.118	0.15	0.20	0	0.35	14	18	<0.5	29
Alternative B <sup>3</sup>	0.185	0.02	0.03	0	0.06	2	3	<0.5	6
	0.970	0.13	0.17	0	0.30	12	13	<0.5	26
Alternative C <sup>4</sup>	0.026	0	0	0	0.01	<0.5	<0.5	<0.5	1
	0.148	0.02	0.03	0	0.05	2	3	<0.5	4
<b>Cumulative OCS Oil and Gas Program</b>									
GOM	15.482	2.01	2.79	0.02	4.82	87	94	2	99
	25.806	3.35	4.65	0.04	8.04	97	99	4	>99.5
CPA/EPA	13.590	1.77	2.45	0.02	4.23	83	91	2	99
	22.381	2.91	4.03	0.04	6.97	95	98	4	>99.5
WPA	1.892	0.25	0.34	0	0.59	22	29	<0.5	44
	3.425	0.45	0.62	0	1.06	36	46	<0.5	65

Notes: Bbbl = billion barrels.

"Platforms" refers to facilities used in exploration, development, or production.

<sup>1</sup> Values represent the low and high resource estimates. Refer to **Table 3-1** for more information on resource estimates.

<sup>2</sup> A lease sale in the WPA, CPA, and the areas of the EPA not under Presidential withdrawal.

<sup>3</sup> A lease sale excluding blocks in the WPA.

<sup>4</sup> A lease sale excluding blocks in the CPA/EPA.

Source: Ji et al. (2017).

### ***Analysis of Offshore Spills <1,000 bbl***

The number of spills <1,000 bbl estimated to occur over the next 50 years as a result of each alternative is provided in **Table 3-5**. The number of spills is estimated by multiplying the oil-spill rate for each of the different spill size groups by the projected oil production as a result of each alternative (**Table 3-1 and Table 3-3**). As spill size increases, the occurrence rate decreases and so the number of spills estimated to occur decreases.

### ***Analysis of 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. These spills occur at shoreline storage, processing, and transport facilities supporting the OCS oil and gas industry. BOEM projects that most (>90%) oil produced as a result of a Proposed Action under the action alternatives would be brought ashore via pipelines to oil pipeline shore bases, stored at these facilities, and eventually transferred via pipeline or barge to GOM coastal refineries. Because oil is commingled at shore bases and cannot be directly attributed to a particular lease sale, this analysis

of coastal spills addresses spills that could occur prior to the oil arriving 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.

Table 3-13 of the 2018 GOM Supplemental EIS details the number of spills that have occurred in the GOM by state between January 2002 and July 2005. When limited to just oil- and gas-related spill sources such as platforms, pipelines, mobile offshore drilling units (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  $\geq 1,000$  bbl occur in water 0-3 mi (0-5 km) offshore. Between 2002 and 2015, only two spills  $\geq 1,000$  bbl occurred in coastal waters (refer to Table 3-13 of the 2018 GOM Supplemental EIS), and those occurred in the coastal waters of Louisiana.

### 3.3.2 Collisions

Most collision mishaps are the result of service vessels colliding with platforms or vessel collisions with pipeline risers. From 1999-2018, the leading causes of 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 2019).

### 3.3.3 Chemical and Drilling-Fluid Spills

BOEM has reexamined the information for chemical and drilling-fluid spills presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. BOEM corresponded with BSEE personnel and examined BSEE's annual reports from 2015 and 2016, as well as checked a previously used webpage (BSEE 2015; 2016). **Table 3-8** (below) updates Table 3-21 (Number and Volume of Chemical and Synthetic-Based Fluid Spills for 10-49 Barrels and >50 Barrels in the Gulf of Mexico from 2007 through 2014) of the 2017-2022 GOM Multisale EIS (Tolbert et al. 2017). In 2015, there was a synthetic-based fluid spill that was larger than some previously reported. BSEE was not aware of any special reason for this. Despite that, the averages appear to be within the range of typical reported data.

Table 3-8. Number and Volume of Chemical and Synthetic-Based Fluid Spills With Sizes 10-49 Barrels and >50 Barrels in the Gulf of Mexico from 2007 through 2016.

Year	Product Lost (bbl)		Number of Spills		Average Spill Volume (bbl)	
	SBF	Chemical	SBF	Chemical	SBF	Chemical
A. Spills 10-49 bbl						
2007	110	17	6	1	18	17
2008	73	102	2	6	37	17
2009	38	24	1	2	38	12

Year	Product Lost (bbl)		Number of Spills		Average Spill Volume (bbl)	
	SBF	Chemical	SBF	Chemical	SBF	Chemical
2010	54	51	3	3	18	17
2011	73	0	2	0	37	0
2012	88	12	4	1	22	12
2013	51	20	2	1	26	20
2014	0	0	0	0	0	0
2015	12	41	1	1	12	41
2016	0	78	0	3	0	26
New average with 2015/2016 numbers	50	35	2	2	21	16
Average value before 2015/2016 data	61	28	3	2	24	12
<b>B. Spills Greater Than 50 bbl</b>						
Year	Product Lost (bbl)		Number of Spills		Average Spill Volume (bbl)	
	SBF	Chemical	SBF	Chemical	SBF	Chemical
2007	1,518	550	2	1	759	550
2008	1,849	3,229	2	16	925	202
2009	602	500	4	3	151	167
2010	131	123	2	1	66	123
2011	252	0	2	0	126	0
2012	158	1,595	3	5	53	319
2013	0	0	0	0	0	0
2014	323	66	3	1	108	66
2015	2,712	628	3	2	904	314
2016	175	1,274	1	2	175	637
New average with 2015/2016 numbers	772	797	2	3	327	238
Average value before 2015/2016 data	604	758	2	3	273	178

bbl = barrel.

SBF = synthetic-based fluid.

### 3.3.4 Spill Response

In the event of a spill, particularly a loss of well control, there is no single method of containment and removal that would be 100-percent effective. 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. It is likely that larger spills under the right conditions would require the

simultaneous use of all available cleanup methods. There are many situations and environmental conditions that could necessitate different approaches. Spill cleanup is a complex and evolving technology, and every new tool then becomes part of the spill-response tool kit. Therefore, each spill-response technique/tool has its specific uses and benefits (Walker and Fingas 2017). 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 could 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 3.2.8 of the 2017-2022 GOM Multisale EIS for more information on specific spill-response techniques. For information on the effects of spill-response activity, refer to Chapter 4 of the 2017-2022 GOM Multisale EIS.

As a result of the Oil Pollution Act of 1990, BSEE is 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. Additional information about the Oil Spill Preparedness Division can be found on BSEE's website at <http://www.bsee.gov/About-BSEE/Divisions/OSPD/index/>. To summarize, BSEE implements regulations found at 30 CFR part 250 and 30 CFR part 254. BSEE sets the requirements, reviews, and approves all oil-spill response plans (OSRPs) no matter how they are submitted and requires the training, equipment testing, and periodic drills listed in the OSRP to be carried out as well as conducting unannounced drills to ensure compliance with OSRPs. The BSEE equipment deployment exercises are designed most often to take place in waterways adjacent to where the equipment is stored to test the equipment that is proposed to be used offshore during the response, but the exercise may be moved to an alternate location if BSEE's exercise parameters require it. BSEE is considering locating its exercises either offshore or large open water bodies that simulate offshore conditions. All spills  $\geq 1$  bbl must be reported to the USCG and BSEE receives notice of these spills. BSEE conducts investigations into spills, may assesses 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 DOCDs on the OCS. BOEM implements regulations found at 30 CFR part 553 by managing the Oil Spill Financial Responsibility Program (OSFR) which requires industry to show financial responsibility to respond to possible spills. BOEM requires that an operator must either submit as initial OSRP or reference an existing approved OSRP prior to approval of an operator-submitted exploration, development, or production plan. Refer to Chapter 3.2.8 of the 2017-2022 GOM Multisale EIS for more information.

### 3.4 CUMULATIVE ACTIVITIES

A cumulative impact “results from the incremental impact of [an] action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR § 1508.7). 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 Gulf of Mexico, currently and into the foreseeable future. Repeated actions, even minor ones, may produce significant impacts over time.

The cumulative impacts assessment focuses on the resources, ecosystems, and human communities that may be affected by the incremental impacts associated with a Proposed Action (under any of the action alternatives), in combination with other past, present, and reasonably foreseeable future actions. 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).

Many of the past, present, and reasonably foreseeable future actions and trends that would contribute to cumulative impacts under any of the action alternatives (Alternatives A-D) also contribute to cumulative impacts under the No Action Alternative (Alternative E). As a result, a separate treatment of the cumulative effects under Alternative E is not considered here, and the cumulative impacts analysis under Alternative A remains applicable. Under Alternative E, a Proposed Action (i.e., a single OCS oil and gas lease sale ) would not occur and, as a result, energy could be obtained from other sources to replace the lost oil and gas production. The opportunity for development of the estimated oil and gas that could have resulted from a Proposed Action (i.e., a single lease sale) or alternative to a Proposed Action, as described above, would be precluded or postponed to a future lease sale, as detailed in **Chapter 2.3.1.5**.

#### 3.4.1 Cumulative OCS Oil and Gas Program Scenario

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, current, and future lease sales. This includes projected activity from past lease sales for which exploration or development has either not yet begun or is continuing and from future lease sales that would be held as a result of current or future Five-Year Programs (5 programs are included in this cumulative analysis). This equates to a 70-year timeframe or 2017-2086 and includes a 50-year analysis period (2017-2066) for a single lease sale. Activities that take place as a result of Five-Year Programs beyond the next four programs are not included in this analysis.

It is reasonably foreseeable to assume that lease sales would continue to be proposed for many years to come, at least until 2032, in the Gulf of Mexico region based on resource availability, existing infrastructure, projected time lapses required for any other major energy sources to come online, and language in the Inflation Reduction Act of 2022 that requires that, as conditions for issuing any “lease for offshore wind development,” the Department hold “an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development”

and “the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres.” For the purposes of conducting cumulative impact analyses here, even though additional NEPA reviews would be required, five National OCS Programs were assumed to occur (the current National OCS Program plus an additional 4; therefore, an additional 20 years of lease sales), resulting in activities that could occur over the next 70 years. However, the level of activities (i.e., exploration wells, production wells, and pipelines) becomes more speculative as time is projected into the future. The causes for this include 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 a lease sale.

Therefore, these scenarios do not predict future OCS oil- and gas-related activities with absolute certainty, even though they were formulated using historical information and current trends in the oil and gas industry. These 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 Supplemental 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 development 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 programs. Methodologies for the Cumulative OCS Oil and Gas Program scenario are similar to those for a typical lease sale scenario analysis and are described in detail in above. **Table 3-9 and Table 3-10** present projections of the major activities and impact-producing factors related to future Cumulative OCS Oil and Gas Program activities.

Table 3-9. Future Activity Projections Associated with the Cumulative OCS Oil and Gas Program (2017-2086), Including All Future Activities, That are Projected to Occur from Past, Current, and Future Lease Sales.

Activity	Region <sup>1</sup>	Offshore Subareas (m) <sup>2</sup>						Totals <sup>3</sup>
		0-60	60-200	200-800	800-1,600	1,600-2,400	>2,400	
Exploration and Delineation Wells	GOM	939-2,562	253-1,166	110-170	153-240	97-278	119-301	1,671-4,717
	CPA/EPA	775-1,999	202-1,007	83-142	88-184	70-142	99-211	1,317-3,685
	WPA	164-563	51-159	27-28	65-56	27-136	20-90	354-1,032
Development and Production Wells <sup>4</sup>	GOM Total	4,050-9,225	1,570-4,324	912-2,034	617-1,127	446-723	633-985	8,238-18,418
	CPA/EPA Total	3,170-6,634	1,139-3,558	676-1,557	490-779	405-623	595-899	6,475-14,050
	WPA Total	880-2,591	431-766	236-477	137-348	41-100	38-86	1,763-4,368
	GOM Oil	438-987	164-453	446-993	280-487	230-372	310-482	1,868-3,774
	CPA/EPA Oil	354-740	122-379	326-750	240-385	207-319	289-437	1,538-3,010
	WPA Oil	84-247	42-74	120-243	40-102	23-53	21-45	330-764
	GOM Gas	2,440-5,566	894-2,457	186-415	149-288	79-126	126-194	3,874-9,046
CPA/EPA Gas	1,898-3,972	645-2,015	142-327	95-152	72-110	119-179	2,971-6,755	

	WPA Gas	542-1,594	249-442	44-88	54-136	7-16	7-15	903-2,291
Installed Production Structures	GOM	2,168-5,121	558-1,638	36-71	26-38	16-38	23-42	2,827-6,948
	CPA/EPA	1,760-3,682	432-1,347	23-54	17-26	14-21	20-30	2,266-5,160
	WPA	408-1,439	126-291	13-17	9-12	2-17	3-12	561-1,788
Production Structures Removed Using Explosives	GOM	2,435-4,388	568-1,310	0	0	0	0	3,003-5,698
	CPA/EPA	2,051-3,315	440-1,065	0-0	0-0	0-0	0-0	2,491-4,380
	WPA	384-1,073	128-245	0-0	0-0	0-0	0-0	512-1,318
Total Production Structures Removed	GOM	3,381-6,148	784-1,796	39-69	36-44	20-33	21-31	4,281-8,121
	CPA/EPA	2,847-4,639	608-1,459	26-54	25-31	17-22	18-24	3,541-6,229
	WPA	534-1,509	176-337	13-15	11-13	3-11	3-7	740-1,892
Length of Installed Pipelines (km) <sup>5</sup>	GOM	2,181-15,822	1,432-10,511	1,078-8,037	1,268-8,265	700-7,001	704-7,359	7,363-56,995
	CPA/EPA	586-11,799	388-8,355	328-6,390	385-6,381	364-6,168	405-6,750	2,456-45,843
	WPA	1,595-4,023	1,044-2,156	750-1,647	883-1,884	336-833	299-609	4,907-11,152
Service-Vessel Trips (1000's of Trips)	GOM	2,443-6,998	645-2,300	284-942	213-556	134-498	187-577	3,909-11,873
	CPA/EPA	1,978-5,037	496-1,892	186-722	140-389	115-306	163-440	3,079-8,788
	WPA	465-1,960	150-408	98-221	72-167	19-192	23-137	830-3,085
Helicopter Operations (1000's of Operations)	GOM	11,714-55,063	4,511-25,155	270-1,162	183-651	139-422	183-546	17,000-83,000
	CPA/EPA	9,614-40,734	3,544-21,159	191-898	148-440	121-352	165-475	13,786-64,059
	WPA	2,098-14,329	966-3,996	78-264	34-211	17-70	17-70	3,214-18,941

<sup>1</sup> Region GOM would be past and future regionwide lease sale activity, Alternative CPA/EPA would be the Central and Eastern Planning Areas' activity, and Alternative WPA would be the Western Planning Area portion of the GOM lease sale area.

<sup>2</sup> Refer to **Figure 3-1**.

<sup>3</sup> Subareas totals may not add up to the planning area total because of rounding.

<sup>4</sup> Development and Production Wells include some exploration wells that were re-entered and completed. These wells were removed from the Exploration and Delineation Wells count.

<sup>5</sup> Projected length of pipelines does not include length in State waters.

Table 3-10. Future Oil Transportation Projections Associated with the Cumulative OCS Oil and Gas Program (2017-2086), Including All Future Transportation, That are Projected to Occur from Past, Current, and Future Lease Sales.

Activity	Region	Offshore Subareas (m) <sup>1</sup>						Totals <sup>2</sup>
		0-60	60-200	200-800	800-1,600	1,600-2,400	>2,400	
Percent Oil Piped <sup>3</sup>	GOM	94-95%	100%	100%	100%	89.6-87.4%	87.4-85.7%	91.6-90.6%
	CPA/EPA	94-95%	100%	100%	100%	97.8-96.3%	94.9-95.3%	90.8-91.0%
	WPA	100%	100%	100%	100%	100-89%	100-86.4%	100-95.1%
Percent Oil Barged	GOM	6-5%	0%	0%	0%	0%	0%	0.2%
	CPA/EPA	6-5%	0%	0%	0%	0%	0%	0.2%
	WPA	0%	0%	0%	0%	0%	0%	0%
Percent Tankered <sup>4</sup>	GOM	0%	0%	0%	0%	10.4-12.6%	12.6-14.3%	8-9%
	CPA/EPA	0%	0%	0%	0%	12.2-13.7%	5.1-4.7%	9-8.75%
	WPA	0%	0%	0%	0%	0-11%	0-13.6%	0-4.85%

- <sup>1</sup> Refer to **Figure 3-1**. Ranges are reported from the low production case scenario to the high production case scenario.
- <sup>2</sup> Subareas totals may not add up to the planning area total because of rounding.
- <sup>3</sup> 100% of gas is assumed to be piped.
- <sup>4</sup> Tankering is forecasted to occur only in water depths >1,600 m (5,250 ft).

### **3.4.2 Non-OCS Oil- and Gas-Related Impact-Producing Factors**

The impact-producing factors 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 aforementioned projected routine activities and potential accidental events, but that are not related to the Cumulative OCS Oil and Gas Program. Chapter 3.3.2 of the 2018 GOM Supplemental EIS summarizes other impact-producing factors that could potentially affect an environmental or socioeconomic resource in addition to OCS oil- and gas-related activity.

#### **State Oil and Gas**

Cumulative offshore production in Texas State waters has increased since 2010 to 42.70 billion barrels of oil and 4.21 trillion cubic feet of gas (Railroad Commission of Texas 2020a; 2020b). Oil and gas production in Louisiana State waters has decreased since 2013 to a level of 4.24 million barrels of oil in 2019, with 2.17 million barrels of oil in 2020 year-to-date, and 15.3 million cubic feet of gas in 2019, with 6.81 million cubic feet of gas in 2020 year-to-date (Louisiana Department of Natural Resources 2020a; 2020b). In Alabama between 1987 and 2018, a total of 3.943 trillion cubic feet of gas and 764,270 barrels of oil were produced in State waters (Alabama Oil and Gas Board 2018). No new information was found for Mississippi or Florida.

#### **Rigs-to-Reefs**

Recent data suggest that the Rigs-to-Reefs Program is increasing in utilization. From 2002 through September 19, 2017, an average of 12.8 percent of removal permits were requested to be considered for the Rigs-to-Reefs Program (BSEE 2020f).

#### **Marine Vessel Activity**

As of 2015, total vessel calls in U.S. Gulf of Mexico ports made up more than one-half (51% of all calls) the total vessel calls in the United States (MARAD 2015). Tankers also make more calls (31% of all calls) in U.S. Gulf of Mexico ports than in other areas of the United States.

#### **Major Storms**

From 2017 to 2022, several hurricanes and tropical storms crossed through the GOM or made landfall on coastal areas of the GOM. 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 platforms and refineries from each hurricane or tropical storm appeared minimal (BSEE 2017a; 2017b; 2017c; 2018a; 2018b; 2019a; 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 2 mi (3 km) south of Port Fourchon, Louisiana, which was attributed to a ruptured pipeline, and a spill discovered 5 mi (8 km) from the Bay Marchand Port, which was attributed to a wellhead discharging oil (Powell 2021; USCG 2021).

### **Eutrophication and Hypoxia**

In 2022, the area of low oxygen that forms annually in the Gulf of Mexico was the eighth smallest on record since the data collection initiative started 36 years ago. The area was measured as 3,275 mi<sup>2</sup> (8,480 km<sup>2</sup>), which was smaller than the forecasted size of 5,792 mi<sup>2</sup> (15,200 km<sup>2</sup>) (Louisiana State University and Louisiana Universities Marine Consortium 2022).

No new information was found for non-OCS oil- and gas-related spills, military warning and water test areas, offshore deepwater ports and nearshore liquefied natural gas terminals, development of gas hydrates, aquaculture, OCS sand borrowing, noise from non-OCS oil- and gas-related activity, coastal environments, Mississippi River hydromodification and eutrophication, and sedimentation.

## **CHAPTER 4**

### **AFFECTED ENVIRONMENT AND IMPACT ANALYSIS**



## **4 AFFECTED ENVIRONMENT AND IMPACT ANALYSIS**

### **4.0 OVERVIEW**

The impacts of a GOM lease sale were analyzed in the 2017-2022 GOM Multisale EIS. The 2018 GOM Supplemental EIS was prepared to update the analyses and inform decisions for the GOM lease sales in 2018 and beyond, as appropriate, and like the 2017-2022 GOM Multisale EIS, analyzes a single Proposed Action (i.e., a Gulf of Mexico OCS oil and gas lease sale). This Supplemental EIS contains summaries of and updates to the previous analyses of the potential environmental impacts that could result under Alternatives A-E from a lease sale in the Gulf of Mexico (i.e., GOM Lease Sale 259), but the analyses may be applied and supplemented as appropriate to inform the decision for GOM Lease Sale 261. This Supplemental EIS tiers from, summarizes, updates, and incorporates by reference all of the relevant material in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### **4.0.1 Issues Analyzed in this Supplemental EIS**

The major issues that frame the environmental analyses in this Supplemental EIS are the result of concerns raised during years of scoping for the Gulf of Mexico OCS Oil and Gas Program. Issues related to OCS oil and gas exploration, development, production, and transportation activities include the potential for oil spills, wetlands loss, air emissions, wastewater discharges and water quality degradation, marine trash and debris, structure and pipeline emplacement activities, platform removal, vessel and helicopter traffic, multiple-use conflicts, support services, demographics, land-use planning, impacts to recreation and beaches, aesthetic interference, environmental justice, and consistency with State coastal zone management programs. Environmental resources and activities identified during the scoping process for the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS that warrant an environmental analysis include air quality, water quality, coastal habitats (including wetlands, seagrasses/submerged aquatic vegetation, barrier beaches and associated dunes), deepwater benthic communities, *Sargassum* and associated communities, live bottom habitats (including topographic features and live bottom [pinnacle trend] features), fishes and invertebrate resources, birds, marine mammals, sea turtles, beach mice, protected birds, protected corals, commercial fisheries, recreational fishing, recreational resources, archaeological resources, land use and coastal infrastructure, economic factors, and socioeconomic factors (including environmental justice).

#### **4.0.2 Issues of Programmatic Concern**

##### **4.0.2.1 Climate Change**

Climate change has led to increased numbers and intensity of storms and hurricanes, which have led to greater storm damage and erosion in coastal areas. Erosion of the Nation's beaches, dunes, and coastal wetlands affects natural resources, energy, defense, public infrastructure, and tourism, which are important to healthy ecosystems and the economy at all levels. In order to mitigate these issues, OCS sediment can be used to replenish coastal areas that have experienced storm damage. Storm damage mitigation for coastal resiliency has led to a greater need for OCS sediment,

which, in turn, requires dredging from a greater number of SSRAs in the GOM. In recent years BOEM has experienced a significant increase in the volume of sediment requested and the number of requests to use OCS sediment resources. This trend is most likely due to a diminishing supply of available material in State waters, increased coastal erosion due to more frequent and intense storms, sea-level rise, and because taking OCS sediment from the Federal OCS is outside the system that allows sediment volume to be added to the system rather than just moving it toward the beach. Using sediment from the OCS for beach nourishment and habitat restoration will help address serious erosion issues and help build coastal resiliency. In addition, there is a potential for space-use conflicts between OCS oil- and gas-related activities and OCS sediment dredging occurring in the same areas. Refer to **Chapter 2.3.4** for more detail on space-use conflicts identified.

Climate change is also the impetus for a transition to a clean energy future. Demand for offshore wind energy has never been greater. Technological advances, falling costs, increased interest, and tremendous economic potential make offshore wind the most promising avenue for diversifying the national energy portfolio. Adding offshore wind to the national energy portfolio will also help in the battle against climate change. Offshore wind is an abundant and efficient alternative domestic energy resource found close to major coastal cities, where more than half of the U.S. population resides and where energy needs are high. Compared to onshore wind, offshore winds are generally stronger and more consistent. Since higher wind speeds can produce significantly more energy and electricity, there is increasing interest in developing offshore wind energy on the OCS. BOEM has an emerging Renewable Energy Program in the GOM and has identified several draft and two final WEAs for future wind energy development. Building renewable energy projects in the draft and final identified WEAs would contribute to the transition to a clean energy future and help to battle climate change. In addition, there is a potential for space-use conflicts between OCS oil- and gas-related activities and OCS wind energy-related activities occurring in the same areas. Refer to **Chapter 2.3.4** for more detail on space-use conflicts identified.

Issues related to climate change, including global warming, sea-level rise, and programmatic aspects of climate change relative to the environmental baseline for the GOM are discussed in Chapter 4.2.1 of the 2017-2022 National OCS Program EIS and are hereby incorporated by reference. New information since publication of the 2017-2022 National OCS Program EIS, 2017-2022 GOM Multisale EIS, and 2018 GOM Supplemental EIS was found for climate change after searching relevant sources, including Google Scholar, government agencies, and climate science journal publications. This new information contributes to BOEM's understanding of climate change issues, but it does not change the conclusions presented in the 2017-2022 National OCS Program EIS, 2017-2022 GOM Multisale EIS, and 2018 GOM Supplemental EIS. For instance, a growing wealth of long-term atmospheric, ocean, and ecosystem observations has provided fundamental information on how climate change affects the way that carbon moves through Earth's environment; however, many fundamental questions remain unanswered (Kaushik et al. 2020). The most challenging issue with societal relevance is whether the rate at which the land and ocean can sequester carbon will continue to keep pace with rising carbon dioxide and methane emissions.

A revision of the “Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions” was proposed (<https://www.regulations.gov/>, docket ID CEQ-2019-0002) (84 FR 30097) in recent years; however, the CEQ rescinded that guidance consistent with Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (86 FR 7037; 86 FR 10252). Although currently under review, this is the most recent CEQ guidance on the issue of greenhouse gas emissions. The Gulf Coast provides a valuable setting to study deeply connected natural and human interactions (National Academies of Sciences 2018). In particular, the concentration of energy-related infrastructure in the region has imprinted changes in the natural landscape. The comprehensive NASEM 2018 study identifies critical areas of research on relevant long-term timescales, i.e., 10-50 years and 50-200 years, that encompass high-priority gaps in understanding regional climate change. Regarding GHG emissions from land sources, Merrill et al. (2018) includes natural sequestration systems to discuss net emissions of GHG associated with fossil fuels in the United States. Natural ecosystems can be sources or sinks (through sequestration) of GHG; however, there is scientific consensus that an important fraction of atmospheric CO<sub>2</sub> is absorbed by the ocean (USEPA 2017a). Merrill et al. (2018) used a dynamic vegetation model to estimate stocks and fluxes from land areas, but no coastal or oceanic natural environments were included to evaluate net GHG in the conterminous United States.

In August 2021, the Intergovernmental Panel on Climate Change (IPCC) unveiled its most recent assessment, the Sixth Assessment Report-AR6 (Intergovernmental Panel on Climate Change 2021a) addressing the most up-to-date physical understanding of Earth’s climate system and climate change. The full report chapters are publicly available, but only in an accepted and approved format. They remain subject to final edition and should be available as a final version in March 2023. The IPCC Working Group I wrote the latest report that would be the base document to inform negotiations in the United Nations Climate Change Conference of the Parties (COP26, <https://ukcop26.org/>) in October 2021. There is a debate regarding the baseline scenarios, known as Representative Concentration Pathways (RCP), proposed since previous IPCC Assessment reports and how much warming might result from a range of global carbon emissions (Wheeling 2020). The most extreme scenario RCP-8.5 (called business as usual) results in a substantial burning of fossil fuel, increase in global temperature of nearly 5°C, and mean sea level roughly a meter higher. However, Burgess et al. (2020) found that emissions trajectories in climate assessments from IPCC overshoot actual energy emissions over the past 15 years largely because socioeconomic factors are not considered in modeling simulations. On the other hand, Schawlm et al. (2020) stated that, despite recent progress in decreasing emissions, the most aggressive scenario (RCP-8.5) of fossil fuel use is as a useful tool for quantifying physical climate risk over near- to mid-term climate policy-relevant time horizons. Tong et al. (2019) declares that if existing fossil-fuel energy infrastructure continues to operate at recent historical rates, the committed Paris Agreement climate goals would be jeopardized.

The IPCC Summary for Policy Makers is a high-level document based on key findings of the IPCC Working Group I report in the AR6. Duncombe (2021) briefly summarizes five takeaways presented in the IPCC Summary for Policy Makers. For instance, global warming is predicted to reach 1.5°C above pre-industrial levels by the early 2030s, exceeding the lower goal of the Paris Agreement in 2015 (Richman 2015), with challenging consequences like the Arctic which could be ice free by

mid- to late century; sea level could rise by a meter by 2100, inundating cities; and extreme heat waves could become more intense and frequent. Global average temperature will be determined by the amounts of GHG emissions within the next decades. The new report presents five scenarios with high confidence levels based on socioeconomic assumptions, climate change mitigations, and air pollution controls. Two of them, the very low and low emissions stay below 2°C, and they require net-zero emissions and carbon removal by mid- to late century. The other three, mid-level, high, and very high emissions, are beyond the lower level of the Paris Agreement. Also, the AR6 states that for any long-term climate solution, net-zero carbon dioxide (CO<sub>2</sub>) is a requirement. Combined sharp cuts of CO<sub>2</sub> per decade and carbon capture are required in the most aggressive road map for policy makers.

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 2021b). These two reports comprise key technical information and data for the Fifth National Climate Assessment, which is a comprehensive and integrative research program to assess the impact of climate change in the U.S. by 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 (i.e., 0.25-0.30 m [0.82-0.98 ft] over 2020-2050) as it has over the last 100 years (1920-2020).

The American Meteorological Society published the *State of Climate in 2020* (Blunden and Boyer 2021), acknowledging that dominant GHG continued to increase in 2020 with concentrations for CO<sub>2</sub> at 412.5 ppm, the highest in the modern instrumental record and in ice core records dating back 800,000 years. While CO<sub>2</sub> emissions were estimated to decrease in 2020 during the COVID-19 pandemic, such reduction did not materially affect CO<sub>2</sub> atmospheric accumulation. The highest net oceanic uptake of CO<sub>2</sub>, approximately 3 petagrams, was observed in 2020 and was the highest in the 39-year record corresponding almost to 30 percent of two recent decades average. There was a transition between El Niño and La Niña conditions in 2020; even so, the annual global surface temperature over the land and oceans was among the three highest in records dating to the mid- to late 1800s. Although many recent studies have discussed the impacts of climate change, few have quantified the risks to socially vulnerable groups and understanding the degree-related impacts (USEPA 2021a).

## 4.1 GREENHOUSE GAS EMISSIONS ANALYSIS

This chapter provides an overview of BOEM's updated GHG methodology and results. BOEM updated its analysis of life cycle greenhouse gas emissions (Wolvovsky and Anderson 2016) to include a newly developed quantitative analysis of Alternative A's impact on foreign oil consumption and the resulting increase of GHG emissions. BOEM organizes its analysis into two parts. The first part estimates GHG emissions resulting from domestically produced or consumed fuels. The second part includes emissions when considering the shift in foreign oil consumption. Refer to the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c), which is incorporated by reference herein, for a more detailed discussion of the methodology, analysis, and results.

The domestic component quantifies full life cycle GHG emissions (i.e., upstream, midstream, and downstream) associated with fuels produced or consumed domestically. The analysis considers both the life cycle emissions associated with the Proposed Action (i.e., the production and consumption of OCS produced oil and gas under Alternative A) as well as the emissions associated with the energy substitutes that would replace the forgone OCS oil and gas under the No Action Alternative (e.g., the production and consumption of increased imports, increased onshore production, and fuel switching). The GHG emissions and social cost analysis presented here is taken directly from the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c). That document compares the leasing scenario, which is identical to Alternative A<sup>3</sup>, to the No Leasing scenario, which is the same as the No Action Alternative, or Alternative E when referencing a single lease sale.

In addition to estimating emissions from domestically produced or consumed products, BOEM's analysis also considers emissions associated with a change in foreign oil consumption. As a result of a lease sale, BOEM estimates a slight decrease in oil prices, which would increase global demand and lead to other changes in the global energy market. BOEM's analysis quantitatively considers the emissions associated with the increased global oil consumption and qualitatively addresses upstream and midstream emissions of foreign oil shifts and the full life cycle emissions of the shifts in other foreign energy market sources in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c).

**Table 4-1** shows the estimates of life cycle GHG emissions of domestically consumed or produced energy and the change in emissions associated with the increase in foreign oil consumption. These results, and the rest of the analysis and tables, are taken directly from the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c). BOEM estimates about 21.2 million metric tons of carbon dioxide equivalent (CO<sub>2</sub>e) will be emitted due to Alternative A from upstream activities and that 44.9 million metric tons of CO<sub>2</sub>e would be emitted from upstream activities associated with the energy substitutes in the No Action Alternative. The increase in emissions associated with the No Action Alternative represents the increase in per barrel GHG emissions from substitute sources. The mid- and downstream analysis shows that the No Action Alternative results in fewer emissions than Alternative A due in part to the estimated reduced demand associated with the relatively higher prices under the No Action Alternative. In net, the life cycle analysis of domestic consumption and production shows that selection of the No Action Alternative results in very similar emissions to the emissions estimated under Alternative A, with slightly higher GHG emissions under the No Action Alternative than would be emitted under Alternative A. When the analysis is expanded to consider emissions from foreign energy markets, BOEM finds the No Action Alternative results in fewer global GHG emissions as there would be an additional 46.8 million metric tons of global emissions as a result of a lease sale under Alternative A.

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<sup>3</sup> For the 2022 Gulf of Mexico GHG Analysis Addendum, BOEM used the mid-case scenario from the most recent 2017-2022 GOM Multisale EIS in its modeling of GHG emissions. This is deemed conservative for Alternative A since this mid-case represents the combined activity stemming from a single year in a 5-year and 10 lease sale schedule of lease sales. Further, Alternatives B-D are reductions of the Alternative A proposed lease sale area.

Table 4-1. Life Cycle Greenhouse Gas Emissions.

Mid-Activity Case (CO <sub>2</sub> e, thousands of metric tons)			
	Domestic Production and Consumption Only		Foreign Only
	Upstream	Midstream and Downstream	Downstream (oil only)
Alternative A	21,183	243,141	46,769
No Action	44,888	225,047	N/A
Difference	(23,705)	18,094	46,769

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

For ease of comparison, BOEM provides combined totals of all three GHG emissions in CO<sub>2</sub> equivalent, or CO<sub>2</sub>e. CH<sub>4</sub> and N<sub>2</sub>O are converted to CO<sub>2</sub>e using USEPA current Global Warming Potentials (USEPA 2021b).

After estimating GHG emissions, BOEM then monetizes the social costs of those GHG emissions to estimate Alternative A's incremental social cost of GHG emissions relative to the No Action Alternative (**Table 4-2**). At a 3 percent discount rate and an average level of statistical damages, having a lease sale under Alternative A would result in savings of \$440 million when considering domestically produced or consumed OCS oil, natural gas, and their substitutes alone. The social cost due to increased foreign emissions under Alternative A (3%, average statistical damages) is \$2.04 billion. While this does not consider the cost of GHG emissions from shifts in foreign energy market consumption of other substitute fuel sources or the upstream or midstream GHG emissions from any foreign energy market substitutes, BOEM believes that the quantified amount is a reasonable approximation given the best available and credible information currently available. The 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c) discusses in greater detail the components of the monetization and variation among the estimates, such as the discount rate and statistical damages.

Table 4-2. Total Social Cost of Greenhouse Gas Emissions.

Mid-Activity Case (billion 2022 \$)					
Discount Rate	Damages Statistic	Domestic Production and Consumption			Foreign Downstream Emissions from Oil
		Alternative A	No Action Alternative	Difference	
5.0%	Average	\$2.87	\$3.07	(\$0.21)	\$0.50
3.0%	Average	\$11.58	\$12.03	(\$0.44)	\$2.04
2.5%	Average	\$17.79	\$18.33	(\$0.55)	\$3.13
3.0%	95 <sup>th</sup> Percentile	\$35.26	\$36.33	(\$1.07)	\$6.21

Notes: Values rounded to nearest \$10 million. A positive value is a cost. A negative value is a benefit. The incremental social cost of greenhouse gases represents the difference between Alternative A and the No Action Alternative. Therefore, a negative incremental value suggests that costs are higher under the No Action Alternative or lower under Alternative A.

In conclusion, as described in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c), BOEM finds that there is only a marginal difference in domestic emissions from Alternative A relative to those of the No Action Alternative. As shown in **Table 4-1**, there are slightly higher emissions from substitutes under the No Action Alternative above those of Alternative A. However, when considering the higher GHG emissions estimated from an increase in foreign oil consumption under Alternative A (as presented in **Table 4-1**), BOEM finds that global GHG emissions under the No Action Alternative are estimated to be slightly lower when compared to those under Alternative A. While BOEM's analysis does include quantification of GHG emissions from foreign oil consumption, the analysis can neither include quantification of foreign oil's upstream and midstream nor foreign substitutes' full life cycle emissions at this time. However, such estimates would not be expected to change the general conclusions of BOEM's analysis as BOEM expects the result of fewer global GHG emissions in the No Action Alternative to remain<sup>4</sup>. BOEM's greenhouse gas quantitative and qualitative analyses together represent the best available and credible approach for comparison of GHG emissions from Alternative A and the No Action Alternative and serve as a proxy for evaluating and comparing impacts to climate change under Alternative A and the No Action Alternative.

As explained in **Chapter 3.2.2.1**, the results are based on model assumptions that do not account for changes in baseline supply and demand that may result from provisions, incentives, and mandates within the Inflation Reduction Act (IRA) of 2022. BOEM uses energy market projections by the Energy Information Administration in its Annual Energy Outlook (AEO) to establish BOEM's baseline scenario. The Annual Energy Outlook projections are based on laws and policies set before the passage of the IRA. Thus, the baseline scenario does not integrate, nor do their results account for impacts from the IRA. The Energy Information Administration is working to update its Annual Energy Outlook to include impacts on supply and demand from provisions within the IRA. BOEM expects this to be completed in 2023. BOEM will evaluate the Energy Information Administration's projections in the context of its 2022 Gulf of Mexico GHG Analysis Addendum when published.

BOEM acknowledges that there is incomplete and unavailable information or data related to the impacts of the IRA on energy markets as analyzed in BOEM's 2022 Gulf of Mexico GHG Analysis Addendum. This information may not be essential to a reasoned choice among alternatives when also considering the context of the IRA and GOM Lease Sales 259 and 261. New information and data compatible with BOEM's modeling methodology (i.e., the updated Energy Information Administration's Annual Energy Outlook) is not expected to be published in the timeframe of this NEPA analysis. BOEM is aware of recent publications that include results from modeling the impact of the IRA on domestic energy supply and demand, which are not complete nor compatible with BOEM's modeling. Most of them focus on the IRA's impact on the electricity and natural gas sectors (Jenkins et al. 2022; Larsen

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<sup>4</sup> As explained in Chapter 4 of the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022), the unquantified reductions would not be high enough to offset the increase in GHG emissions resulting from the increase in foreign oil consumption associated with new leasing because oil has higher emissions than all other substitute energy sources except coal. Moreover, downstream emissions accounts for the majority of the life cycle emissions, meaning most of the foreign GHG emissions have already been quantified in this analysis.

et al. 2022; Rennert et al. 2022)<sup>5</sup>. The quantitative results of one of these recent studies suggests that the impact to the domestic petroleum market would be very small (a decrease of less than 1% in demand) and minimal change supply (Larsen et al. 2022). Thus, while not complete, this recent study suggests that, at least for the domestic petroleum market, the IRA would not change BOEM's exploration and development scenarios or conclusions regarding global GHG emissions. The few available studies, to date, do not have sufficient detail to be able to determine how the IRA may affect foreign consumption and substitution. Nevertheless, even if BOEM was able to integrate the impacts of the IRA into its analysis of GHGs and determined that the information was essential for the decisionmaker when making a reasoned choice among alternatives, the IRA mandates that the lease sale be held. Therefore, the No Action Alternative is not available (but is included for analysis purposes), and the remaining alternatives are all subject to the same exploration and development scenarios and would have similar GHG emissions profiles as modeled in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c). Given these interim findings, BOEM has determined that the information is not essential to support a reasoned choice among alternatives.

#### 4.1.1 Supplemental EIS Impact Analyses

Summaries of the affected environment and the potential impacts of a single lease sale under each alternative are presented and reexamined in **Chapters 4.2-4.15**. The affected environment descriptions and impact analyses by resource are detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS, and are hereby incorporated by reference. The analysis of the alternatives for each resource considers routine activities, accidental events, cumulative impact analysis, incomplete or unavailable information, new information available since publication of the 2018 GOM Supplemental EIS, and conclusions for each resource. This Supplemental EIS also incorporated by reference from the 2017-2022 GOM Multisale EIS the baseline data in the assessment of impacts from a Proposed Action on the resources and the environment.

Within each resource summary and within the full analysis in the 2017-2022 GOM Multisale EIS, the cumulative analysis considers environmental and socioeconomic impacts that may result from the incremental impact of a Proposed Action when added to all past, present, and reasonably foreseeable future OCS oil- and gas-related activities (OCS Oil and Gas Program), as well as non-OCS oil- and gas-related activities (e.g., import tankering and commercial fishing). This includes projected activity from lease sales that have been held, but for which exploration or development has not yet begun or is continuing.

A summary of the potential impacts from a Proposed Action on each environmental and socioeconomic resource and the conclusions of the analyses can be found in the following

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<sup>5</sup> BOEM acknowledges that these reports estimate increases in renewables and electrification, along with decreases in natural gas consumption and net imports of petroleum. Their results would likely decrease estimates of domestic emissions for substitute energy sources produced and consumed under Alternative E (No Action). However, the study does not present these findings in a way that is compatible with BOEM's modeling framework. The Energy Information Administration's updated *Annual Energy Outlook*, expected in 2023, is expected to produce the necessary data for BOEM to quantifiably analyze the impacts of the IRA on its future GHG analyses once it is available.

discussions. **Table 4-3** provides a comparison of expected impact levels by alternative and is derived from the analysis of each resource. The findings for Alternatives A-E would be a Proposed Action’s *incremental contribution* to the cumulative impacts from past, present, and future activities in the GOM. These activities would include both OCS oil- and gas-related and non-OCS oil- and gas-related activities that would be expected regardless of whether or not a lease sale was to occur. The impact-level ratings have been specifically tailored and defined for each resource within the impact analysis of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. General impact conclusions are presented below. Cumulative impacts of current, past, and reasonably foreseeable future activities, however, would continue to occur under Alternative E.

It must be emphasized that, in arriving at the overall conclusions for certain environmental resources (e.g., birds, fisheries, and wetlands) for each alternative, the conclusions are based on potential impacts to the resources or species population as a whole, not to individuals, small groups of animals, or small areas of habitat. BOEM analyzes impacts on a finer geographic scale and mitigations that are appropriate for consideration through site-specific environmental reviews at the post-lease stage. Each resource topic discussion includes a threshold effects determination and includes a resource-specific definition of impact level. These discussions can be found in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Additionally, potential beneficial effects of a Proposed Action were considered and identified in individual resource chapters. For example, implementation of a lease sale is anticipated to have beneficial impacts in the Area of Interest for economics due to the direct and indirect spending associated with the oil and gas industry.

**Beneficial** – Impacts would be positive. The level of beneficial impacts is specified in the analysis, which could be low, medium, or high.

**Negligible** – Impacts may or may not cause observable changes to natural conditions; regardless, they do not reduce the integrity of a resource.

**Minor** – Impacts cause observable and short-term changes to natural conditions but they do not reduce the integrity of a resource.

**Moderate** – Impacts cause observable and short-term changes to natural conditions and/or they reduce the integrity of a resource.

**Major** – Impacts cause observable and long-term changes to natural conditions and they reduce the integrity of a resource.

Table 4-3. Alternative Comparison Matrix for a Single Lease Sale.

Impact Level Key <sup>1</sup>					
Beneficial <sup>2</sup>	Negligible	Minor	Moderate	Major	
Alternative					
Resource	A	B	C	D	E
Air Quality	Minor	Minor	Minor	Minor	None
Water Quality	Negligible	Negligible	Negligible	Negligible	None

Coastal Habitats Estuarine Systems	Moderate	Moderate	Minor	Moderate	Negligible	
	Minor	Minor	Negligible to Minor	Negligible to Minor	Negligible	
Coastal Barrier Beaches and Associated Dunes						
Deepwater Benthic Communities	Negligible	Negligible	Negligible	Negligible	None	
<i>Sargassum</i> and Associated Communities	Negligible	Negligible	Negligible	Negligible	None	
Live Bottoms Topographic Features	Negligible	Negligible	Negligible	Negligible	None	
	Negligible to Minor	Negligible to Minor	Negligible	Negligible	None	
Pinnacles and Low-Relief Features						
Fishes and Invertebrate Resources	Minor	Minor	Minor	Minor	None	
Birds	Moderate	Moderate	Moderate	Moderate	None	
Protected Species						
	Marine Mammals	Negligible	Negligible	Negligible	Negligible	None
	Sea Turtles	Negligible	Negligible	Negligible	Negligible	None
	Beach Mice	Negligible	Negligible	Negligible	Negligible	None
	Protected Birds	Negligible	Negligible	Negligible	Negligible	None
Protected Corals	Negligible	Negligible	Negligible	Negligible	None	
Commercial Fisheries	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible	
Recreational Fishing	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible	
Recreational Resources	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible	
Archaeological Resources	Negligible <sup>3</sup>	Negligible <sup>3</sup>	Negligible <sup>3</sup>	Negligible <sup>3</sup>	None	
Human Resources and Land Use						
	Land Use and Coastal	Minor	Minor	Minor	Minor	None
Infrastructure Economic Factors	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Beneficial to Minor	Negligible to Minor	
Social Factors (including Environmental Justice)	Minor	Minor	Minor	Minor	None	

Note: Some resources have a range for the impact levels to account for certain variables such as the uncertainty of non-OCS oil- or gas-related activities, the level and magnitude of potential accidental events, and the minimization of the OCS oil- or gas-related impacts through lease stipulations, mitigations, and/or regulations.

The impact-level ratings have been specifically tailored and defined for each resource within the Chapter 4 impact analysis of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

- <sup>1</sup> The findings for Alternatives A-D are the incremental contribution of a Proposed Action added to what would be expected to occur under the No Action Alternative (i.e., no lease sale). Therefore, each impact determination under Alternatives A-D assumes that the cumulative conditions and impacts (i.e., past, present, and future activities as a result of past lease sales) under the No Action Alternative would still be present.
- <sup>2</sup> The level of beneficial impacts is specified in the analysis, which could range from low, medium, or high.
- <sup>3</sup> The level of impacts for archaeological resources ranges between negligible to major and is dependent upon whether a survey is performed, mitigation is imposed, mitigation is followed, or a site is identified prior to the activity.

## 4.2 AIR QUALITY

### 4.2.1 Summary

BOEM has reexamined the analysis for air quality presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.2.4**. No new information was discovered that would alter the impact conclusion for air quality presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of air quality, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.1 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.1 of the 2018 GOM Supplemental EIS. **Chapter 4.2.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### 4.2.2 Analysis of Alternatives A-E Summary

Air quality is the degree of pollution in the ambient air and is assessed by measuring the pollutants in the air. To protect public health and welfare, the Clean Air Act established National Ambient Air Quality Standards (NAAQS) for certain common and widespread pollutants. The six common “criteria pollutants” are particle pollution (also known as particulate matter, PM<sub>2.5</sub> and PM<sub>10</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), lead (Pb), and ozone (O<sub>3</sub>). Air emissions from OCS oil and gas development in the Gulf of Mexico would arise from emission sources related to drilling and production with associated vessel support, flaring and venting, decommissioning, fugitive emissions, and oil spills. Associated activities that take place as a result of a Proposed Action support and maintain the OCS oil and gas platform sources. Air emissions from non-OCS oil- and gas-related emissions in the Gulf of Mexico would arise from emission sources related to State oil and gas programs, onshore industrial sources, onshore and offshore transportation sources, and natural events. Since the primary NAAQS are designed to protect human health, BOEM focuses on the impact of these activities on the States, where there are permanent human populations. For this Supplemental EIS analysis, the affected environment comprises the WPA, CPA, and EPA, including the States of Texas, Louisiana, Mississippi, Alabama, and Florida, and the respective State waters, as these are the areas that BOEM’s Gulf of Mexico Regional Office could reasonably be expected to impact. This area of potential effects also includes national parks and Federal wilderness areas where air quality and air quality-related values (primarily visibility) are protected more stringently than under

the NAAQS. There are protected Class I areas in the GOM region, specifically: the Breton Wilderness Area in Louisiana; and the Bradwell Bay Wilderness Area, Chassahowitza National Wilderness Area, Everglades National Park, and St. Marks Wilderness Area in Florida.

In the “Air Quality Modeling in the Gulf of Mexico Region” study (refer to **Chapter 4.2.4** of this Supplemental EIS and Appendices B-D of the 2018 GOM Supplemental EIS), photochemical grid modeling was conducted to assess the impacts to nearby states of existing and future OCS oil and gas exploration, development, and production. There are two versions of this study, which are described in more detail in **Chapter 4.2.4** of this Supplemental EIS. The conclusions based on the 2019 report did not change from the conclusions based on the 2018 draft interim assessment, which can be found in Appendices B-D of the 2018 GOM Supplemental EIS.

The air quality modeling study examines the potential impacts of the lease sales with respect to the NAAQS for the criteria pollutants O<sub>3</sub>, NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>2.5</sub>, PM<sub>10</sub>; the air quality-related values, including visibility and acid deposition (sulfur and nitrogen) in nearby Class I and sensitive Class II areas; and the incremental impacts of Prevention of Significant Deterioration (PSD) pollutants (NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>) with respect to PSD Class I and Class II increments. *(Note: For post-lease activities, if a facility is determined as a major source, a regulatory PSD increment consumption analysis as would be required in accordance with the New Source Review program requirements of the Clean Air Act).*

Historic trend data are limited for a lease sale consisting of the WPA, CPA, and small portion of the EPA not subject to Congressional moratoria. In the scenario in **Chapter 3** of this Supplemental EIS and Chapter 3.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, the projected activities of a single lease sale are based on a range of observations and provide a reasonable expectation of oil and gas production anticipated from a single lease sale. Results from improved scenarios and simulations in the “Air Quality Modeling in the Gulf of Mexico Region” study show that the potential impacts of a single lease sale would be **minor**. More specifically, the potential impacts of a single lease sale to the Breton Wilderness Area would be **moderate**, whereas the overall potential impacts of a single lease sale would be **minor** for all other areas. However, as new data become available, BOEM anticipates future modeling to refine its predictions.

The incremental contribution of a lease sale under Alternatives A-D to the cumulative impacts would most likely have a **minor** effect on coastal nonattainment areas because most impacts on the affected resource could be avoided with proper mitigation at the post-lease stage. Portions of the Gulf Coast onshore areas have ozone levels that exceed the Federal air quality standard, but the incremental contribution from a lease sale would be very small and would not on their own cause an exceedance. Alternative E, the cancellation of a single lease sale, would result in no new activities associated with a lease sale; therefore, the incremental impacts would be **none** because new impacts would be avoided entirely. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under Alternative E.

BOEM contracted an air quality modeling study in the GOM region to assess the impacts of OCS oil- and gas-related development to nearby States, as required under the OCSLA. The data from

forecasted emissions resulting from the 10 proposed GOM lease sales in the 2017-2022 National OCS Program was annualized using BOEM's Resource Evaluation's mid-case scenario. These results are presented in Appendices B-D of the 2018 GOM Supplemental EIS and Wilson et al. (2019b). Under the 10 lease sale mid-case scenario, the cumulative impacts to the Breton Wilderness Area and Gulf Islands National Seashore would be **moderate**, whereas the overall cumulative impacts of the 10 proposed lease sales would be **minor to moderate**.

The cumulative impacts would most likely have a **moderate** effect on coastal nonattainment areas for certain pollutants. Portions of the Gulf Coast onshore areas have ozone levels that exceed the Federal air quality standard, but the cumulative impacts from past, present, and future lease sales do not on their own cause an exceedance. A full analysis of air quality can be found in Chapter 4.1 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.1 of the 2018 GOM Supplemental EIS.

### 4.2.3 Incomplete or Unavailable Information

This chapter discusses the incomplete or unavailable information needed to assess the impacts from OCS oil- and gas-related activities. As noted earlier, the final Air Quality Modeling Report (Wilson et al. 2019b) has been published and does not change the conclusions made previously based on the 2018 draft interim assessment in Appendices B-D of the 2018 GOM Supplemental EIS.

Incomplete and unavailable information includes data that may have become available since the Air Quality Modeling Report (Wilson et al. 2019b) was started. The unavailable information includes study inputs. The study used the 2014 GWEI. Since then BOEM has published a 2017 GWEI, and a 2021 inventory is in progress. The USEPA also now has more current national emission inventory data than what was used to establish cumulative impacts and more recent onshore monitoring data than was available when the study began. If these data were available to be used in a more recent study, it is expected that the results would not change because the activities that generate the emissions do not vary widely from year to year. Therefore, BOEM has determined that more timely emissions and monitoring information is not essential to a reasoned choice among alternatives.

### 4.2.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS

Various printed and Internet sources (e.g., Texas Commission on Environmental Quality, Louisiana Department of Environmental Quality, and USEPA) were examined to assess recent information regarding air quality that may be pertinent to a Proposed Action. New information was found for air quality after searching relevant Internet and government sources, including the USEPA's website. BOEM's air quality subject-matter experts regularly review USEPA's website since the Clean Air Act is the law authorizing the USEPA to establish the National Ambient Air Quality Standards to protect public health and public welfare and to regulate emissions of hazardous air pollutants. The new information discovered and described below represents updates to BOEM's air quality modeling capability. Because this new information only serves to supplement our analytical capability and does

not show any additional impacts, the overall impact conclusions in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS remain unchanged.

One GWEI study was released documenting the 2014 air pollutant emission inventory for OCS oil and gas sources in the GOM (Wilson et al. 2017). This information has been used to update emissions in the final modeling effort in the “Air Quality Modeling in the Gulf of Mexico Region” study described above. No new information that would add to the analyses or change the conclusions reached by BOEM was discovered since publication of the 2018 GOM Supplemental EIS.

A second GWEI study was released documenting the 2017 air pollutant emission inventory for OCS oil and gas sources in the GOM. It will support future EISs through its use as updated input (Wilson et al. 2019a).

An update to the air quality modeling study to conduct photochemical and dispersion modeling for the GOM region to assess the OCS oil and gas development pre- and post-lease impacts to the states was published on September 3, 2019 (Wilson et al. 2019b). BOEM's most recent air quality modeling study and data analysis is the *Air Quality Modeling in the Gulf of Mexico Region* study (Wilson et al. 2019b). There are two versions of this study. The first version of the study was published in Appendices F, G, and H of the 2017-2022 GOM Multisale EIS. After completion of the initial modeling, BOEM directed the contractor to prepare a revised modeling analysis using lessons learned from the previous work. Several improvements were incorporated. The first version used the 2011 Emissions Inventory and the same year as base for future simulations and cumulative analysis. In the second version, BOEM replaced the 2011 emissions with the 2014 Emissions Inventory. Additional changes between the first version and the second version include an improved geographical distribution of OCS sources on the shelf, corrections to the sea-salt algorithm, and inclusion of emissions from a single lease sale, as well as 10 lease sales, and source apportionment. The 2011 calendar year emissions for most pollutants were significantly higher compared to the calendar year 2014 emission inventory (Wilson et al. 2017). On the other hand, the 2014 emission inventory was more recent and had a reliable methodology to allocate the emissions using global positioning systems to track vessel movements. In both versions of the study, BOEM used the year 2012 meteorology because it is more representative of average regional climatology. Temperatures over the GOM in 2011 were climatologically high and precipitation was low compared to 2012, which was more representative of a typical year.

Wilson et al. (2019b) made improvements to the first version based on comments and recommendations from the USEPA, industry, and the general public. BOEM concluded that the study was highly influential under the *OMB 2004 Peer Review Bulletin* (70 FR 2664). As a result, BOEM contracted the National Academies of Sciences, Engineering, and Medicine (NASEM) to provide an independent technical review of Wilson et al. (2019b). The National Academies Board on Atmospheric Sciences and Climate appointed an ad hoc committee to conduct this review reported in the NASEM (National Academies of Sciences 2019). The committee that reviewed the Air Quality Modeling in the Gulf of Mexico Region study concluded that there were “potential underestimates of the impacts of GOMR emissions on air quality” (National Academies of Sciences 2019). Their reasons included the

lack of performance evaluations of the highest air quality impacts from offshore to onshore and not using warmer years for modeling ozone, PM<sub>10</sub>, and PM<sub>2.5</sub> formation (National Academies of Sciences 2019). The “Air Quality Modeling in the Gulf of Mexico Region” study also had similar conclusions regarding uncertainties, stating “one of the key uncertainties associated with analyzing the air quality impacts from offshore oil and gas sources in the Gulf of Mexico is the magnitude of the modeled ozone and particulate matter concentrations over the Gulf waters” (Wilson et al. 2019b). These uncertainties are likely due to the lack of available offshore air quality monitoring data. At this time, reported results are consistent with previous BOEM analyses and do not alter previous conclusions.

BOEM has also embarked on new a form of emissions inventory. Operators are using the new inventory tool called Outer Continental Shelf Air Quality System (OCS AQS). The OCS AQS is a web-based solution that replaces the legacy Gulfwide Offshore Activity Data System (GOADS) emission inventory system. The main purpose is to collect activity data, automatically calculate emissions, and perform quality assurance. This new process is advantageous because it does not require software installation, it has import and export features, activity can be entered monthly rather than at the end of the year, it includes all historical emission inventory data, and it generates reports and has mapping features. The completed 2017 GWEI and the 2021 Inventory currently in progress were not used in the Air Quality Modeling Study.

Research has assessed methane (CH<sub>4</sub>) emissions from oil and gas industry in the GOM. Yacovitch et al. (2020) collected shipboard measurements downwind from offshore oil and gas platforms in February 2018. Yacovitch and coworkers sampled methane, ethane, and combustion tracers. They found significant variability within the emission composition (based on the methane to ethane ratio) between individual sites. There was a total of 103 sampling sites in shallow and deep waters.

Similarly, Gorchoy Negrón et al. (2020) used aircraft to assess methane emissions in the GOM during January 2018 at shallow and deepwater platforms and drillships. Gorchoy Negrón and coworkers developed an approach that combined facility-level sample results, production data, and emissions inventory estimates to generate an aerial-based inventory of CH<sub>4</sub>. They compared their results with the USEPA greenhouse gas inventory. Gorchoy Negrón et al. (2020) found that their estimates were consistent with the USEPA’s inventory for the deepwater platforms and drillships but were higher than the USEPA’s inventory for shallow-water platforms and drillships. At this time, reported results are consistent with previous BOEM analyses and do not alter previous conclusions.

#### **4.2.5 Conclusion**

BOEM has reexamined the analysis for air quality presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regards to the updated scenario provided in **Chapter 3** and the understanding that no new information on air quality has been discovered since publication of the 2018 GOM Supplemental EIS that would alter the impact conclusion for air quality presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale

EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## **4.3 WATER QUALITY**

### **4.3.1 Summary**

BOEM has reexamined the analysis for water quality presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on new information presented in **Chapter 4.3.4**. No new information was discovered that would alter the impact conclusions for water quality presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analyses and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of water quality, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.2 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.2 of the 2018 GOM Supplemental EIS. **Chapter 4.3.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### **4.3.2 Analysis of Alternatives A-E Summary**

Water quality is a term used to describe the condition or environmental health of a waterbody or resource, reflecting its particular biological, chemical, and physical characteristics and the ability of the waterbody to maintain the ecosystems it supports and influences. It is an important measure for both ecological and human health. Water quality patterns and trends are complex and variable. Assessments over more than two decades reveal that water quality in coastal and nearshore areas of the northern GOM are rated as fair. Coastal water impacts associated with routine OCS oil- and gas-related activities include increases in turbidity resulting from pipeline installation and navigational canal maintenance, discharges of bilge and ballast water from support vessels, and runoff from shore-based facilities. Farther offshore, water quality tends to be rated good except for the hypoxic area that typically forms along the shelf west of the Mississippi River during the summer (Kennicutt II 2017). For a further discussion of this hypoxic zone, refer to **Chapter 4.3.4**. The largest impact-producing factors affecting water quality are operational discharges and wastes, drilling fluid spills, chemical and waste spills, and oil spills. The activity associated with a lease sale could contribute a small percentage to existing and future OCS oil- and gas-related activities. The specific discharges, drilling muds, cuttings, produced water, and accidents resulting in spills would occur in proportion to production volume and, therefore, would add a small increase to the currently anticipated impacts. Furthermore, the vessel traffic and vessel-related discharges associated with a lease sale represent a fraction of the current ongoing commercial shipping and military activity in the Gulf of Mexico. The impacts of operational discharges, sediment disturbances resulting in increased turbidity, and accidental releases are a small percentage of the current overall impacts to coastal and offshore waters.

The impacts of OCS Oil and Gas Program-related routine operational discharges (detailed in Chapter 3.1.5.1 of the 2017-2022 GOM Multisale EIS and summarized in Table 3-8 of the 2018 GOM Supplemental EIS) on water quality under Alternatives A-D are considered **negligible** beyond 1,000 m (3,281 ft) to **moderate** within 1,000 m (3,281 ft) of the source. The potential impacts from OCS Oil and Gas Program-related oil spills on water quality under Alternatives A-D are considered **moderate**, even with the implementation of safety requirements and mitigating measures. This is because activities to address oil spills may cause secondary impacts to water quality, such as the introduction of additional hydrocarbons into the dissolved phase through the use of dispersants and the sinking of hydrocarbon residuals from burning. The impacts from a Proposed Action are a small addition to the cumulative impacts on water quality when compared with inputs from hypoxia, potentially leaking shipwrecks, chemical and weapon dumpsites, natural oil seeps, and natural turbidity. Therefore, the incremental contribution of the routine activities and accidental events associated with a Proposed Action to the cumulative impacts on water quality is expected to be **negligible** for Alternative A, B, C, or D. Alternative E, the cancellation of a single lease sale, would result in no new activities associated with a lease sale; therefore, the incremental impacts would be **none** because new impacts would be avoided entirely. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under Alternative E. A full analysis of water quality can be found in Chapter 4.2 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.2 of the 2018 GOM Supplemental EIS.

### 4.3.3 Incomplete or Unavailable Information

In preparation for this Supplemental EIS, BOEM has reviewed the latest information available relative to the potential impact-producing factors on water quality, which is presented in **Chapter 3**. Much of the information pertaining to water quality impacts from the *Deepwater Horizon* oil spill and response has been discussed in previous NEPA documents, and water quality has recovered from the *Deepwater Horizon* oil spill and response. BOEM has identified incomplete or unavailable information that may be relevant to reasonably foreseeable impacts on water quality. Much of this information relates to non-OCS oil- and gas-related impacts. Specifically, potentially polluting shipwrecks and chemical and weapon disposal areas may cause potential impacts to offshore water quality and the marine environment. There are no publicly available data regarding these potential impacts, in part because no entity has been tasked with this responsibility. It is not foreseen that this information would be publicly available to include in this NEPA analysis regardless of the costs or resources needed to obtain it. BOEM has used the best available scientific information available and believes that any additional information would not likely change the impacts conclusions and is not essential to a reasoned choice among alternatives.

### 4.3.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS

A search of relevant literature and government sources for information pertinent to water quality in the GOM since publication of the 2018 GOM Supplemental EIS resulted in finding updates to the USEPA Region 4 and Region 6 NPDES permits, the updated estimated hypoxic zone in the GOM, and a USEPA assessment of coastal GOM water quality.

The final NPDES General Permit No. GMG290000 for “New and Existing Sources and New Dischargers 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” was issued by USEPA Region 6 on September 19, 2017, with an expiration date of September 30, 2022. On July 22, 2022, the Regional Administrator of Region 6 proposed to reissue the GMG 290000 permit. The 2022 Draft GMG290000 OCS General Permit is available (USEPA 2022b). As of October 1, 2022, the 2017 GMG290000 Offshore General Permit will be in administratively continued status, and the permit should be reissued soon.

The final NPDES General Permit No. GEG460000 for “New and Existing Sources in the Offshore Subcategory of the Oil and Gas Extraction Category for the Eastern Portion of the Outer Continental Shelf of the Gulf of Mexico” was reissued by USEPA Region 4 on December 21, 2017, with an effective date of January 20, 2018. The term of the permit will be no longer than 5 years from the effective date of the permit (USEPA 2017c). Information on the renewal process should be available in the near future.

A recent global, deepwater review of environmental impacts from the oil and gas industry, which was written to influence management strategies, noted the global need for more baseline data, monitoring, and geospatial information (Cordes et al. 2016). The review noted how better baseline data would have been helpful after the *Deepwater Horizon* explosion, oil spill, and response. However, the scope of the review did not include detailed information on all of the studies and monitoring efforts that have taken place since the *Deepwater Horizon* explosion, oil spill, and response in the Gulf of Mexico. The study noted general environmental impacts, but it did not include all of the detailed information that BOEM includes in its EISs. Some BOEM mitigation efforts were briefly noted, but the authors focused their discussion on environmental protections from the Bureau of Ocean Energy Management’s NTLs and not the more robust requirements laid out in the Code of Federal Regulations and the U.S. Environmental Protection Agency’s NPDES permit, which specifically includes limitations, prohibitions, and reporting requirements for discharges and wastes generated from offshore oil and gas facilities. The review also noted some areas where further studies could be relevant. However, since this review was global in nature and did not include all of the latest post-*Deepwater Horizon* information and failed to acknowledge regulatory requirements in the Code of Federal Regulations and the U.S. Environmental Protection Agency’s NPDES permit, this review does not change the conclusions of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

The Vessel Incidental Discharge Act was enacted on December 4, 2018, to regulate incidental discharges from commercial vessels. The law authorized the USEPA and the U.S. Coast Guard to develop standards of performance for vessel discharges and to implement, monitor, and enforce regulations. The Vessel Incidental Discharge National Standards of Performance were published in the *Federal Register* on October 26, 2020, with a 30-day public comment period, which closed on November 25, 2020. The final standards and regulations are anticipated to be published in 2022 (USEPA 2022a).

The size of the Gulf of Mexico hypoxic zone or “dead zone” is updated annually by a collaboration between NOAA and the Louisiana Universities Marine Consortium. This is an area of low oxygen that persists in Louisiana and Texas coastal waters each summer and that can kill fish and other marine life. The 2022 size of 3,275 mi<sup>2</sup> (8,482 km<sup>2</sup>) was smaller than the measured dead zone in 2021, which was 6,334 mi<sup>2</sup> or 16,400 km<sup>2</sup> (Louisiana State University and Louisiana Universities Marine Consortium 2022). As stated on page 3-212 of the 2017-2022 GOM Multisale EIS, the Louisiana-Texas hypoxic zone is considered to be unrelated to OCS oil- and gas-related activities but is discussed as a potential cumulative effect.

The USEPA’s assessments performed over more than two decades have concluded that water quality in a majority of estuaries and coastal environments along the northern Gulf of Mexico coast is highly influenced by human activities. One of the most prevalent causes of degraded water quality in the coastal areas of the Gulf of Mexico is excessive levels of anthropogenic nutrients that create widespread coastal eutrophication. Eutrophication lowers dissolved oxygen concentrations, increases chlorophyll *a* concentrations, diminishes water clarity, and can lead to toxic/nuisance algal blooms and loss of submerged aquatic vegetation. These assessments consistently have concluded that water quality in the coastal areas of the Gulf of Mexico is fair (USEPA 2021c).

### 4.3.5 Conclusion

BOEM has reexamined the analysis for water quality presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regard to the updated scenario provided in **Chapter 3** and the new information on water quality since publication of the 2018 GOM Supplemental EIS. No new information was discovered that would alter the impact conclusion for water quality presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS; therefore, the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## 4.4 COASTAL HABITATS

### 4.4.1 Estuarine Systems (Wetlands and Seagrasses/Submerged Vegetation)

#### 4.4.1.1 Summary

BOEM has reexamined the analysis for estuarine systems presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapters 4.4.1.4 and 4.4.2.4**. No new information was discovered that would alter the impact conclusions for estuarine systems presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of estuarine systems, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.3.1 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.3.1 of the 2018 GOM Supplemental EIS. **Chapter 4.4.1.2** is a summary of the resource description and

impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### 4.4.1.2 Analysis of Alternatives A-E Summary

The estuarine system is the transition zone between freshwater and marine environments. It can consist of many habitats, including wetlands and those containing submerged vegetation. The coastline of the WPA, CPA, and EPA is more than 75,639 km (47,000 mi) (NOAA 2008) and comprises more than 750 bays, estuaries, and sub-estuary systems (USEPA 2012). These coastal and estuarine ecosystems provide important nursery grounds and adult habitat for numerous species, including fish, invertebrates, and birds, while seagrass beds provide foraging habitat for sea turtles and manatees (Byrnes et al. 2017). The largest impact-producing factors from routine activities affecting estuarine systems are regular navigation channel maintenance dredging and vessel operation. The impacts may include increased erosion rates, removal of sediments, increased turbidity, and changes in salinity (Erftemeijer and Lewis III 2006; Kenworthy and Fonseca 1996; Onuf 1996). The impacts to these habitats from routine activities associated with a Proposed Action are expected to be **negligible to moderate**. **Minor** impacts would be due to the projected low probability for any new pipeline landfalls (0-1 projected), the minimal contribution to the need for maintenance dredging, and the mitigating measures expected to be used to further reduce or avoid these impacts (e.g., the use of modern techniques such as directional drilling). However, impacts caused by vessel operations related to a Proposed Action over 50 years would be **moderate** considering the permanent loss of hundreds of acres of wetlands. Accidental oil spills can vary widely in their impacts depending on the volume and type of oil, condition of the oil as it reaches shore, time of year, spill distance, and composition of the plant community affected. However, several of the impacts can include plant die-back, erosion, loss of plant cover, and conversion into mudflats or open water. Spill recovery efforts may cause negative impacts as well. Often, the best course of action is to let the impacted area(s) recover naturally to avoid secondary impacts associated with the cleanup process, such as trampling vegetation, accelerating erosion, and burying oil (Getter et al. 1984; Long and Vandermeulen 1983; Mendelssohn et al. 1993; Michel et al. 2013). Overall, impacts to estuarine habitats from small and large oil spills associated with activities related to a Proposed Action would be expected to be **minor** because of the distance of most post-lease activities from the coast, the expected weathering and biodegradation of spilled oil over that distance, the projected low probability of large spills near the coast, the resiliency of wetland vegetation, and the available cleanup techniques. Refer to the updated *Gulf of Mexico Catastrophic Spill Event Analysis* technical report for an analysis of impacts from a low-probability catastrophic spill event (BOEM 2021d).

Cumulative impacts to estuarine habitats are caused by a variety of factors, including the OCS oil- and gas-related and non-OCS oil- and gas-related activities outlined in Chapter 4.3 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, and human and natural impacts. Development pressures in the coastal regions of the GOM have been largely the result of tourism and residential beach-side development, and this trend is expected to continue. Storms would continue to impact the coastal habitats and have differing impacts. The incremental contribution of a Proposed Action to the cumulative impacts on estuarine habitats is expected to be **minor to moderate**

depending on the selected alternative. Under Alternative E, the cancellation of a single lease sale would result in no new activities associated with a lease sale. There could, however, be some incremental increase in impacts from vessel operations and navigational channel maintenance dredging (i.e., two impact-producing factors for estuarine systems) caused by a compensatory increase in imported oil and gas to offset reduced OCS production, but it would likely be **negligible**. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative. A full analysis of estuarine habitats can be found in Chapter 4.3.1 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.3.1 of the 2018 GOM Supplemental EIS.

#### **4.4.1.3 Incomplete or Unavailable Information**

BOEM has identified incomplete or unavailable information regarding estuarine habitat. There is incomplete information about impacts resulting from routine activities, as the scenario forecast is only an estimate, and many global factors can affect OCS oil- and gas-related activity.

There are unknowns regarding the future restoration efforts that are being planned, such as what projects would ultimately be constructed and how successful they may be. In addition, the future rates of relative sea-level rise are not known with certainty, and thus, resulting future impacts to wetlands are unknown beyond predictions based on models and trends. Future rates of coastal development are unknown, as is the extent of impacts to estuarine systems thereof.

BOEM acknowledges that there remains incomplete or unavailable information that may be relevant to reasonably foreseeable significant impacts on estuarine systems. This incomplete or unavailable information includes potential data on the *Deepwater Horizon*, explosion, oil spill, and response that may be forthcoming. As there is substantial information available since the *Deepwater Horizon* explosion, oil spill, and response, which is included in the 2017-2022 GOM Multisale EIS, BOEM believes that the incomplete or unavailable information regarding the effects of the *Deepwater Horizon* explosion, oil spill, and response on estuarine systems would likely not be essential to a reasoned choice among alternatives. Regardless of the costs involved, it is not within BOEM's ability to obtain this information from the NRDA process within the timeline contemplated in the NEPA analysis for this Supplemental EIS. BOEM's subject-matter experts have used what scientifically credible information is available in their analyses and applied it using accepted scientific methodology.

Many studies have been produced that demonstrate the effects of exposure of wetland plants to crude oil, covering a wide range of exposure intensity, longevity, and oil characteristics. Much has been learned about the different survival and recovery rates of various plant species. In addition, studies have been produced regarding the long-term impacts of canal dredging and pipeline installation on wetlands.

#### **4.4.1.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

Various printed and Internet sources (including the U.S. Department of the Interior, Geological Survey; National Wetlands Research Center; Gulf of Mexico Alliance; NOAA; Journal of Marine

Science and Engineering; Marine Pollution Bulletin; and scientific publication databases including Science Direct, Elsevier, and JSTOR) were examined to assess recent information regarding estuarine systems that may be pertinent to a Proposed Action. BOEM used reasonably accepted scientific methodologies to extrapolate from existing information in completing this analysis and formulating the conclusions presented here. New information was found for coastal habitats after a search of relevant literature. These new references support the information in the Affected Environment; therefore, the impact conclusions for coastal habitats presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS still apply.

In Barataria Bay, the microbial community in *Deepwater Horizon*-oiled sediments showed decreased diversity and smaller population sizes of sulfate-reducing and denitrifying bacteria (Bae et al. 2018). A study focused on determining the recovery of salt marshes' ecosystem functionality (i.e., denitrification capacity) after exposure to the *Deepwater Horizon* oil spill. Researchers found that certain drivers of ecosystem denitrification capacity either recovered or established a new, stable state after 6 years. Oiling intensity (e.g., light, moderate, or heavy) played a vital role in the long-term recovery of marsh ecosystem services (Tatariw et al. 2018). As of June 2018, 8 years after the *Deepwater Horizon* oil spill, oil-derived organics (alkanes and polycyclic aromatic hydrocarbons [PAHs]) remain about 10 times higher than background concentrations in oiled marsh sediment, suggesting that oil contamination may persist for many more years (Turner and Rabalais 2019). This persistence is partially due to the low oxygen concentrations of marsh soils. These references are relevant for determining the recovery status of coastal habitats after the *Deepwater Horizon* oil spill.

For other ongoing cumulative impacts, one study suggests that previous models may have overestimated the resiliency of Louisiana marshes as they relied on short-term (e.g., decades or less) data to inform their findings. Modeling that uses relative sea-level rise rates on a longer term scale (e.g., thousands of years) suggests that coastal marshes in the Mississippi Delta may be less resilient than assumed in recent estimates (Törnqvist et al. 2020). New remote-sensing technology is also being used to study wetland losses and gains in the GOM. Potter (2021) used ground-truthed Landsat satellite imagery to analyze changes in western Barataria Basin, Louisiana's wetlands post-Hurricane Katrina (2005 to 2018). Conversion of wetland-to-water was strongly skewed to areas with historic oil and gas well locations. Western Barataria Basin has experienced a net loss of marshlands post-Katrina, but Potter (2021) found that several restoration efforts projects (e.g., Turtle Bay, Little Lake/Round Lake, and Bayou L'Ours) have substantially offset these losses.

Michel (2021) compiled a literature study on the effects of oil spills >20,000 bbl on a variety of resources, including estuarine systems (including wetlands and seagrasses/submerged vegetation). Impacts were assessed from four large oil spills (the Gulf War, *Deepwater Horizon*, *Metula*, and *Amoco Cadiz*) for salt marshes and seven oil spills for submerged vegetation (few studies have quantified impacts from spills >20,000 bbl; instead they conducted literature synthesis from field-based studies/reports' data). This literature synthesis showed that oil impacts can persist for multiple years to decades, with each spill posing different impacts and recovery outcomes. For more analysis on accidental oil-spill impacts to estuarine systems (wetlands and seagrasses/submerged vegetation), refer to Chapter 4.3.1.2.2 of the 2017-2022 GOM Multisale EIS. Michel (2021) recommends through

the synthesis the importance of incorporating post-spill monitoring as a part of the response, damage assessment, and restoration plans for salt marshes. For submerged vegetation, the literature consistently found that seagrasses are not usually extensively damaged unless heavily coated with oil, physical impacts occur, or they are deprived of light for prolonged periods; full recovery is typically within 1-2 years post-spill. Entrained oil within the sediments of a submerged vegetation area may pose periodic re-releases of oil in the area, causing potential secondary impacts to the localized area.

#### **4.4.1.5 Conclusion**

BOEM has reexamined the analysis for estuarine systems presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regards to the updated scenario provided in **Chapter 3** and the understanding that no new information on estuarine systems has been discovered since publication of the 2018 GOM Supplemental EIS. No new information was discovered that would alter the impact conclusion for estuarine systems presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### **4.4.2 Coastal Barrier Beaches and Associated Dunes**

#### **4.4.2.1 Summary**

BOEM has reexamined the analysis for coastal barrier beaches and associated dunes presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.4.2.4**. No new information was discovered that would alter the impact conclusion for coastal barrier beaches and associated dunes presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of coastal barrier beaches and associated dunes, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action, are presented in Chapter 4.3.2 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.3.2 of the 2018 GOM Supplemental EIS. **Chapter 4.4.2.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### **4.4.2.2 Analysis of Alternatives A-E Summary**

The coastal barrier beaches and associated dunes are those beaches and dunes that line the coast of the northern GOM, including both barrier islands and mainland beaches. Barrier islands make up more than two-thirds of the northern GOM shoreline (Morton et al. 2004). These shorelines are usually sandy beaches and are composed of wind-blown sand and other unconsolidated, predominantly coarse sediments. The largest impact-producing factor from routine activities affecting estuarine systems is navigation channel maintenance dredging. This activity removes sediment from the system, contributing to beach erosion. The impacts to coastal barrier beaches and dunes from

routine activities associated with a Proposed Action are expected to be **negligible** to **minor** due to the minimal number of projected onshore pipelines, the minimal contribution to vessel traffic and to the need for maintenance dredging, and the mitigating measures that would be used to further reduce or avoid these impacts. Accidental oil spills and response activities, if they reach shore, can affect beaches and dunes through faunal community shifts, toxic effects, and physical disturbance of response efforts. A coastal oil spill from a nearshore vessel accident or pipeline rupture, and related onshore cleanup activities, would pose a greater threat to coastal beaches. Overall, impacts to coastal barrier beaches and dunes from accidental events associated with OCS oil- and gas-related activities related to a Proposed Action would be expected to be **minor** because of the distance of most resulting activities from the coast, the expected weathering of spilled oil, the projected low probability of large spills occurring near the coast, and available cleanup techniques. Refer to the updated *Gulf of Mexico Catastrophic Spill Event Analysis* technical report for an analysis of impacts from a low-probability catastrophic spill event (BOEM 2021d).

Cumulative impacts to coastal barrier beaches and dunes are caused by a variety of factors, including the OCS oil- and gas-related and non-OCS oil- and gas-related activities outlined in Chapter 4.3.2 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS and other human and natural impacts. Cumulative OCS oil- and gas-related sources, such as spills resulting from all past and present leasing activities (including the millions of barrels that entered the GOM from the *Deepwater Horizon* oil spill) are estimated to have had a **major** impact on coastal barrier beaches and dunes. For non-OCS oil- and gas-related sources, development pressures in the coastal regions of the GOM have been largely the result of tourism and residential beach-side development, and this trend is expected to continue. Efforts to stabilize the GOM shoreline through the construction of manmade structures can deprive natural restoration of the barrier beaches (i.e., sediment nourishment and sediment transport), which has adversely impacted coastal beach landscapes. Storms would continue to affect coastal habitats in differing impact levels. These cumulative non-OCS oil and gas-related sources are expected to have **major** impacts on coastal barrier beaches and dunes. The incremental contribution of a Proposed Action (including reasonably foreseeable oil spills and other accidental events) to the cumulative impacts on coastal barrier beaches and dunes is expected to be **minor** for the action alternatives (i.e., Alternatives A-D). The No Action Alternative (i.e., Alternative E), which is the cancellation of a single lease sale, would result in no new activities associated with a lease sale and, therefore, would have no incremental contribution to the cumulative impacts on coastal barrier beaches and dunes. Cumulative impacts from all current and past sources (including both OCS and non-OCS oil- and gas-related sources) would continue for all alternatives, including Alternative E (i.e., the No Action Alternative). A full analysis of coastal barrier beaches and associated dunes can be found in Chapter 4.3.2 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.3.2 of the 2018 GOM Supplemental EIS.

#### 4.4.2.3 Incomplete or Unavailable Information

BOEM acknowledges that there remains incomplete or unavailable information regarding coastal barrier beaches and associated dunes in the GOM. There is incomplete information about routine impacts, as the scenario forecast is only an estimate, and many global factors can affect OCS

oil- and gas-related activity. Future rates of coastal development are unknown, as is the extent of such impacts to coastal barrier beaches. There are unknowns regarding future planned restoration efforts, such as what specific projects would ultimately be constructed and their success. In addition, the future rates of relative sea-level rise are not known with certainty (Hausfather 2013), and thus, the resulting impacts to coastal barrier beaches and associated dunes are unknown beyond predictions based on models and trends.

A large body of information regarding impacts of the *Deepwater Horizon* explosion, oil spill, and response on coastal barrier beaches and associated dunes has been developed and continues to be developed through the Natural Resource Damage Assessment (NRDA) process, but information remains incomplete. Though substantial information has become available since the *Deepwater Horizon* explosion, oil spill, and response, which was analyzed in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, BOEM believes that the incomplete or unavailable information regarding the effects of the *Deepwater Horizon* explosion, oil spill, and response on coastal barrier beaches and dunes would likely not be essential to a reasoned choice among alternatives. The incomplete information would not be available within the timeframe contemplated by the NEPA analysis of this Supplemental EIS. However, much is known about the extent of the oiling of beaches and the continuing degradation of the remaining oil.

BOEM has determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives. BOEM's subject-matter experts have used what scientifically credible information is available in their analyses and applied it using accepted scientific methodology. Many studies have demonstrated the effects of exposure of beaches to crude oil, covering a wide range of exposure intensity, longevity, and oil characteristics. Much has been learned about the impact of oil-spill cleanups on beaches and the degradation rates of oil over time. In addition, studies have been conducted regarding the long-term impacts of navigation canal dredging on beaches and barrier islands.

#### **4.4.2.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

Various printed and Internet sources (including the U.S. Department of the Interior, Geological Survey; National Wetlands Research Center; Gulf of Mexico Alliance; NOAA; Louisiana State University; and scientific publication databases including Science Direct, Elsevier, and JSTOR) were examined to assess recent information regarding coastal barrier beaches and associated dunes that may be pertinent to a Proposed Action. No new information that would add to the analyses or change the conclusions was discovered since publication of the 2018 GOM Supplemental EIS.

The *Deepwater Horizon* oil buried in Florida beach sediments was degraded after 1 year, such that hydrocarbon concentrations were similar to those of reference stations (Huettel et al. 2018). This rapid degradation was attributed to tidal pumping and oil-spill cleanup activities. *Deepwater Horizon* oil in the form of sediment-oil-agglomerates on sandy Florida beaches is slow to degrade and may persist for at least three decades, if not longer (Bociu et al. 2019). These references are relevant for determining the recovery status of coastal habitats after the *Deepwater Horizon* oil spill.

A recent study (Caudle et al. 2019) used the Chiroptera LIDAR and Imaging System to study the shoreline change rates along the southern Texas Gulf Coast from 2000 to 2013. Historical studies suggest that the shoreline in the study area retreated at 86 percent of the monitoring sites, with an average rate of 2.2 m/yr (7.2 ft/yr) between 1937 and 2013. Between 2000 and 2013, the rates decreased to an average 1.1 and 1.3 m/yr (3.6 and 4.3 ft/yr) at Padre Island and Brazos Island, respectively, with 76 percent of the sites retreating. Between 2010 and 2013, 64 percent of the monitoring sites advanced an average distance of 4.9 m (16.1 ft) (Caudle et al. 2019).

Michel (2021) compiled a literature study on the effects of oil spills >20,000 bbl on a variety of resources, including coastal barrier beaches and associated dunes. Impacts were assessed from three large oil spills for beaches (the *Exxon Valdez*, *Gulf War*, and *Deepwater Horizon*). This literature synthesis showed that oil impacts can persist for multiple years to decades, with each spill posing different impacts and recovery outcomes. For more analysis on accidental oil-spill impacts to coastal barrier beaches and associated dunes, refer to Chapter 4.3.2.2.2 of the 2017-2022 GOM Multisale EIS.

#### 4.4.2.5 Conclusion

BOEM has reexamined the analysis for coastal barrier beaches and associated dunes presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regards to the updated scenario provided in **Chapter 3** and the understanding that no new information on coastal barrier beaches and associated dunes was discovered since publication of the 2018 GOM Supplemental EIS. Therefore, no new information was discovered that would alter the impact conclusion for coastal barrier beaches and associated dunes presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## 4.5 DEEPWATER BENTHIC COMMUNITIES

### 4.5.1 Summary

BOEM has reexamined the analysis for deepwater benthic communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.5.4**. No new information was discovered that would alter the impact conclusion for deepwater benthic communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of deepwater benthic communities, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.4 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.4 of the 2018 GOM Supplemental EIS. **Chapter 4.5.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

## 4.5.2 Analysis of Alternatives A-E Summary

BOEM defines “deepwater benthic communities” as including both chemosynthetic communities (chemosynthetic organisms plus seep-associated fauna) and deepwater coral communities (deepwater coral plus associated fauna). These communities are typically found in water depths of 300 m (984 ft) or deeper throughout the GOM.

The OCS oil- and gas-related impact-producing factors for deepwater benthic communities can be grouped into three main categories: (1) bottom-disturbing activities; (2) drilling-related sediment and waste discharges; and (3) accidental oil spills. These impact-producing factors have the potential to damage individual deepwater habitats and disrupt associated benthic communities if insufficiently distanced or otherwise mitigated. However, impacts from individual routine activities and accidental events are usually temporary, highly localized, and expected to impact only small numbers of organisms and substrates. Moreover, the expected site-specific reviews and the application of mitigations will distance activities from deepwater benthic communities, greatly diminishing the potential effects. Therefore, at the regional scope of this analysis, and assuming adherence to all expected regulations and mitigations, the impact to deepwater benthic communities as a result of the proposed activities are expected to be **negligible** for any of the action alternatives. Impacts from accidental events are expected to be **negligible to minor** for any of the action alternatives. The expected OCS oil- and gas-related activities from a Proposed Action would also *contribute incrementally* to the overall OCS oil- and gas-related and non-OCS oil- and gas-related cumulative effects experienced by deepwater benthic communities, but only by a **negligible** amount. Under Alternative E, the cancellation of a single lease sale, the potential for impacts would be **none** because new impacts to deepwater benthic communities related to a cancelled lease sale would be avoided entirely. The overall OCS oil- and gas-related cumulative impacts to deepwater benthic communities are estimated to be **negligible to minor**. Non-OCS oil- and gas-related activities such as commercial fishing (currently negligible) and shifting baseline environmental conditions related to climate change (currently negligible but likely to increase over time should current trends continue or worsen) could cause more noticeable impacts on deepwater benthic communities over the next 50 years. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative. A full analysis of deepwater benthic communities can be found in Chapter 4.4 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.4 of the 2018 GOM Supplemental EIS.

## 4.5.3 Incomplete or Unavailable Information

BOEM identified incomplete or unavailable information related to deepwater benthic communities and potential OCS oil- and gas-related impacts, i.e., the locations of deepwater benthic communities in the GOM, the toxicity of oil and dispersants to deepwater benthic organisms, the long-term effects of OCS oil- and gas-related infrastructure, the long-term effects associated with climate change-related factors, and the ecological effects and interactions between deepwater benthic communities and deepwater fish communities. BOEM will continue to analyze and support the collection of the best available scientific information related to deepwater benthic communities. However, a complete understanding of these communities and all environmental parameters affecting

them is not necessary for a reasoned choice among alternatives. BOEM's distancing criteria, as described in NTL No. 2009-G40, prevent oil and gas infrastructure from being installed in close proximity to sensitive deepwater coral communities, avoiding or minimizing the potential for adverse impacts and the disruption of the important influences that these corals have on adjacent habitat and benthos.

In completing this analysis and in making conclusions, BOEM used the best available science to determine the range of reasonably foreseeable impacts, applying accepted scientific methodologies to both integrate existing information and extrapolate potential outcomes. Therefore, BOEM has determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives.

#### **4.5.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

Various printed and Internet database sources (including literature from relevant peer-reviewed journals and reports) were examined to assess recent information regarding deepwater benthic communities that may be pertinent to a Proposed Action. New information was found for deepwater benthic communities after searching relevant literature. Sources searched include Google Advanced Scholar Search and Google Advanced Book Search. The cited references are noteworthy in that they further support the previously described characterization of the affected environment, but they do not change any of the impact conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Girard et al. (2018) documented oil spill-related impacts to deepwater corals and monitored the impacted colonies' recovery. The researchers determined that recovery is slow and dependent upon the extent of initial impacts; there is evidence suggesting more heavily impacted colonies may not recover (Girard et al. 2018). Bourque and Demopoulos (2019) assessed the long-term impacts of the *Deepwater Horizon* oil spill on infaunal communities at both impacted and non-impacted deepwater coral sites between 2010 and 2016 to quantify temporal changes in community metrics coupled with sediment characteristics. The research found that community parameters differed between non-impacted and impacted sites and that macrofaunal communities changed between observation years while non-impacted communities remained relatively stable. Evidence also indicated that infaunal communities at impacted sites have not recovered to any known natural community as of 2016.

A microbiome is the complete set of symbiotic microbes, including an organism's DNA. Their taxonomy is identified by their DNA. Three articles on coral microbiomes (Girard et al. 2016; Kellogg 2019; Kellogg et al. 2017) reaffirm and build upon earlier, more speculative research (Al-Dahash and Mahmoud 2013), which had been novel at the time and was specifically mentioned in the 2017-2022 GOM Multisale EIS as a potential mechanism explaining successful association of deepwater corals in close proximity to natural hydrocarbon expulsion/seeps, which implied a potential new understanding of a portion of the baseline affected environment in the GOM. Symbiotic microbes

of deepwater corals are an adaptation to proximity of some of the holobionts (which are the combination of host and symbiont) to natural hydrocarbon expulsion/seeps. This provides new understanding of the baseline affected environment in the GOM. BOEM finds this noteworthy, but it does nothing to change the impact analyses as these adaptations only relate to naturally occurring background levels of hydrocarbons and not to higher hydrocarbon levels associated with accidental or catastrophic spills, which was previously discussed in the 2017-2022 GOM Multisale EIS.

A lipid metabolome is the complete set of lipid metabolites (lipids that take part in metabolic chemical reactions) in an organism. Deepwater coral species have distinct lipid metabolomic fingerprints, and at the site, individual, and population scale, they have high lipid metabolomic diversity (Vohsen et al. 2019). This is important to their baseline because it may be an adaptation to natural stressors; it may also protect them from anthropogenic stressors including climate change (Vohsen et al. 2019).

Connectivity is important to deepwater coral species recovery after serious anthropogenic or natural mortality because recovery depends on recruitment by larvae from outside the area of impact. Successful recruitment depends on transportation of sufficient numbers of spawned larvae connecting (by water currents) to downstream settling sites; this is called connectivity. For the Gulf of Mexico deepwater coral *Callogorgia delta*, depth differences between a larval source and its destination on the scale of tens to at most a few hundreds of meters restrict connectivity far more than horizontal separation on a scale of about 250 km (155 mi) (Bracco et al. 2019). This is because currents tend to run somewhat parallel to isobaths rather than perpendicular to them.

Additionally, new research published by Bourque and Demopoulos (2018) suggest that deepwater coral communities influence the benthos in adjacent habitat. Sediment grain size and organic carbon content are important factors in determining the density and structure of infaunal communities. Altered hydrodynamic flow near deepwater coral communities influences the sediment grain size and organic content of the adjacent benthic habitat.

New information was identified that improves our understanding of the spatial distribution and community structure within deepwater canyons in the central Gulf of Mexico. Shantharam and Baco (2020) found that macrofauna abundance and species richness decreased and evenness increased with depth within De Soto Canyon. Cluster analysis identified three depth-related groups that conform to previously established (Pequegnat et al. 1990) bathymetric boundaries: Shelf/Slope-Transition (300-700 m; 984-2,697 ft); the Archibenthal Zone (700-1,650 m; 2,697-5,413 ft); and the Abyssal (>2,000 m; 6,562 ft). Community structure is most related to fluorometry and oxygen saturation, combined with one or more of the following: salinity; particulate organic carbon; sediment organic carbon; and slope. Canyon wall abundances were higher than the canyon axis or adjacent slope, for which the differences may result from the entrainment of seasonal water masses characterized by high salinity, oxygen saturation, fluorometry, and turbidity. Variability in community composition may be due to the influence of hydrocarbon seeps within the canyon.

New research refines our understanding of the spatial distribution of molluscs within the Gulf of Mexico basin. Shantharam and Baco (2020) used the Biodiversity of the Gulf of Mexico database (BioGoMx) to investigate species richness and the trophic diversity of six major classes of benthic molluscs in the Gulf of Mexico. Assemblage distributions were compared among geographic region (NW, NE, SW, and SE) and depth class (inshore, upper shelf, lower shelf, upper slope, lower slope, and abyssal plain) for a total of 24 geographic-depth units. The eastern Gulf of Mexico contains greater species richness than the western Gulf of Mexico. This may be due to the proximity of the eastern Gulf of Mexico to and exchange with the tropical Caribbean and West Indian regions. The northern Gulf of Mexico contained higher species richness than the southern Gulf of Mexico; however, this may be a function of sampling bias. Mollusc richness peaked at the upper shelf (20-60 m; 66-197 ft), with cephalopods and scaphopods peaking on the lower shelf (60-200 m; 197-656 ft), and then decreased. The dominance of carnivores among Gulf of Mexico molluscs (46%) is attributed to the high proportion of gastropod species. Suspension feeders (22%), grazers (14%), herbivores (8%), and parasitic species (5%) followed. The latter were primarily found at abyssal depths (species richness was 19% of the total there). Chemosymbiotic species are prevalent in the Gulf of Mexico due to the occurrence of cold seep habitat.

Zimmerman et al. (2020) conducted a 58-year temporal analysis of deep-sea coral generic diversity using a machine learning model to simulate deep-sea coral occurrences on the deep shelf (50-200 m; 164-656 ft) and slope (210-2,000 m; 689-6,562 ft). Their goal was to develop a historical baseline of deep-sea coral biodiversity in order to characterize benthic community vulnerability to anthropogenic factors. In the northern Gulf of Mexico, there was a statistically significant decrease in deep-sea generic coral biodiversity in simulated data in all ecoregion/depth pairs, but not for observed data. The lowest levels of generic richness were observed for the 2007/2008-2018 time interval compared to the preceding five decades. There was a relatively stable trend in the number of observed genera on the shelf and a decrease in the number of observed genera on the slope. These results indicate that deep-sea coral diversity can decrease rapidly. The authors suggest that this indicates that coral biodiversity may not mitigate deep-sea ecosystem change. The determination of the mechanisms that may be causing these changes was not within the scope of this study but does create a framework for its evaluation.

New information that improves our understanding of the spatial distribution of the effects of the 2010 *Deepwater Horizon* oil spill was identified, but it does not alter previous conclusions. Approximately 2-3 months after the Macondo (*Deepwater Horizon*) well was capped, 227 stations were sampled to collect data on impacts from the spill on benthic communities. Fifty-eight of those stations were analyzed (summarized in Reuscher et al. 2020). Reuscher et al. (2020) analyzed data from an additional 58 of these stations to measure impacts of the spill to infauna communities, doubling the footprint analyzed. The authors concluded that oil and spill-related products spread farther in the northeastern and southwestern directions from the wellhead than previously thought, causing damage to meiofauna and microfauna in an area of ~263 km<sup>2</sup> (102 mi<sup>2</sup>). High nematode to copepod ratios confirmed meiofauna community disturbance.

Schwing et al. (2020) reviewed and synthesized research on benthic impacts, recovery, processes, and interactions among communities and organisms, and vulnerability and resilience analysis for size-based benthic groups following the *Deepwater Horizon* oil spill. Findings included evidence supporting the following: microbial communities returned to near baseline conditions within 2 years of the spill; foraminifera assemblages are significantly different post-spill; decreases in evenness (how equal the community is numerically) and increases in abundance of meiofauna consistent with an increase in opportunistic taxa related to *Deepwater Horizon*-induced stressors; and decreases in Shannon diversity (accounts for evenness and abundance) of microfauna. There is also evidence of continuing impacts to the resiliency of local benthic megafauna. In summary, the response and recovery of benthic organisms and communities is spatially and temporally variable, with larger organisms requiring longer to recover.

Bytingsvik et al. (2020) investigated the sensitivity in the deep-sea carbonate coral *Lophelia pertusa* to the dispersant Corexit 9500 and hydrocarbons in 96-hour tests. Corals showed high sensitivity to all contaminants after measuring the LC<sub>50</sub> (lethal concentration causing 50% mortality) and EC<sub>50</sub> (effective concentration causing 50% reduction in polyp activity). Shrimp also showed similar sensitivities to these contaminants, indicating that multiple benthic species would potentially be at risk. These results support previously reported findings.

Goode et al. (2020) provided a meta-analysis of current literature on the resilience of benthic communities located on seamounts to trawling disturbance. Deep-sea corals play an integral role in community development within benthic communities. Their findings suggest that the mean total abundance of benthic communities will gradually increase if protected from trawling activities, but this response is not the same across all taxonomic groups. Long-lived species benthic species will have comparatively lower resilience compared to short-lived fauna. Moreover, removal of corals from benthic communities by trawling can provide opportunity for competitor species to grow, impacting other native benthic assemblages. The authors concluded that recovery of benthic communities from trawling disturbance will, on average, be at least several decades. While this study evaluated benthic communities located on seamounts, the conclusions are relevant to coral-dominant, deep-sea benthic communities in general.

#### **4.5.5 Conclusion**

BOEM has reexamined the analysis for deepwater benthic communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. No new information was discovered that would alter the impact conclusion for deepwater benthic communities, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## 4.6 SARGASSUM AND ASSOCIATED COMMUNITIES

### 4.6.1 Summary

BOEM has reexamined the analysis for *Sargassum* and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.6.4**. No new information was discovered that would alter the impact conclusion for *Sargassum* and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of *Sargassum* and associated communities, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with the Proposed Action are presented in Chapter 4.5 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.5 of the 2018 GOM Supplemental EIS. **Chapter 4.6.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### 4.6.2 Analysis of Alternatives A-E Summary

*Sargassum* in the GOM is comprised of *S. natans* and *S. fluitans*, and is characterized by a brushy, highly branched thallus with numerous leaf-like blades and berrylike pneumatocysts. The *Sargassum* cycle is truly expansive, encompassing most of the western Atlantic Ocean and the GOM with the growth, death, and decay of these plant and epiphytic communities, which may play a substantial role in the global carbon cycle. Several impacting factors can affect *Sargassum*, including vessel-related operations, oil and gas drilling discharges, operational discharges, accidental spills, non-OCS oil- and gas-related vessel activity, and coastal water quality. Routine vessel operations and accidental events that occur during drilling or vessel operations and oiling due to an oil spill are the impact-producing factors that could be reasonably expected to impact *Sargassum* populations in the GOM. All these impact-producing factors would result in the death or injury to the *Sargassum* plants or to the organisms that live within or around the plant matrix through either physical contact and breaking up of *Sargassum* mats or through coating and toxicity of oil or chemicals. However, the unique and transient nature of *Sargassum*'s life cycle, and the broad range of the plants and animals that use the plant matrix help to buffer against impacts that may occur at any given location. Impacts to the overall *Sargassum* community are therefore expected to be **negligible** from either routine activities or reasonably foreseeable accidental events for any of the action alternatives. The *incremental contribution* of a Proposed Action on the population of *Sargassum* would be **negligible** when considered in the context of cumulative impacts to the population. Under Alternative E, the cancellation of a single lease sale, the potential for impacts from routine activities and accidental events would be **none** because new impacts to *Sargassum* and associated communities related to a cancelled lease sale would be avoided entirely. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under Alternative E. Impacts from changing water quality would be much more influential on *Sargassum* than OCS development and would still occur without the presence of OCS oil- and gas-related

activities. A full analysis of *Sargassum* and associated communities can be found in Chapter 4.5 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.5 of the 2018 GOM Supplemental EIS.

### 4.6.3 Incomplete or Unavailable Information

Although much is known about *Sargassum* and its life history, incomplete or unavailable information still remains. This incomplete or unavailable information includes information on the effects of *in situ* oil exposure and the factors influencing the movement patterns of *Sargassum*. BOEM used existing information and reasonably accepted scientific methodologies for extrapolation in completing the analysis above. BOEM has determined that there are few foreseeable significant adverse impacts to the *Sargassum* population associated with a Proposed Action, using publications such as Brooks et al. (2018) who suggest that *Sargassum* is continually present in the west-central GOM and that it moves in a general west-to-east pattern during the growing season; however, movements at a finer temporal or spatial scale are more difficult to predict. With respect to the effects of oiling from the *Deepwater Horizon* oil spill, Liu et al. (2014) noted that the toxicity or presence of oil across the surface waters of the GOM was variable at any given time, suggesting that it is difficult to predict the effects of *Sargassum* coming into contact with surface oil. Additionally, Lindo-Atichati et al. (2012) suggested that patterns of larval fish in the surface currents in the northern GOM were not consistent spatially or temporally and that they were highly dependent on mesoscale current structures like the Loop Current and associated eddies. Combined, these studies suggest that, as *Sargassum* is passively moved in the surface waters, its presence at any given location or at any given time is difficult to predict, especially as the population grows exponentially during the growing season. Ultimately, the ephemeral and wide-ranging nature across the northern GOM and the reproductive capabilities of *Sargassum* provide a life history that is resilient towards localized or short-term deleterious impacts, such as those expected to be associated with OCS oil- and gas-related routine activities and non-catastrophic oil or synthetic-based fluid spills. Therefore, BOEM has determined that the incomplete information on *Sargassum* is not essential to a reasoned choice among alternatives and that the information used in lieu of the unavailable information is acceptable for this analysis.

### 4.6.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS

New information was found for *Sargassum* and associated communities after searching relevant literature. Sources searched include Google Scholar, Springer, Elsevier, Cambridge University Press, Wiley Publishing, and Bio One web databases. Because this new information only further supports the previously described characterization of the affected environment, this new information does not alter the impact conclusions for *Sargassum* and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Since 2011, the density and areal coverage of *Sargassum* has dramatically increased in the Gulf of Mexico. In 2018, the extent of *Sargassum* created the largest macroalgae bloom ever recorded (Wang et al. 2019). The Great Atlantic *Sargassum* Belt stretches from West Africa to the Gulf of

Mexico and may be caused by excess nutrient discharge from the Amazon River and changes in ocean circulation (Oviatt et al. 2019; Wang et al. 2019).

Michel (2021) compiled a literature study on the effects of oil spills >20,000 bbl on a variety of resources, including *Sargassum* and associated communities. Floating *Sargassum* can be affected via oil at the water column surface, potentially impacting sea turtles, seabirds, fish, and invertebrates. BOEM classifies spills of this magnitude as catastrophic and does not deem them as reasonably foreseeable as a result of the proposed activities. Therefore, the conclusions of the literature study regarding spills of this magnitude do not affect the impact conclusions in the present analysis.

#### **4.6.5 Conclusion**

BOEM has reexamined the analysis for *Sargassum* and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regards to the updated scenario provided in **Chapter 3** and the understanding that new information on *Sargassum* and associated communities has been discovered since publication of the 2018 GOM Supplemental EIS; this information further supports the previously described characterization of the affected environment. Therefore, no new information was discovered that would alter the impact conclusion for *Sargassum* and associated communities presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### **4.7 LIVE BOTTOMS**

#### **4.7.1 Topographic Features**

##### **4.7.1.1 Summary**

BOEM has reexamined the analysis for topographic features and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.7.1.4**. No new information was discovered that would alter the impact conclusion for topographic features and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of topographic features and associated communities, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.6.1 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.6.1 of the 2018 GOM Supplemental EIS. **Chapter 4.7.1.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### 4.7.1.2 Analysis of Alternatives A-E Summary

Topographic features (Chapter 4.6.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS) are a subset of GOM live bottom habitats that are large enough to have an especially important ecological role, with specific protections defined in the Topographic Features Stipulation. Within the Gulf of Mexico, BOEM has identified 37 topographic features where some degree of protection from oil and gas development may be warranted based on geography and ecology. These subsea banks provide areas of hard substrate that support benthic and fish communities with relatively high biomass, diversity, and abundance. Many of these habitats remain relatively pristine and have a high aesthetic and scientific value, in part because they represent ecological and/or geographic extremes for many species (Johnston et al. 2015; Nash et al. 2013; Rezak and Bright 1981). Of the possible impact-producing factors considered, it was determined that bottom-disturbing activities associated with drilling, exploration, and vessel operations were the only impact-producing factors associated with routine activities that could reasonably be expected to impact topographic features. Impacts could result through crushing, increased turbidity, or smothering from sediment deposited on the seafloor. The impact-producing factors resulting from accidental events include bottom disturbances associated with the accident or response (e.g., equipment falling to the seafloor, anchoring), as well as the release of sediments and toxins during oil-spill response operations.

Application of the proposed Topographic Features Stipulation under Alternatives A-C, which is a required mitigation as a result of the 2017-2022 National OCS Program's Record of Decision (detailed in **Appendix A** of this Supplemental EIS) and will be applied for GOM Lease Sales 259 and 261, and removing these blocks from leasing under Alternative D would assist in preventing or minimizing potential impacts to topographic feature communities by increasing the distance of OCS oil- and gas-related activities from these features. Compliance with the Topographic Features Stipulation is assumed in this analysis. Application of this stipulation has resulted in **negligible** impacts by a Proposed Action to topographic features from routine activities and accidental events. The *incremental contribution* of a Proposed Action to the overall cumulative impacts is expected to be **negligible** under Alternatives A-C with adherence to the required Topographic Features Stipulation and **negligible** under Alternative D because the Topographic Features Stipulation blocks would not be available for lease. Both the application of the Topographic Features Stipulation and the removal of Topographic Features Stipulation blocks from leasing would minimize impacts to these features by distancing OCS oil- and gas-related, bottom-disturbing activity from them. Under Alternative E, the cancellation of a single lease sale, the potential for new incremental impacts to topographic features is **none** because new impacts would be avoided entirely. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under Alternative E. Impacts ranging from **negligible** to **moderate** may still be expected from non-OCS oil- and gas-related activities such as fishing, pollution, and climate change; however, the incremental impact of the proposed activities should not result in a meaningful augmentation of the overall expected impacts. A full analysis of topographic features can be found in Chapter 4.6.1 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.6.1 of the 2018 GOM Supplemental EIS.

#### 4.7.1.3 Incomplete or Unavailable Information

BOEM recognizes that there is incomplete or unavailable information related to topographic features and associated communities 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 impact-producing factors 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 Flower Garden Banks National Marine Sanctuary for any impacts related to OCS oil- and gas-related activities. At the East and West Flower Garden Banks, corals have generally flourished (refer to Johnston et al. 2021, and references therein) even as OCS oil- and gas-related development has occurred, sometimes just outside of the stipulated No Activity Zone. BOEM used existing information and reasonably accepted scientific methodologies to extrapolate from available information in completing this analysis and formulating the conclusions presented here. BOEM has determined that incomplete or unavailable information, as identified above, could not be acquired within the timeframe of this analysis, and the currently available body of evidence supports past analyses and does not indicate that adverse impacts to topographic features would be expected as a result of a Proposed Action. Therefore, BOEM has determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives.

#### 4.7.1.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS

New information was found for live bottoms (topographic features) after searching relevant literature. Sources searched include Google Scholar, Elsevier, Research Gate, Springer, Wiley Publishing, Royal Society Publishing, and Inter-Research. This new information only updates the description of the affected environment and contributes to BOEM's knowledge of non-OCS oil- and gas-related cumulative impacts. Existing guidance to operators, adherence to BOEM's Topographic Features Stipulation, and distancing of OCS oil- and gas-related activities from the Flower Garden Banks National Marine Sanctuary are sufficient to mitigate potential impacts. Therefore, the new information does not alter the impact conclusions for topographic features presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

On May 1, 2020, the National Oceanic and Atmospheric Administration (NOAA) published a proposed rule to expand the boundaries of the Flower Garden Banks National Marine Sanctuary (FGBNMS) (85 FR 25359). Pursuant to Executive Order 13795, NOAA requested an analysis from BOEM on the potential OCS oil and gas resources and development impacts of the proposed expansion. The NOAA's significance determination in their Proposed Rule for the Expansion of the FGBNMS stated that the "Proposed Action would not have a significant negative economic impact on OCS oil and gas development in the Gulf of Mexico." For this consultation, BOEM determined that the proposed FGBNMS expansion could result in a reduction in the Nation's recoverable oil and gas reserves. However, BOEM agreed that these impacts do not appear to rise to the level of "economically significant" as defined in Executive Order 12866 (\$100 million per year). BOEM requested that NOAA recognize valid existing rights of the active leases within the proposed expansion areas. A final rule for the proposed FGBNMS was published in the *Federal Register* on January 19,

2021 (86 FR 4937). BOEM determined that the expansion would not change the analysis because BOEM already considered impacts to topographic features and live bottoms (which largely overlap with the expanded boundaries) and the mitigating effects of the stipulations. Any OCS oil- and gas-related activities in the boundaries would require a permit or certification from NOAA, and they would be required to distance activities from features in the blocks. Additional language has been added to the Topographic Features Stipulation for this and future lease sales. This language notifies lessees that, should their lease block in the future be included in a national marine sanctuary, their operations may be subject to additional requirements and regulations from the NOAA, and a permit from that agency may be required in certain instances.

Recent research suggests that the East and West Flower Garden Banks could serve as nursery habitat for one or more Mobulid species (Stewart et al. 2018). While additional research would be necessary to confirm whether these banks serve as nursery habitat for mantas, confirmation would not affect BOEM's impact conclusions in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Researchers in Australia investigating potential impacts to corals following a 3D seismic survey concluded that the survey caused no mortality and no discernable physical impacts to exposed corals (Heyward et al. 2018).

In 2016, there was a localized mortality event at the Flower Garden Banks. New research suggests that low oxygen concentrations (Johnston et al. 2019b) or higher water temperatures (Johnston et al. 2019a) were the cause of this bleaching event. Genetic evidence from two endangered coral species (*Orbicella* spp.) at the East Flower Garden Bank indicates that hypersaline surface conditions due to the passage of Hurricane Harvey in 2017 is linked to sublethal stress related to redox state and mitochondrial function in benthic invertebrates (Wright et al. 2019). The overall duration of this stressed state in these corals is unknown but, as hurricanes are a regular occurrence in the GOM, this type of impact is likely both common and temporary.

The introduction of invasive species associated with live bottom habitat have the potential to cause habitat modification to the reef ecosystem. Invasive lionfish (*Pterois volitans*) first arrived in the Gulf of Mexico in 2010 and currently inhabit the coasts of all five Gulf Coast States, as well as artificial and natural reefs. As lionfish grow, fish comprise a greater part of their diet (Dahl and Patterson III 2014). Their density, feeding patterns, growth rate, and lack of predators have the potential to significantly affect benthic communities. 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. 2020), which may mitigate their overall effect on benthic communities. The invasive regal demoiselle (*Neopomacentrus cyanomos*) has been recorded on the Flower Garden Banks (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).

The invasive ahermatypic stony coral *Tubastraea coccinea* is found throughout the Gulf of Mexico, often attached to oil and gas platforms. Derouen et al. (2020) developed a species distribution

model for *T. coccinea* to identify determinants of invasion and to predict potential range expansion in the GOM. The model indicates that distribution is correlated with surface variables (i.e., mean pH and mean calcite) and benthic variables (i.e., maximum current velocity, minimum iron, and minimum dissolved oxygen). The model suggests expansion of this species is most likely to occur within the western half of the northern Gulf of Mexico, with the highest occurrences clustered along the Texas and Louisiana coasts between 88° and 97° W. longitude.

In August 2022, stony coral tissue loss disease (SCTLD)-like lesions were observed on brain and star coral species on the East and West Flower Garden Banks coral caps. The FGBNMS activated their SCTLD preparedness plan and, in September 2022, samples of diseased tissue were collected for analysis, and diseased lesions on corals within the BOEM-funded, Long-Term Monitoring Program sites were treated with antibiotics. Healthy corals were also collected for potential future restoration efforts (Johnston 2022). The total extent of the disease outbreak within the shelf-edge topographic features is currently unknown, analysis of the diseased-tissue samples is ongoing, and the response to treatment is under evaluation. It is unknown at this time what will be the ultimate impact of the SCTLD-like disease to the coral cap communities on the live bottom topographic features; however, at this time, it is not expected that this event will alter previous impact conclusions in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

This information is helpful for analysis of cumulative effects and the contribution of multiple stressors to these sensitive ecosystems. At this time, reported results are consistent with previous BOEM analyses and do not alter previous conclusions of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### **4.7.1.5 Conclusion**

BOEM has reexamined the analysis for topographic features and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the additional information presented above. No new information was discovered that would alter the impact conclusion for topographic features and associated communities presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### **4.7.2 Pinnacles and Low-Relief Features**

#### **4.7.2.1 Summary**

BOEM has reexamined the analysis for pinnacles and low-relief features and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the additional information presented below. No new information was discovered that would alter the impact conclusion for pinnacles and low-relief features and associated communities presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed in these documents still apply for GOM Lease Sales 259 and 261.

A detailed description of pinnacles and low-relief features and associated communities, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.6.2 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.6.2 of the 2018 GOM Supplemental EIS. The following information is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Any new information that has become available since these documents were published is presented below.

#### **4.7.2.2 Analysis of Alternatives A-E Summary**

The Pinnacle Trend is an area of high-relief pinnacle features approximately 64 mi x 16 mi (103 km x 26 km) in water depths ranging from approximately 200 to 650 ft (60 to 200 m). This area is in the northeastern portion of the CPA at the outer edge of the Mississippi-Alabama shelf between the Mississippi River and De Soto Canyon. Outside of the Pinnacle Trend area, low-relief live bottom epibenthic communities occur in isolated locations in shallow waters (<300 m; 984 ft) throughout the GOM, wherever there exists suitable hard substrate and other physical conditions (e.g., depth, turbidity), allowing for community development. Hard bottom habitats occur throughout the GOM. In this analysis, low-relief features are equivalent to any potentially sensitive biological feature (PSBF) that is neither a topographic feature nor defined pinnacle that is in less than a 300-m (984-ft) water depth.

The impact-producing factors for pinnacles and low-relief live bottom features and associated communities can be grouped into three main categories: (1) bottom-disturbing activities; (2) drilling-related sediment and waste discharges; and (3) oil spills. These impact-producing factors have the potential to damage individual pinnacle and low-relief feature habitats and disrupt associated benthic communities if insufficiently distanced or otherwise mitigated. Under Alternatives A and B, the Live Bottom (Pinnacle Trend) Stipulation, which is a required mitigation as a result of the 2017-2022 National OCS Program's Record of Decision, will be applied for GOM Lease Sales 259 and 261, along with site-specific reviews of permit applications and associated distancing requirements, would mitigate potential impacts to the communities as a result of both routine activities and accidental events. Under Alternatives C and D, the Live Bottom (Pinnacle Trend) Stipulation blocks would not be leased, either because they are not part of the proposed lease sale area (Alternative C) or because they would be removed from leasing within the lease sale area (Alternative D) and, therefore, OCS oil- and gas-related, bottom-disturbing activities would be distanced from live bottoms in the Pinnacle Trend area, mitigating potential routine activities and accidental events.

However, live bottom communities are found throughout the GOM, not just in the blocks subject to the Topographic Features and Live Bottom (Pinnacle Trend) Stipulations and, therefore, the impacts associated with Alternatives A-D could potentially cause some negative effects to live bottoms on OCS blocks that would not have stipulations applied under Alternatives A and B or be eliminated from leasing under Alternatives C and D. However, BOEM's site-specific seafloor reviews help identify live bottom features and mitigate impacts to them by distancing bottom-disturbing OCS oil- and gas-related activity from these features.

At the broad geographic and temporal scope of this analysis, and assuming adherence to all expected lease stipulations and typically applied regulations and mitigations, routine activities are expected to have short-term localized effects. Although accidental events have the potential to cause severe damage to specific pinnacle and low-relief feature communities, the number and likelihood of such events is expected to be very small. At the regional scope of this analysis, the *incremental contribution* of impacts from reasonably foreseeable routine activities and accidental events to the overall cumulative impacts is expected to be **negligible to minor** because bottom-disturbing activities would be distanced from live bottoms in the Pinnacle Trend area through the application of the Live Bottom (Pinnacle Trend) Stipulation (Alternatives A and B) or not leasing the OCS blocks subject to the Live Bottom (Pinnacle Trend) Stipulation (Alternatives C and D). In addition, OCS oil- and gas-related activities outside of the stipulation blocks would be mitigated through site-specific seafloor reviews and the application of appropriate conditions of approval on post-lease OCS oil- and gas-related activities. Proposed OCS oil- and gas-related activities would contribute incrementally to the overall OCS and non-OCS oil- and gas-related cumulative impacts experienced by pinnacle and low-relief feature habitats. Under Alternative E, the cancellation of a single lease sale, the potential for impacts to pinnacle and low-relief feature communities are **none** because new impacts would be avoided entirely. Cumulative impacts of current and past activities (OCS and non-OCS oil- and gas-related activities such as fishing, pollution, and climate change), however, would continue to occur under this alternative. The OCS oil- and gas-related cumulative impacts to live bottom communities are estimated to be **negligible to minor**. A full analysis of pinnacles and low-relief features can be found in Chapter 4.6.2 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.6.2 of the 2018 GOM Supplemental EIS.

#### 4.7.2.3 Incomplete or Unavailable Information

BOEM recognizes that there is incomplete or unavailable information related to GOM live bottom habitats in general and specifically in relation to routine activities, accidental events, and cumulative impacts for OCS oil- and gas-related activities and cumulative non-OCS oil- and gas-related activities. However, the information available is adequate to make a determination with respect to reasonably foreseeable impact-producing factors associated with a Proposed Action.

Research in offshore marine systems is logistically complex and requires substantial resources to conduct. The total amount of research on live bottom habitats has therefore been limited, although BOEM and its predecessor agencies have funded numerous studies over the past 40 years. An example of incomplete knowledge is the exact distribution of GOM live bottom habitats. To address this knowledge gap, BOEM requires operators to provide detailed, updated, site-specific survey information about potential live bottom habitats; this information is reviewed by subject-matter experts prior to approval of individual proposed activities, and appropriate protective mitigations are applied where appropriate.

Given the geographic and temporal scope of a Proposed Action, it is expected that impacts resulting from a particular lease sale would have negligible impacts on the overall status of GOM pinnacle and low-relief feature communities. BOEM will continue to analyze the best available

scientific information related to live bottom habitats for indications of potential OCS activity-related impacts and other relevant information. BOEM used reasonably accepted scientific methodologies to extrapolate from existing information in completing this analysis and formulating the conclusions presented here. BOEM has determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives.

#### **4.7.2.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

Various printed and Internet sources (including Elsevier, PLoS ONE, Taylor and Francis Online, NOAA's NCCOS Publications Explorer, and Wiley Online Library) were examined to assess recent information regarding pinnacles and low-relief features and associated communities that may be pertinent to a Proposed Action. No new information that would add to the analyses or change the conclusions was discovered since publication of the 2018 GOM Supplemental EIS.

Recent research suggests that mesophotic coral and sponge ecosystems, in addition to hosting unique assemblages of species found only in these transitional zones (Baldwin et al. 2018; Díaz and Pomponi 2018), may also serve as refuge for reef species more commonly associated with shallower habitats (Vaz et al. 2016). These findings reinforce BOEM's earlier assessments of the Pinnacle Trend's ecological importance, but they do not affect the impact determinations.

#### **4.7.2.5 Conclusion**

BOEM has reexamined the analysis for pinnacles and low-relief features presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. No new information was discovered that would alter the impact conclusion for pinnacles and low-relief features and associated communities presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## **4.8 FISH AND INVERTEBRATE RESOURCES**

### **4.8.1 Summary**

BOEM has reexamined the analysis for fish and invertebrate resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.8.4**. No new information was discovered that would alter the impact conclusion for fish and invertebrate resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of fish and invertebrate resources, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with the Proposed Action are presented in Chapter 4.7 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. **Chapter 4.8.2** is a summary of the resource description and impact analysis

incorporated from the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.7 of the 2018 GOM Supplemental EIS.

#### 4.8.2 Analysis of Alternatives A-E Summary

The distribution of fishes and invertebrates in the GOM varies widely, and species may be associated with different habitats at various life stages, which is discussed in detail in Chapter 4.7.1 of the 2017-2022 GOM Multisale EIS. The impact-producing factors expected to affect these resources are anthropogenic sound, bottom-disturbing activities, habitat modification, and accidental oil spills. The impacts from routine activities, excluding infrastructure emplacement, would be expected to be **negligible to minor** due to the resulting short-term, localized effects. The installation of OCS oil- and gas-related infrastructure, particularly standing oil and gas platforms, constitutes a long-term, local habitat modification and is hypothesized to have resulted over the life of the program in **moderate** changes in the distribution of some species. Although this impact is not necessarily adverse and infrastructure is expected to be decommissioned to allow sites to be restored to their natural state, the cumulative impact over the life of the OCS Oil and Gas Program is spatially and temporally extensive. Further, because oil and gas explorations continue to move into deepwater (>300 m; 984 ft) habitats, the installation of new, standing structures (i.e., standing oil and gas platforms) that attract diverse, reef-associated communities of fish and invertebrates are not often constructed and emplaced on the OCS. Floating structures are generally used in deep waters and, due to their lack of a vertical hard structure present throughout the water column and their distance from shore, these structures do not support the diversity of fish and invertebrate communities observed around shallow-water structures. However, they can act as short-term, fish-attracting devices for highly migratory species, such as tunas.

Accidental spills have been historically low-probability events and are typically small in size. However, depending on the size of the spill, its spatiotemporal distribution (e.g., a shallow embayment with limited water exchange), the spill response (e.g., use of dispersants), and the species and life stages exposed, localized, but measurable impacts such as mortality of eggs/larvae, juveniles with limited mobility, and immobile benthic species (e.g., oysters) and/or reduced fitness resulting in changes to behavior (e.g., alterations in habitat use resulting in increased predation) may potentially occur. While population-level impacts would not be expected, short-term, community-level variations may be locally detected (e.g., species mix and relative abundance). For more information regarding how accidental oil spills can impact fish and invertebrates, refer to Chapter 4.5.8 of BOEM's *Biological Environmental Background Report for the Gulf of Mexico OCS Region* (BOEM 2021a). Therefore, the expected impact to fish and invertebrate resources from reasonably foreseeable accidental oil spills is **negligible to minor**. Commercial and recreational fishing are expected to have the greatest direct effects on fish and invertebrate resources, resulting in impact levels ranging from negligible for most species to potentially moderate for some targeted species (e.g., hogfish [*Lachnolaimus maximus*], gray triggerfish [*Balistes caprisacus*], and greater amberjack [*Seriola dumerilli*]). As such, the analysis of routine activities and accidental events indicates that the *incremental contribution* from OCS oil- and gas-related activities to the overall cumulative impacts on fish and invertebrate resources as a result of a single lease sale would be **minor**. A full analysis of fish and invertebrate resources can be found

in Chapter 4.7 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.7 of the 2018 GOM Supplemental EIS.

While the proposed WPA lease sale (Alternative C) would occur in a smaller area with less projected activity than a proposed regionwide WPA/CPA/EPA (Alternative A) or proposed CPA/EPA lease sale (Alternative B) as described in **Chapter 3**, activities isolated to specific planning areas are considered to pose similar potential impacts to populations as do activities occurring in all planning areas. This is because fish and invertebrates may generally be considered even throughout their range of habitats within the planning areas. For example, the WPA and CPA both encompass a similar breadth of habitat types (i.e., coastal, estuarine, continental shelf, continental slope, and abyssal plain) and associated species. Therefore, a similar mix of species would be exposed to the analyzed impact-producing factors, regardless of the specific action alternative selected. Although a regionwide WPA/CPA/EPA (Alternative A) or CPA/EPA lease sale (Alternative B) would result in more activity over a larger area and would ultimately expose a larger number of fish and invertebrates to impact-producing factors than would occur under Alternative C (WPA only). However, as mentioned previously, the impacts from routine activities, excluding infrastructure emplacement, would be expected to be **negligible** to **minor** due to the resulting short-term, localized effects. Combining Alternative D with Alternative A, B, or C would further reduce the potential exposure of fish and invertebrates to impacts as lease blocks with lease stipulations meant to offer protections for hard bottom habitats that support diverse fish and invertebrate communities, such as topographic banks and pinnacles, could be excluded from leasing. Regardless of the alternative chosen, post-lease, site-specific reviews of proposed activities result in the application of mitigations meant to avoid or minimize impacts to fish and invertebrates associated with hard bottom habitats. Overall, the analysis of routine OCS oil- and gas-related activities indicates that the expected overall impact to fish and invertebrate resources, depending on the impact-producing factor and the affected species for Alternatives A-D, would range from **negligible** to **moderate** for the period analyzed. Under Alternative E, the incremental impacts on fish and invertebrate resources within the Gulf of Mexico would be **none** because new impacts would be avoided entirely; however, impacts would continue from past and ongoing OCS oil- and gas-related activity.

### 4.8.3 Incomplete or Unavailable Information

Analyses of routine activities, accidental events, and cumulative impacts drew upon the most recent and best available scientific research to assess the potential effects on many fish and invertebrate species and their habitats. Nonetheless, BOEM identified incomplete or unavailable information related to impacts to fish and invertebrate resources resulting from OCS oil- and gas-related and non-OCS oil- and gas-related activities in the GOM. Anthropogenic sound and habitat modification directly or indirectly affect large areas of the GOM and potentially impact thousands of species. However, the response of individuals, groups of conspecifics (members of the same species), and communities are highly variable and inconsistent. In addition, BOEM recognizes that there is incomplete information with respect to potential long-term effects resulting from exposure to oil from reasonably foreseeable spills. Although additional information on these impact-producing factors may be relevant to the evaluation of impacts to fish and invertebrate resources, BOEM has

determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives. The findings collectively indicate that impacts are likely, but limited, and are not expected to induce a population-level response. BOEM recognizes the potential that populations with spatially limited distributions or increased sensitivity to an impact-producing factor may be more severely impacted than current research suggests. However, sufficient data to conduct a complete assessment of all potentially affected species are not available or obtainable within the timeline contemplated in the NEPA analysis of this Supplemental EIS. 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.

#### **4.8.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

Various printed and Internet sources (including PLoS ONE, Taylor and Francis Online, NOAA's NCCOS Publications Explorer, Google Scholar, Elsevier, Research Gate, Springer, Wiley Publishing, Royal Society Publishing, and Inter-Research) were examined to assess recent information regarding fish and invertebrate resources that may be pertinent to a Proposed Action. New information was found for fish and invertebrate resources, but it does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Many fish and invertebrate species have habitat preference shifts linked to critical life history stages. Such shifts affect species distribution and are considered in BOEM's analysis of potential impacts to fish and invertebrate resources. Long-term monitoring programs intended to assess any changes in the distribution and age structure of managed fish species have been in place for decades in the GOM. Results from these monitoring programs inform stock assessments, fisheries management decisions, and numerous studies. Monitoring data collected by the Louisiana Department of Wildlife and Fisheries (Ward et al. 2018) have indicated little support for large-scale species redistributions or reductions in populations that were predicted to occur by Ainsworth et al. (2018), using end-to-end ecosystem modeling.

Powers et al. (2018) characterized the distribution and age composition of red snapper (*Lutjanus campechanus*) on the inner and mid-shelf of the north-central GOM continental shelf (offshore of the Mississippi and Alabama border) and found that this species demonstrates ontogenetic changes in habitat use that differ slightly from similar studies. Age 0- and 1-year-old fish were found primarily in shallow water (~10-40 m; 33-66 ft) over unconsolidated muddy bottom, 2- to 8-year-old fish were predominantly captured at both artificial and natural reefs, and older fish (5-42 years old) were caught away from reef structures over unstructured bottoms in all depth strata (20-100 m; 131-328 ft). The authors also found that red snapper (primarily 2-8 years old) were four times more abundant on artificial reefs than on natural reefs and 27 times more abundant on artificial reefs than on unstructured bottom. Another study used hydroacoustic and video data collected from both standing and toppled platforms and found that red snapper was the dominant species present in both

scenarios, with fish communities differing among depth layers, seasonality, and between the structure types (Reynolds et al. 2018).

While the results of the aforementioned studies may raise some concern over the impacts of decommissioning activities (i.e., explosive removals) to GOM red snapper populations due to resulting mortalities, a recent study by Gallaway et al. (2020) indicated that the impacts are relatively minor (1% to 8% of the estimated stock abundance) for red snapper, gray triggerfish (*Balistes capricus*), vermilion snapper (*Rhomboplites aurorubens*), and cobia (*Rachycentron canadum*) at the current removal rate. In contrast, losses to greater amberjack (*Seriola dumerili*) could potentially represent 45 percent of the known stock. However, the authors speculate that the most recent stock assessment estimates of absolute abundance for greater amberjack in the GOM is inaccurate and needs further examination. In an effort to improve the greater amberjack abundance estimates for both the southeast and GOM regions, Federal funding totaling \$9 million was recently awarded to a research team that will conduct an independent study to estimate the absolute abundance of this species, as well as their movements and how they are distributed by habitat, including artificial, natural, and uncharacterized habitats (Schneider 2021). A similar effort known as “The Great Red Snapper Count” was recently conducted in the GOM and results from that assessment revealed that the absolute abundance of the red snapper stock in the GOM was estimated to be significantly higher (118 million) than Federal fisheries officials had previously estimated (36 million) (Stuntz et al. 2021). It is important to note here that Gallaway et al. (2020) used the Gulfwide red snapper stock estimates developed by Federal fisheries managers (i.e., 36 million) versus the updated estimate resulting from the Stuntz et al. (2021) assessment in their impact analysis.

Elliott et al. (2019a) published a review on information gaps in understanding the impacts of seismic surveys on marine vertebrates. These gaps include potential displacement in the water column, physiological impacts, potential impacts of masking on acoustically active fish species, and the potential for habitat avoidance. BOEM concludes that the unavailable information from this study may be relevant to foreseeable significant adverse impacts to fish because the full extent of impacts on fish is not known. However, BOEM has analyzed the issues brought forward in Elliott et al. (2019a) in its *Gulf of Mexico OCS Proposed Geological and Geophysical Activities in the Gulf of Mexico: Western, Central, and Eastern Planning Areas – Final Programmatic Environmental Impact Statement* (BOEM 2017c). In that Programmatic EIS, BOEM determined impacts to fish resources and EFH are assessed as **negligible to minor** for airgun surveys as well as vessel and equipment noise based on the potential to disrupt spawning aggregations or schools of important prey species, the mobile and temporary nature of most surveys, the small area of the seafloor affected during surveys, and the possibility of fishes temporarily moving away from noise that is affecting them.

Research into the effects of chronic exposure to polycyclic aromatic hydrocarbons (PAHs) has identified trends that could indicate potential long-term fitness declines in some populations of demersal fishes (Pulster et al. 2020a; Snyder et al. 2019). The continued presence of PAHs in sediments disturbed and ingested by demersal fishes (e.g., tilefish), periodic resuspension of contaminated sediments by environmental events and anthropogenic activities, and exposure to both natural and anthropogenic periodic contamination unrelated to OCS oil- and gas-related activities

(e.g., atmospheric, run-off, and vessels) may be affecting the condition of fishes in areas of increased exposure. Over time, the researchers posit that such effects may result in decreased fecundity or habitat shifts within affected populations.

Comprehensive baselines for petroleum contamination (i.e., biliary PAH concentrations) in GOM fishes were developed by Pulster et al. (2020b) for 2,503 fishes, comprised of 91 species from samples taken over 7 years (2011-2018). The northern GOM had significantly higher biliary PAH concentrations than fish sampled from the West Florida Shelf and the coastal regions of Mexico and Cuba. Yellowfin tuna (*Thunnus albacares*), golden tilefish (*Lopholatilus chamaelonticeps*), and red drum (*Sciaenops ocellatus*) had the highest concentrations of contaminants, whereas concentrations were relatively low for most other species such as snappers and groupers. Although declines in oil contamination for many demersal species were documented in the years following the *Deepwater Horizon* oil spill, recent increases detected in some species suggests the potential for interactions between multiple input sources (e.g., natural and anthropogenic inputs) and the possible resuspension of oil-contaminated sediments.

Continued research has been conducted in deep pelagic habitats of the GOM, which were among the environments most affected by the *Deepwater Horizon* oil. Romero et al. (2020) analyzed the tissue of five midwater oceanic cephalopod species in the northern GOM before the *Deepwater Horizon* oil spill and for two periods after the spill (i.e., 2011 and 2015-2016, respectively). The composition of PAHs shifted to a more petrogenic source (e.g., crude oil) after the spill that then weathered and mixed with other sources in 2015-2016. Concentrations of PAHs in tissue samples were generally lower in 2011 relative to 2010, which the authors attributed to potential post-spill food web effects (e.g., decreases in prey availability and/or dietary quality). In contrast, PAH concentrations increased by 84 percent between 2015 and 2016 in one mesopelagic, nonmigrating species (*H. corona*), possibly due to extended exposure to oil residues persistent at depth and/or the resuspension of contaminated sediments. For the aforementioned studies investigating PAH contamination in GOM fishes and invertebrates, long-term monitoring would be needed to determine the effects beyond the immediate observations.

Recent research by Bolser et al. (2020) on fishes associated with petroleum platforms in the GOM has further elucidated both the environmental and structural drivers (i.e., characteristics of platforms) of the horizontal (i.e., latitudinal and longitudinal) and vertical (i.e., position in the water column) species-specific distribution patterns. The majority of study species (11 of 17) were not influenced by the predictors used (e.g., distance from shore, number of platforms within 3.1 mi [5 km], salinity, temperature, and dissolved oxygen) and were found to associate with platforms over a wide range of environmental conditions and structural characteristics, suggesting that these variables may not be as important as the simple number of platforms available. However, distance from shore was a significant predictor of horizontal distributions for economically valuable species such as greater amberjack (*Seriola dumerili*) and vermilion snapper (*Rhomboplites aurorubens*), as well as dissolved oxygen levels for red snapper (*Lutjanus campechanus*). Vertical distributions of red snapper on petroleum platforms were significantly influenced by temperature, salinity, dissolved oxygen, and seafloor depth.

A study published by Meekan et al. (2021) assessed the impacts of a seismic survey on the assemblages of several commercially targeted demersal fish species (e.g., *Lutjanidae* sp.) using a large-scale experiment off the coast of Western Australia. Results indicated that no short-term (days) or long-term (months) impacts on the composition, abundance, size structure, behavior, and movement were measured a result of exposure. The multiple lines of evidence presented in this study suggest that seismic surveys have little impact on demersal fishes in tropical shelf environments.

Since publication of the 2018 GOM Supplemental EIS, environmental studies evaluating the impacts of climate change to coastal fish and invertebrates in the GOM have been published. Poleward shifts/range expansions of tropical-associated species have been documented in the GOM, coinciding with higher mean temperatures and fewer winter freezes. For example, Purtlebaugh et al. (2020) used data collected as part of a long-term monitoring program to document the poleward expansion of the common snook (*Centropomus undecimalis*), a recreationally valuable species of sportfish, along the west coast of Florida. Similarly, Fujiwara et al. (2019) used long-term, fishery-independent data collections of fish and invertebrates captured along the Texas coast to document range expansions for many species of tropical and sub-tropical fish and invertebrates. In contrast, reductions in prevalence and range contractions were documented for species that are closer to the southern range of their historical distribution. Changes in occupancy probabilities are associated with environmental variables, such as sea level, temperature, salinity, and dissolved oxygen. Observed, northward expansions and resulting increases in biodiversity in the northern GOM may have effects on ecosystems since such changes could alter the ecology of existing systems by introducing new species interactions and/or altering existing ones (Fujiwara et al. 2019).

Schlenker et al. (2022) recently published a study that investigated the impacts of crude oil exposure to survival and reproduction of wild-caught mahi-mahi (*Coryphaena hippurus*), a commercially and recreationally valuable GOM fish species. During the study, GOM mahi-mahi were captured, exposed to crude oil or control conditions onboard, and then electronically tagged and released in locations spanning from the vicinity of the *Deepwater Horizon* oil spill wellhead to areas along the West Florida Continental Shelf. Fin clip samples were also collected to assess for changes in gene expression. Results indicated impacts to survival and reproduction, including significant changes to gene expression profiles, predation mortality, altered acceleration and habitat use within the first 8 days following oil exposure, as well as cessation of apparent spawning activity for at least 37 days. However, it should be noted that the concentrations of the nonweathered source oil from the *Deepwater Horizon* oil spill the fish were exposed to (i.e., ~30 µg/L) were higher than the concentrations reported (i.e., >1 µg/L) for 84 percent of over 20,000 water samples collected in the GOM (i.e., from a few meters to over 800 km [497 mi] in all directions from the *Deepwater Horizon* wellhead) following the *Deepwater Horizon* oil spill, which is a level that can be considered as background based on pre-spill studies (Wade et al. 2015).

At this time, reported results are consistent with previous BOEM analyses and do not alter previous conclusions. Therefore, the new information is not essential to a reasoned choice among alternatives because BOEM has already considered these issues in its determination of impacts to fish and invertebrate resources.

## **4.8.5 Conclusion**

BOEM has reexamined the analysis for fish and invertebrate resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regards to the updated scenario in **Chapter 3** and the understanding that no new information essential to an analysis of fish and invertebrate resources has been discovered since publication of the 2018 GOM Supplemental EIS. Therefore, no new information was discovered that would alter the impact conclusion for fish and invertebrate resources presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## **4.9 BIRDS**

### **4.9.1 Summary**

BOEM has reexamined the analysis for birds presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.9.4**. No new information was discovered that would alter the impact conclusion for birds presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261.

A detailed description of birds, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.8 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.8 of the 2018 GOM Supplemental EIS. **Chapter 4.9.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### **4.9.2 Analysis of Alternatives A-E Summary**

The affected species of birds include both terrestrial songbirds and many groups of waterbirds. Passerines, or songbirds, represent many of the breeding and wintering birds within the Gulf Coast States. They are only found offshore when migrating across the GOM, and they cannot stop and rest or feed on the water. Some species of seabirds live primarily offshore except when breeding and, therefore, are rarely observed in the nearshore environment. The remaining species are found within coastal and inshore habitats and may be more susceptible to potential deleterious effects resulting from OCS oil- and gas-related activities because their abundance or density overlaps spatially and temporally with these activities, and due to the potential of oil impacting their habitat or food resources.

Routine impacts to coastal, marine, and migratory birds that were considered include routine discharges and wastes, anthropogenic noise from platform severance with explosives and geophysical surveys with airguns, platform presence and lighting, and pipeline landfalls. These impact-producing factors can affect birds through entanglement and ingestion of non-food items, leading to mortality or decreased fitness, barotrauma from noise sources, attraction to and collisions with platforms and nocturnal circulation from platform presence and lighting (Russell 2005), and disturbance of shoreline or wetland habitat from pipeline landfalls. The impacts to birds from routine OCS oil-and gas-related

activities are similar wherever they may occur in the GOM and are not expected to affect a substantial number of birds (i.e., population-level effects). Further, no injury to or mortality of a small number of individuals or a small flock would occur. Therefore, impacts are considered **negligible** for discharges, wastes, and noise and **minor** for platform severance, airgun geophysical surveys, and platform presence and lighting.

Accidental events such as oil spills, spill cleanup activities, and emergency air emissions can impact birds. Hydrocarbons may affect birds through inhalation or ingestion while eating oiled prey, preening oiled plumage, or drinking hydrocarbons in water (Leighton 1993). Birds and prey may be killed by toxic oiling (Leighton 1993). Oiled plumage can also be lethal because it causes loss of insulation, ability to fly, and buoyancy, as well as it can be transferred from such plumage to egg shells during incubation and can cause embryo mortality (Leighton 1993). Seabirds may not always experience the greatest impacts from an accidental spill, but it may take longer for populations to recover because of their unique population ecology (demography). Some species of seabirds have larger clutches (e.g., laughing gulls [*Leucophaeus atricilla*] usually have three eggs per clutch except in the tropics) and may recover quite quickly. However, many species of seabirds can have a clutch size of just one egg along with a relatively long life span and an often delayed age of first breeding. Because of the latter case, impacts on seabirds from overall accidental events would be expected to be **moderate**. Impacts from overall accidental events on other waterbirds farther inshore would also be expected to be **moderate** because of the extensive overlap of their distributions with oiled inshore areas and shorelines expected to be impacted by a large oil spill ( $\geq 1,000$  bbl). Moderate impacts would affect a substantial abundance of birds but would not be measurable population impacts.

The overall cumulative impacts on birds from OCS oil- and gas-related sources are expected to be **moderate**, and the non-OCS oil- and gas-related anthropogenic events and natural processes are considered **major** because of the anthropogenic impact of non-native infectious diseases. The *incremental contribution* of a Proposed Action to the overall cumulative impacts to birds in the Gulf of Mexico OCS is considered **moderate** for Alternatives A-D because of the potential impacts that could result from a large oil spill ( $\geq 1,000$  bbl; not a catastrophic event). Alternative E (No Action Alternative) is the cancellation of a single lease sale, therefore, would offer no new lease blocks for exploration and development; therefore, the incremental contribution to the overall cumulative impacts to birds would be **none** because new impacts would be avoided entirely. However, there would be continuing impacts associated with the existing OCS oil- and gas-related activities from past, present, and reasonably foreseeable permitted activities and previous lease sales. A full analysis of birds can be found in Chapter 4.8 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.8 of the 2018 GOM Supplemental EIS.

### 4.9.3 Incomplete or Unavailable Information

BOEM has identified incomplete or unavailable information related to impacts on birds resulting from OCS oil- and gas-related activities and non-OCS oil- and gas-related activities in the GOM. BOEM's subject-matter experts have used the available scientifically credible evidence presented below and applied accepted scientific methodologies to integrate existing information and

extrapolate potential outcomes in completing this analysis and formulating the conclusions presented herein.

Few studies have evaluated the impact of artificial light along the coast on birds, and it is unknown if it is relevant to evaluating whether adverse impacts from the human environment are significant. However, this information is not essential to a reasoned choice of among alternatives. BOEM used available information to fill the data gap. Existing information (Longcore and Rich 2004) shows that outdoor lights at night can have lethal impacts due to collisions and exposure to predators. Sublethal impacts may also occur; nocturnal migrants may become entrapped by lights and birds may avoid otherwise favorable nesting sites in lighted areas (Longcore and Rich 2004). The impact level of obstruction lighting located on platforms also needs further study. The best available information was obtained from a study by observers on platforms, a model of energy reserves of migratory birds, and several studies of the effect of light on birds. This scientific information, presented in the 2017-2022 GOM Multisale EIS, supports the conclusion that platform lighting, in general, has **minor** impacts.

#### **4.9.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

New information was found for birds after a search of relevant literature available through various printed and Internet sources (including websites of 5 Federal agencies [i.e., FWS, USEPA, USGS, NOAA, and BOEM]; 5 State agencies [i.e., Texas Parks and Wildlife Department; Louisiana Department of Wildlife and Fisheries; Mississippi Department of Wildlife, Fisheries, and Parks; Alabama Wildlife and Freshwater Fisheries Division; and Florida Fish and Wildlife Conservation Commission]; and 4 nonprofit stakeholders [i.e., National Fish and Wildlife Foundation, Nature Conservancy, Barataria-Terrebonne National Estuary Program, and the National Audubon Society]). Environmental journal articles were also located online using three search engines (i.e., JSTOR, Google Advanced Scholar Search, and Google Advanced Book Search). Resources were examined to assess recent information regarding birds that may be pertinent to a Proposed Action. The new information expands BOEM's knowledge base with regards to sublethal impacts to birds and describes lethal impacts to a very small number of birds. Information was found on the positive and negative influences of many waterbird species in the Proposed Action area located on the coast. No population-level impacts were described; therefore, it does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

A BOEM-funded study found that brown pelicans breeding in the eastern GOM (the Florida panhandle) experienced lower year-round exposure to surface pollutants, while central (Alabama, Mississippi, and Louisiana) and western (Texas) breeders had similar year-round exposure rates (Lamb 2016). Oil and gas platforms and pipelines, along with shipping traffic and port locations, are the majority of sources of acute and chronic pollution in the GOM (Lamb 2016). Lamb et al. (2019) used GPS tracking devices to characterize the year-round habitat preferences of the eastern subspecies *P.o. carolinensis* of brown pelicans, which breeds in the northern GOM across all three of BOEM's planning areas. Their habitat preferences suggest that highly productive, low-salinity habitats

(i.e., estuaries) are crucial during energy-intensive periods (e.g., chick-rearing and molting). The data also found a distinct separation between brown pelican breeders from EPA-located colonies and those in the CPA and WPA. The EPA breeders only shared 15 percent of their total year-round habitat area, while breeders from the CPA and WPA overlapped habitat usage 30-40 percent. The only area in which breeders from all three planning areas overlapped was in the Mississippi River Delta region. Further investigation is suggested by the researchers to understand this separation.

Lamb et al. (2020) conducted the BOEM-funded effort to explore the ecological drivers of brown pelican (*Pelecanus occidentalis*) movement patterns, health, and reproductive success in the GOM. Some of the key conclusions from this report found that the proximity of a breeding colony to a localized stress event (e.g., oil spill) should not be the only consideration when assessing the probability of an individual encountering the event. This is in part due to the spatial and temporal overlap of different breeding colonies. Further, the reproductive success of brown pelicans in the northern GOM was found to be strongly linked to the individual's ability to locate and forage on abundant, small, schooling fish as well as maintaining a high rate of meal provisioning. The report identified three areas suggested for future research regarding brown pelican diet: the frequency, timing, and location of interactions with commercial fisheries; pelican diets during migration and wintering periods; and the effect of natural and anthropogenic stressors on prey availability or quality. Lamb et al. (2020) also assessed the risk exposure faced by brown pelicans in the northern GOM and found their PAH profile to be diverse and comprised of mostly alkylated PAHs, suggesting petrogenic sources (e.g., crude oil). Jodice et al. (2022) established baseline values of the blood analyte concentrations in chick and adult brown pelican samples, compared these against regional levels of oil and gas development, and found that these oil and gas activity levels may not be the primary drivers of hematology and blood biochemistry (e.g., a predictor of health) in those observed. Finally, corticosterone (i.e., CORT) concentrations in brown pelican feathers can be used as a predictor for many ecological and biological parameters (e.g., nutritional stress and survival of chicks to fledging stage).

Coastal breeding waterbird species, such as those in the northern GOM, especially encounter negative anthropogenic effects (e.g., coastal land loss, sea-level rise, and oil spills). Sea-level rise washes away beach-nesting birds' habitat, subsidence and sea-level rise alter and/or remove marsh nesters' habitat, and island habitat is declining from erosion. Hurricanes that are destructive to birds also occur, especially on the coast. Besides this, waterbird species that are completely or primarily restricted to coastal areas have nearly linear ranges that naturally limit their population sizes (Remsen et al. 2019). Among the Gulf Coast States' and the world's coasts, the Mississippi River has historically built Louisiana's coastal wetlands (especially marshes), thus causing singularly high coastal wetland bird population sizes. The Louisiana Wildlife Action Plan lists the seaside sparrow as "apparently secure" and the clapper rail as "demonstrably secure." They are the only marsh-breeding species listed as a national FWS species of conservation concern in concordance with the Louisiana Wildlife Action Plan (Remsen et al. 2019).

Several studies have been published on the impacts of oil on birds. Short-term exposure of seabirds to oil resulted in a large number of observed clinical symptoms (endpoints), such as organ

weight changes, gross organ lesions, biochemical changes, histopathology (tissue disorders), oxidative stress (including hemolytic anemia), heart change (including echocardiograms), and blood smear (blood cell count). Impacts, however, were mostly sublethal (Alexander et al. 2017; Dean et al. 2017; Harr et al. 2017a; Harr et al. 2017b; Harr et al. 2017c; Horak et al. 2017; Pritsos et al. 2017). Birds exposed to small amounts of oil were shown to fly poorly in wind tunnel experiments (Maggini et al. 2017b), when homing (Perez et al. 2017a), and during repeated 161-km (100-mi) experimental flights (Perez et al. 2017b). The experimental results simulated those encountered during long-distance migration. Metabolites are (usually small) molecules that are intermediates in metabolic pathways, producing products as endpoints. Investigation of such pathways by chemical analysis showed that many metabolites were remarkably altered in seabirds' blood plasma and livers after repeated sublethal exposure to external oil (Dorr et al. 2019). A total of nine metabolites were affected in blood plasma and eight were altered in the liver. Amino acid, energy, and fatty acid metabolic pathways were impacted in oiled seabirds. Several of the metabolites were part of the complex one-carbon cycle. The cycle may provide a feed-forward pathway in which a substance activates genes that code for enzymes that make more of the substance (Dorr et al. 2019). In other words, the cycle may cause epigenetic changes.

Michel (2021) compiled a literature study on the effects of oil spills >20,000 bbl on a variety of resources, including birds. Impacts were assessed from numerous large oil spills (the Gulf War, *Deepwater Horizon*, *Metula*, and *Amoco Cadiz*). Marine and coastal birds are more vulnerable to impacts from oiling events given their foraging tactics and habitat usage in habitats more likely to be oiled and areas where oil tends to persist. For more analysis on accidental oil-spill impacts to birds, refer to Chapter 4.3.1.2.2 of the 2017-2022 GOM Multisale EIS. Michel (2021) noted that only a few bird species have been studied enough to predict population-level impacts from accidental oil spills; thus, continued surveying of impacted populations is recommended. Michael et al. (2022) conducted a vulnerability analysis of seabirds in the northern GOM by creating an oiling index using data from the Gulf of Mexico Marine Assessment Program for Protected Species' vessel-based seabird surveys, available literature, and oil and gas platform locations. The analysis concluded that suitable seabird habitat for 24 species occurring offshore could often overlap (15% of highly suitable habitat) with oil and gas platform areas, often along the shelf-slope. The two most vulnerable species to oiling (northern gannet [*Morus bassanus*] and Audubon's shearwater [*Puffinus lherminieri*]) had varying spatial overlap levels (58% and 5%, respectively). Neither of these species are ESA-listed and are species of least concern globally.

#### 4.9.5 Conclusion

BOEM has reexamined the analysis for birds presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS regarding the updated scenario provided in **Chapter 3** and based on the new information presented in **Chapter 4.9.4**. No new information was discovered that would alter the impact conclusion for birds presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## 4.10 PROTECTED SPECIES

### 4.10.1 Marine Mammals

#### 4.10.1.1 Summary

BOEM has reexamined the analysis for marine mammals presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.10.1.4**. No new information was discovered that would alter the overall impact conclusion(s) for marine mammals presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of marine mammals, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.9.1 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.9.1 of the 2018 GOM Supplemental EIS. **Chapter 4.10.1.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### 4.10.1.2 Analysis of Alternatives A-E Summary

The Gulf of Mexico marine mammal community is diverse and distributed randomly throughout the GOM, with the greatest abundances and diversity of species inhabiting oceanic and OCS waters. Twenty-one species of cetaceans and one species of sirenian regularly occur in the GOM (Davis et al. 2000; Jefferson et al. 1992) and are identified in NMFS' Gulf of Mexico Stock Assessment Reports (Hayes et al. 2018; 2019; 2020). The GOM's Cetacea include the suborders Mysticeti (i.e., baleen whales) and Odontoceti (i.e., toothed whales), and the order Sirenia, which includes the West Indian manatee (*Trichechus manatus*). While all marine mammals are protected under the Marine Mammal Protection Act, only the sperm whale (*Physeter microcephalus*) and Rice's whale<sup>6</sup> (*Balaenoptera ricei*) are listed as endangered, and the West Indian manatee is listed as threatened under the Endangered Species Act, as described in detail in the 2017-2022 GOM Multisale EIS. The Final Rule (84 FR 15446) to list the GOM Bryde's whale (newly named Rice's whale) as endangered was issued and became effective on May 15, 2019. The impact-producing factors affecting marine mammals in the GOM as a result of past, present, and reasonably foreseeable OCS oil- and gas-related activities are decommissioning activities, operational discharges, G&G activities, noise, transportation, marine debris, and accidental oil spills and spill-response activities. Accidental events involving large spills, particularly those continuing to flow fresh hydrocarbons into oceanic and/or outer shelf waters for extended periods (i.e., days, weeks, or months), pose a chance of impacting marine mammal populations inhabiting GOM waters. While accidental events cannot be predicted and have the

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<sup>6</sup> On August 23, 2021, NMFS published a direct final rule in the *Federal Register* (84 FR 15446), "Endangered and Threatened Wildlife and Plants; Technical Corrections for the Bryde's Whale (Gulf of Mexico Subspecies)." The NMFS revises its common name to Rice's whale, the scientific name to *Balaenoptera ricei*, and the description of the listed entity to the entire species. The changes to the taxonomic classification and nomenclature do not affect the species' listing status under the ESA or any protections and requirements arising from its listing. This rule became effective on October 22, 2021.

potential to impact marine mammal species, the size and number of such non-catastrophic events is expected to be **negligible** based on OSRA modeling. Further, catastrophic oil spills are not reasonably foreseeable, and most of the OSRA modeled oil spills are of a size and number that population-level impacts are unlikely. Refer to the updated *Gulf of Mexico Catastrophic Spill Event Analysis* technical report for an analysis of impacts from a low-probability catastrophic spill event (BOEM 2021d).

Proposed OCS oil- and gas-related activities would also contribute incrementally to the overall OCS oil- and gas-related and non-OCS oil- and gas-related cumulative effects experienced by marine mammal populations. At the regional, population-level scope of this analysis, impacts from reasonably foreseeable routine activities and accidental events could be **negligible** to **moderate** for Alternatives A, B, C, or D. However, the incremental contribution of a Proposed Action to cumulative impacts to marine mammal populations, depending upon the affected species and their respective population stock estimate, even when taking into consideration potential impacts (*Deepwater Horizon* explosion, oil spill, and response; non-OCS oil- and gas-related activities; and the minimization of the OCS oil- and gas-related impacts through lease stipulations and regulations), is expected to be **negligible**. Under Alternative E, cancellation of a single lease sale, the impacts on marine mammals in the Gulf of Mexico would be **none** because new impacts would be avoided entirely on activities associated with the cancelled lease sale. However, cumulative impacts from previous lease sales and non-OCS oil- and gas-related activities would remain. A full analysis of marine mammals can be found in Chapter 4.9.1 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.9.1 of the 2018 GOM Supplemental EIS.

#### 4.10.1.3 Incomplete or Unavailable Information

BOEM has identified incomplete information regarding impacts of the *Deepwater Horizon* explosion, oil spill, and response on marine mammals in the GOM. This incomplete information may be relevant to the evaluation of adverse impacts because it could provide changes in the baseline environmental conditions for marine mammals in the affected environment from the *Deepwater Horizon* oil spill and response, exacerbating any impacts from a Proposed Action. In NEPA, the term “baseline” usually consists of the pre-project environmental conditions. For the purpose of this Supplemental EIS, the baseline is the condition of resources in the vicinity of the project as they exist at the time this environmental analysis began. The injuries assessed within the *Deepwater Horizon Oil Spill: Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* do not necessarily equate to the current baseline as defined in NEPA (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016). Quantification of a new baseline has several difficulties, including the lack of pre-spill data, the interpretation of post-spill data, and other potential parameters that may have contributed to the quantification of the new baseline. The difference between the state of the resources in an earlier injury assessment and in a current baseline assessment equals any recovery that may have occurred. In addition, the injury assessment reviews a worst-case impact scenario while a baseline assessment determines a reasonable understanding of the current state of the resource.

On December 13, 2010, NMFS declared an unusual mortality event (UME) for cetaceans (whales and dolphins) in the Gulf of Mexico; it was later closed in May 2016. Evidence of the UME was first noted by NMFS as early as February 2010, before the *Deepwater Horizon* explosion, oil spill, and response. The UME investigation and the Deepwater Horizon Natural Resource Damage Assessment (NRDA) process determined that the *Deepwater Horizon* explosion, oil spill, and response resulted in the death of marine mammals and is the most likely explanation of the persistent, elevated stranding numbers in the northern Gulf of Mexico after the spill. Data have supported that the adrenal and lung disease observed in dolphins was most likely due to exposure to petroleum products from the spill. This has resulted in both dolphin mortalities and fetal loss. Research, while ongoing, suggests that the effect on these populations has not ended, with evidence of failed pregnancies found in 2015 (NMFS 2019).

Temporal and spatial boundaries of this UME are being redefined but are currently based in March 2010-July 2014. Studies published from the NRDA process evaluating the possible impacts of the *Deepwater Horizon* explosion, oil spill, and response on bottlenose dolphins exposed to oiling have shown overall poor health and prevalence of poor body condition, disease, and abnormalities as compared with bottlenose dolphins in the Gulf of Mexico that were not exposed to oiling (Schwacke et al. 2014; Venn-Watson et al. 2015). Bacterial pneumonia was also identified from dolphins before and during the UME, but it was detected more in the UME dolphins (Venn-Watson et al. 2015). While this information may ultimately be useful in expanding the available knowledge on baseline environmental conditions following the *Deepwater Horizon* explosion, oil spill, and response, it remains difficult to draw specific conclusions regarding the current overall bottlenose dolphin population in the GOM.

Even with publications such as the Venn-Watson et al. (2015) marine mammal study, the best available information on impacts to GOM marine resources does not yet provide a complete understanding of the population impacts of the oil spill and active response/cleanup activities from the *Deepwater Horizon* explosion and oil spill on marine resources as a whole in the GOM. Relevant data on the status of marine mammal populations after the UME and *Deepwater Horizon* explosion, oil spill, and response may take years to acquire and analyze, and impacts from the *Deepwater Horizon* explosion, oil spill, and response may be difficult or impossible to discern from other factors. For example, even 20 years after the *Exxon Valdez* spill, the long-term impacts to marine mammal populations remained unknown (Matkin et al. 2008) and investigations continue. Therefore, it is not possible for BOEM to obtain this information within the timeframe contemplated for the NEPA analysis in this Supplemental EIS, regardless of the cost or resources needed.

Unavailable information provides challenges in understanding the baseline conditions and changes within marine mammal populations. The impacts of naturally occurring tropical storms and hurricanes in the GOM have never been determined, and the impacts remain difficult to quantify. The impacts associated with the *Deepwater Horizon* explosion, oil spill, and response make an understanding of the cumulative impacts less defined. BOEM used existing information and accepted scientific methodologies to extrapolate from publicly available information on marine mammals in completing the relevant analysis of marine mammal populations. There are existing leases in the

GOM with ongoing or the potential for exploration, drilling, and production activities. In addition, non-OCS oil- and gas-related activities would continue to occur in the GOM irrespective of a Proposed Action (e.g., fishing, military activities, and scientific research). Therefore, BOEM concludes that the unavailable information from these events may be relevant to foreseeable significant adverse impacts to marine mammals because the full extent of impacts on marine mammals is not known. However, BOEM has determined that the information is not essential to a reasoned choice among alternatives for this Supplemental EIS (including the No Action and Action Alternatives) because none of the sources reveal reasonably foreseeable significant adverse impacts to marine mammals that were not otherwise considered in this Supplemental EIS.

#### **4.10.1.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

New information was found for marine mammals after searching through relevant sources. Because the new information provides support for or was already considered in the previous BOEM analyses, it does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. BOEM will continue the persistent review of best available science, as well as consultations with NMFS and FWS, to keep informed on new data regarding marine mammals. On March 13, 2020, NMFS published their Biological Opinion for oil and gas lease sales; for more information, refer to the Endangered Species Act in **Chapter 5**. An Incidental Take Regulation on Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico was published in the *Federal Register* (86 FR 5322) on January 19, 2021, with a 90-day implementation period, or an effective date of April 19, 2021, and ending April 19, 2026. For more information, refer to the Endangered Species Act in **Chapter 5**.

More information assessing the impacts of the *Deepwater Horizon* explosion, oil spill, and response to marine mammals has become available since publication of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Findings from multiple studies analyzing the Barataria Bay and Mississippi Sound bottlenose dolphin (*Tursiops truncatus*) populations, in addition to other marine mammal populations, further support that the *Deepwater Horizon* explosion, oil spill, and response contributed to the adverse health effects described in the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016), including impaired stress responses, high prevalence of lung and adrenal lesions, persistent lung and pulmonary disease, and reproductive failure; though other factors specific to this area certainly continuously and historically contribute to these stresses (Frasier et al. 2020; Morano et al. 2020; Schwacke et al. 2017; Smith et al. 2017; Takeshita et al. 2017). Takeshita et al. (2017) stated that “while many of these studies have now been published...a true understanding of the long-term effects of *Deepwater Horizon* oil contamination (and the associated response activities) on northern GOM marine mammals will require sustained investigation and monitoring.” Michel (2021) compiled a literature study on the effects of oil spills >20,000 bbl on a variety of resources, including marine mammals. Cetaceans may not avoid oil spills as initially thought but may experience substantial and long-lasting impacts, including reduced reproduction and increased disease and mortality. These impacts were documented in cetaceans that were resident in semi-enclosed heavily

oiled waterbodies. The remaining difficulty in determining impacts to marine mammals is 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. BOEM classifies spills of this magnitude as catastrophic and does not deem them as reasonably foreseeable as a result of the proposed activities. Therefore, the review of the new information expands on but supports the conclusions found in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

There is incomplete or unavailable information related to the long-term effect of the *Deepwater Horizon* explosion, oil spill, and response. Relevant data on the status of marine mammal populations after any relevant UMEs and the *Deepwater Horizon* explosion, oil spill, and response may take years to acquire and analyze, and impacts from the *Deepwater Horizon* explosion, oil spill, and response may be difficult or impossible to discern from other factors. Therefore, it is not possible for BOEM to obtain this information within the timeframe contemplated for analysis in this NEPA analysis, regardless of the cost or resources needed.

Two GOM marine mammal species have had reclassifications under the ESA. The status of the Florida sub-species of the West Indian manatee was reclassified from “endangered” to “threatened” in 2017 (82 FR 16668). On April 15, 2019, NMFS published the final rule to list the GOM Bryde’s whale (*Balaenoptera edeni*), now named the Rice’s whale (*Balaenoptera ricei*), as endangered, and it became effective on May 15, 2019 (84 FR 15446). These status changes were included in BOEM’s previous NEPA analysis since both were anticipated and considered.

Recent evidence shows that the population of Bryde’s whales in the northern GOM is actually a new species of baleen whale, Rice’s whale (*Balaenoptera ricei*) (86 FR 47022; Rosel et al. 2021). A new, evolutionarily divergent lineage of baleen whale, Rice’s whale, was identified based on genetic data and found to be restricted primarily to the northern GOM. Based on vessel and aerial survey sightings, the primary core habitat of Rice’s whale (not legally protected under the ESA and MMPA) is in the northeastern GOM, centered in De Soto Canyon in water depths between approximately 100 and 400 m (492 and 1,345 ft) (Rosel et al. 2021). BOEM believes the potential for vessel strikes to sperm and Rice’s whale is extremely unlikely to occur due to the generally slow vessel transiting and surveying speeds, limited vessel routes originating from the eastern GOM, and the additional mitigations on vessels within the Rice’s whale core area (as defined by the 2020 GOM Biological Opinion [BiOp]) (Soldevilla et al. 2022). The core area has been changing over the years as baseline information becomes available (Rosel and Garrison 2022). BOEM will continue to monitor current literature and work with NMFS as it relates to consultations, though the conclusions found in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS still remain valid.

Historically, there has been much debate on whether marine mammals can suffer from a form of decompression sickness caused by *in vivo* (in the natural body) nitrogen gas-bubble expansion. However, recent pathological findings of two Risso’s dolphins (*Grampus griseus*) suggest that, while rare, it is possible as a result of rapid ascent to the surface while struggling with prey during hunting (Fernández et al. 2017). Although more investigation is needed, this study brings to question how

exposure to stressful situations, whether from natural or anthropogenic sources, may affect the diving behavior of marine mammals, including rapid ascents that may ultimately lead to death. More information is needed to further understand this subject and will require sustained investigation and monitoring. Review of this information does not change the conclusions found in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Potential changes in diving behavior as a result of the routine activities are expected to be short-term and temporary. Thus, none of the routine activities are likely to cause such diving sickness.

There is incomplete and unavailable information related to decompression sickness in marine mammals. Conditions such as this were analyzed in the *Gulf of Mexico OCS Proposed Geological and Geophysical Activities in the Gulf of Mexico: Western, Central, and Eastern Planning Areas; Final Programmatic Environmental Impact Statement* (BOEM 2017c), and the rarity of the condition described in the literature does not make this new information essential to a reasoned choice among alternatives.

A study by Garrison et al. (2018) found strong associations between mesoscale physical features, sperm whales (*Physeter macrocephalus*), and their prey in the GOM. Squid biomass was found to be highest at intermediate depths, particularly between 600 and 700 m (1,989 and 2,297 ft), that correspond to primary sperm whale feeding depths. Sperm whale sightings occurred in two distinct habitats, neither of which are protected under the ESA and MMPA. First, there were consistent sightings along the 1,000-m (3,281-ft) isobath in regions of weakly positive sea-surface height. These occurred from the Mississippi Canyon region into the western GOM. Second, there were strong concentrations of sperm whales in deeper waters of the central GOM, primarily associated with the low sea-surface height anomaly and along the boundary with the Loop Current.

A report by Barkaszi and Kelly (2019) contained a compilation and analysis of visual and acoustic protected species (i.e., marine mammal and sea turtle) observation data collected during seismic operations in the GOM from 2009 to 2015. For whales and dolphins, there is evidence that the closest points of approach to airgun arrays are significantly farther during full power operations than during silence, indicating that there may be some avoidance response to the full power operations. Sighting durations for whales showed significantly shorter durations during silence than during minimum source or full power. Further, longer sighting durations corresponded to increased surface times and less dive behaviors. 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 significance to an animal. Sound exposure levels above certain thresholds, therefore, would have the greatest potential to disturb or cause injury (Ruppel et al. 2022).

The NMFS will release yearly updated marine mammal Stock Assessment Reports, which might change the exposure numbers and the estimation of impacts to various stocks (Hayes et al. 2018; 2019; 2020). However, based on the conservative assumptions built into the initial, potential impact magnitudes that are reasonably foreseeable for the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, and without identification or observation of any significant increases in

the densities (or other factors), the variation of the densities and other similar factors could change the initial magnitudes; however, these magnitude identifiers should still be reasonably accurate and representative given the conservative initial nature of the marine mammal exposure modeling.

Southall et al. (2019) published updated marine mammal noise exposure criteria, including scientific recommendations for hearing impacts and classifications. Elliott et al. (2019a) published a review on information gaps in understanding the impacts of seismic surveys on marine vertebrates. These gaps include marine mammal response to potential masking by seismic surveys, the extent and duration of avoidance behavior, and physiological impacts. BOEM concludes that the unavailable information from this study may be relevant to foreseeable significant adverse impacts to marine mammals because the full extent of impacts on marine mammals is not known. However, BOEM has analyzed the issues brought forward in Elliott et al. (2019a) in its *Gulf of Mexico OCS Proposed Geological and Geophysical Activities in the Gulf of Mexico: Western, Central, and Eastern Planning Areas; Final Programmatic Environmental Impact Statement* (BOEM 2017c). In that Programmatic EIS, BOEM determined

Impacts to marine mammals from all IPFs associated with deep-penetration seismic airgun surveys may result in extensive (i.e., affecting large numbers of individuals) short-term but not severe impacts with possible, albeit limited, physical injury or possible mortality (resulting only from vessel collisions). ... However, when impacts from deep penetration seismic airgun surveys to all marine mammals within the AOI during the 10-year timeframe of this Programmatic EIS are considered for the impact level determination, the overall impact level [ranges from minor to moderate]. Duarte et al. (2021) examined changing ocean soundscapes due to anthropogenic activities and climate change, and their potential effects on marine species. Evidence indicates that anthropogenic noise can affect the behavior and physiology of marine species, depending on several factors such as acoustics, behavioral context, and the physical environment. Overall, the new information found is not essential to a reasoned choice among alternatives because BOEM has already considered these issues in its determination of impacts to Marine Mammals.

#### 4.10.1.5 Conclusion

BOEM has reexamined the analysis for marine mammals presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regard to the additional information presented above. No new information was discovered that would alter the overall impact conclusion(s) for marine mammals presented in those documents, and the analysis and potential impacts detailed in 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261. At the regional, population-level scope of this analysis, impacts from reasonably foreseeable routine activities and accidental events could still be **negligible** to **moderate** for all action alternatives.

## 4.10.2 Sea Turtles

### 4.10.2.1 Summary

BOEM has reexamined the analysis for sea turtles presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.10.2.4**. No new information was discovered that would alter the impact conclusion for sea turtles presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of sea turtles, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.9.2 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.9.2 of the 2018 GOM Supplemental EIS. **Chapter 4.10.2.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### 4.10.2.2 Analysis of Alternatives A-E Summary

Five ESA-listed sea turtle species are present throughout the northern GOM year-round: Northwest Atlantic Ocean DPS loggerhead (*Caretta caretta*); Kemp's ridley (*Lepidochelys kempi*); North Atlantic DPS green (*Chelonia mydas*); Northwest Atlantic DPS (proposed) leatherback (*Dermochelys coriacea*); and hawksbill (*Eretmochelys imbricata*). However, only Kemp's ridley and loggerhead sea turtles commonly nest on beaches in the GOM during the nesting season. All five species are highly migratory with individuals migrating into nearshore waters as well as other areas of the GOM, North Atlantic Ocean, and the Caribbean Sea. Historically, intense harvesting of eggs, loss of suitable nesting beaches, and fishery-related mortality led to rapid declines of sea turtle populations.

Anthropogenic impacts continue to pose the greatest threat to sea turtles. Sea turtle critical habitat and nesting sea turtles are threatened with climate change, natural disasters, beach erosion, armoring, nourishment, artificial lighting, beach driving and cleaning, increased human presence, human response to disasters, coastal development, recreational beach use including equipment and furniture, exotic dune and beach vegetation, natural habitat obstructions, military testing and training activities, poaching, and nest predation.

Due to the expected implementation of mitigations (e.g., the NMFS 2020 GOM BiOp and 2021 Amended ITS Appendices and conditions of approval on post- and/or prelease activities), routine activities (e.g., noise or transportation), and accidental events (e.g., oil spills) related to a Proposed Action are not expected to have long-term adverse effects on the population size or productivity of any sea turtle species or populations in the northern GOM. Lethal effects could occur from chance collisions with OCS oil- and gas-related service vessels or ingestion of accidentally released plastic materials from OCS oil- and gas-related vessels and facilities. However, as part of the protected species stipulation, the NMFS 2020 GOM BiOp and 2021 Amended ITS Appendix C ("Vessel Strike

Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols”) and NMFS 2020 GOM BiOp Appendix B (“Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols”) are commonly applied. Most routine activities and accidental events as a result of a Proposed Action are therefore expected to have **negligible** to **moderate** impacts. For example, a minor impact might be a behavioral change in response to noise while a moderate impact might be a spill contacting an individual and causing injury or mortality (not anticipated and unlawful for this Proposed Action).

The effects associated with Alternative A, B, C, or D would be equivalent because of the diversity and distribution of sea turtles throughout the GOM. The analyses in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS assumed a wide distribution of species and considered impacts to sea turtles occurring in a wide range of habitats across all planning areas. While a WPA lease sale (Alternative C) would be in a smaller area with less projected activity than a regionwide (Alternative A) or CPA/EPA lease sale (Alternative B) as described in **Chapter 2**, sea turtles are distributed throughout the GOM planning areas. As such, activities isolated to specific areas pose similar potential impacts to populations as do activities occurring in all planning areas. Therefore, because of the free-swimming ability and wide distribution of species across the GOM, the level of impacts would be the same for Alternatives A-D. However, Alternative E would avoid impacts from a lease sale and the related post-lease activities because the single lease sale would not be held; only impacts from past lease sales and associated post-lease activities would continue. Thus, under Alternative E, the impacts on sea turtles from the cancellation of a single lease sale within the Gulf of Mexico would be **none** because new impacts would be avoided entirely. However, cumulative impacts from previous lease sales and non-OCS oil- and gas-related activities would remain. The incremental contribution of a Proposed Action to the cumulative impacts on sea turtles would be expected to be **negligible**. Population-level impacts are not anticipated.

A full analysis of sea turtles can be found in Chapter 4.9.2 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.9.2 of the 2018 GOM Supplemental EIS.

#### 4.10.2.3 Incomplete or Unavailable Information

Unavailable information provides challenges in understanding the baseline conditions and changes within sea turtle populations. The impacts associated with the *Deepwater Horizon* explosion, oil spill, and response makes an understanding of the cumulative impacts less defined but overall changes the baseline as in conceivably less numbers of individual species. Not all of the information collected during the NRDA process, which was used as a basis for NMFS’ determinations, has been published to date. BOEM continues to use existing information and reasonably accepted scientific methodologies to extrapolate from publicly available information on sea turtles in completing the relevant analyses of sea turtle populations and associated impacts. BOEM concludes that the unavailable information for the analysis herein may be relevant to foreseeable significant adverse impacts to sea turtles, though such impacts would be associated with a low-probability catastrophic spill, which is not part of the Proposed Action nor reasonably foreseeable as a result of any post-lease activities. Therefore, BOEM has determined that the incomplete or unavailable information is not

essential to a reasoned choice among alternatives for this Supplemental EIS (including the No Action and action alternatives).

#### **4.10.2.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

New information was found for sea turtles after searching relevant literature. This new information supports the previous BOEM analyses. The new information found is not essential to a reasoned choice among alternatives because BOEM has already considered these issues in its determination of impacts to sea turtles; therefore, it does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. On March 13, 2020, NMFS published their Biological Opinion for oil and gas lease sales; for more information, refer to the Endangered Species Act in **Chapter 5**.

More information assessing the impacts of the *Deepwater* Horizon explosion, oil spill, and response to sea turtles has become available since publication of the 2018 GOM Supplemental EIS. Findings from multiple studies analyzing exposed sea turtle populations further support that the *Deepwater* Horizon explosion, oil spill, and response contributed to the adverse health effects described in the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016), including adrenal insufficiency, which can result in reduced reproduction and, in some cases, death (Frasier et al. 2020; Kocmoud et al. 2019; Lauritsen et al. 2017; Mitchelmore et al. 2017; Shaver et al. 2017; Stacy et al. 2017; Wallace et al. 2017; Ylitalo et al. 2017).

Nelms et al. (2016) and Piniak et al. (2016) published new studies regarding potential impacts of noise on sea turtle hearing. Through a systematic review, policy comparison, and stakeholder analysis, Nelms et al. (2016) found that potential impacts of seismic surveys on sea turtles vary (i.e., hearing damage, entanglement, and critical habitat exclusion) and can be obscure due to the lack of research. Thus, understanding the impacts on individuals and populations can be challenging. By measuring auditory evoked potential responses of juvenile green sea turtles to tone pip stimuli, Piniak et al. (2016) found that these turtles have a narrow range of underwater and aerial low-frequency hearing. Aerial sound pressure thresholds were lower than those underwater, though they detected a larger frequency range underwater (Piniak et al. 2016). Also, sound intensity level thresholds were lower underwater. Elliott et al. (2019a) published a review on information gaps in understanding the impacts of seismic surveys on marine vertebrates. These gaps include the physiological responses of sea turtles (e.g., stress hormone levels) to airguns in a field setting, short- and long-term behavioral responses (e.g., changes to diving, foraging, migration patterns, and nesting behavior), and the impact of airguns on sea turtle distribution and abundance at sea. BOEM concludes that the unavailable information from this study may be relevant to foreseeable significant adverse impacts to sea turtles because the full extent of impacts on sea turtles is not known. However, BOEM analyzed the issues brought forward in Elliott et al. (2019a) in its *Gulf of Mexico OCS Proposed Geological and Geophysical Activities in the Gulf of Mexico: Western, Central, and Eastern Planning Areas; Final*

*Programmatic Environmental Impact Statement* (BOEM 2017c). In that Programmatic EIS, BOEM determined

Impacts on sea turtles are assessed as minor for airgun surveys for Alternatives A through D and F because they are not expected to result in substantial changes to behavior, growth, survival, annual reproductive success, or lifetime reproductive success (fitness).

Climate change poses a programmatic issue of concern for sea turtles, especially during the nesting season. Bevan et al. (2019) collected incubation temperatures at nesting beaches for the critically endangered Kemp's ridley (*Lepidochelys kempii*) (i.e., Tamaulipas, Mexico, and Padre Island, Texas) over a period of 3 years. The range of temperatures were significantly different across the three locations. However, they represented a restricted range of incubation temperatures, which is a determining factor for critical biological events. Northern beaches in Texas and Mexico could provide cooler incubation temperatures (exhibiting differences in male to female hatching ratios), but the likelihood of this range shift is diminished due to several life history factors of the Kemp's ridleys (e.g., age to maturity, sex determination mechanism, and nesting site fidelity).

Putman et al. (2019) developed a useful predictive model for the distribution and abundance variation of young sea turtles in the western North Atlantic, with implications in the GOM. Higher densities of overall young sea turtles were predicted in the northern GOM versus the southern GOM, but with a high degree of temporal variability. This is likely due to the ongoing ocean circulation processes. Relatively high densities of Kemp's ridleys were predicted in the western and central GOM, green turtles (*Chelonia mydas*) in the northern GOM, and loggerheads (*Caretta caretta*) in the eastern GOM. Overall, there has been an increasing trend of sea turtle densities in the northern GOM from 1996 to 2017, which suggests that anthropogenic activities have not had an overall negative population-level impact.

A report by Barkaszi and Kelly (2019) contained a compilation and analysis of visual and acoustic protected species (i.e., marine mammal and sea turtle) observation data collected during seismic operations in the GOM. There was a slightly higher visual detection rate for sea turtles during active airgun operations than silence. Loggerhead turtle sighting rates were the same both inside and outside the *Sargassum* critical habitat.

Garrison et al. (2020) found that loggerhead turtles in the northern GOM were typically found in shallow water in late spring/early summer and then migrated into deeper water during fall and/or winter months. The spatial and seasonal variation in loggerheads represents the shift in habitats and behavioral modes across seasons, with animals moving into deeper waters and spending progressively less time at the surface during cooler months. There was a significant interaction between season and day, indicating that the diurnal effects were different among the different seasons. Garrison et al. (2020) also found that, during the winter and spring, Kemp's ridley turtles spent a larger amount of time near the surface during daylight hours compared to night hours. During the summer, the time at the surface was the same for both day and night and was not significantly different during

the fall. Dive-surface behaviors for loggerheads and Kemp's ridleys indicated important seasonal, diurnal, and spatial effects on the time available at the surface.

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. Further, a range of individual variation in home range size was observed; larger home ranges were in greater water depths.

Iverson et al. (2020) identified migration corridors of post-nesting female adult loggerhead turtles in the GOM and Florida Straits, and overlaid the corridors on shipping density, commercial line fishing, and shrimp trawling data. This yielded hotspots in the Florida Straits, off the northwest Florida coast, and off the Tampa Bay coast. Loggerheads migrated in neritic and oceanic waters, with some leaving the GOM. Neritic waters west of Florida and in the Florida Straits were observed to be high-use migration corridors, with migration mainly occurring in July and August.

In a study to analyze juvenile green sea turtle movements in the northwestern GOM, Metz et al. (2020) found that tracked green turtles exhibited strong seasonal fidelity to their original capture locations. All turtles displayed residency in Texas bays during summer months (March-November) while 5 of the 15 individuals exhibited seasonal migrations into Mexican waters following passage of strong cold fronts in December and January. Winter (e.g., Mexico) and summer (e.g., Texas) core areas were not significantly different.

Duarte et al. (2021) examined changing ocean soundscapes due to anthropogenic activities and climate change, and their potential effects on marine species. Evidence indicates that anthropogenic noise can affect the behavior and physiology of marine species, depending on several factors, such as acoustics, behavioral context, and the physical environment.

Michel (2021) compiled a literature study on the effects of oil spills >20,000 bbl on a variety of resources, including sea turtles. Physical fouling of sea turtles and their nesting habitat, and oil ingestion can result in behavioral changes, physiological changes, and reduced nesting success. No studies have documented population-level effects on sea turtles following an oil spill, largely due to limited data on their population, geographic range, and other stressors. BOEM classifies spills of this magnitude as catastrophic and does not deem them as reasonably foreseeable as a result of the proposed activities. Therefore, the conclusions of the literature study regarding spills of this magnitude do not affect the impact conclusions in the present analysis.

#### **4.10.2.5 Conclusion**

BOEM has reexamined the analysis for sea turtles presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regard to the additional information presented above. No new information was discovered that would alter the impact conclusion for sea turtles presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale

EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261. At the regional, population-level scope of this analysis, impacts from reasonably foreseeable routine activities and accidental events could be **negligible** to **moderate** for all action alternatives.

### 4.10.3 Beach Mice

#### 4.10.3.1 Summary

BOEM has reexamined the analysis for beach mice presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.10.3.4**. No new information was discovered that would alter the impact conclusion for beach mice presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of beach mice, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.9.3 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.9.3 of the 2018 GOM Supplemental EIS. **Chapter 4.10.3.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### 4.10.3.2 Analysis of Alternatives A-E Summary

The four subspecies of beach mouse (i.e., Alabama [*Peromyscus polionotus ammobates*]; Perdido Key [*Peromyscus polionotus trisyllepsis*]; Choctawhatchee [*Peromyscus polionotus allophrys*]; and St. Andrew [*Peromyscus polionotus peninsularis*]) are small coastal rodents that are only found along specific beaches in parts of Alabama and northwest Florida, and are federally listed as endangered. Populations of the listed subspecies have fallen to levels approaching extinction. Beach mice rely on dune systems as favorable habitat for foraging and maintaining burrows. Impacts to beach mice may occur directly to the animal or its habitat. Due to the distance between beach mouse habitat and OCS oil- and gas-related activities, impacts from routine activities are not likely to affect beach mouse habitat except under very limited situations. Pipeline emplacement or construction, for example, could cause temporary degradation of beach mouse habitat; however, these activities are not expected to occur in areas of designated critical habitat. Accidental oil spills and associated spill-response efforts are not likely to impact beach mice or their critical habitat because the species live above the intertidal zone where contact is highly unlikely. Habitat loss from non-OCS oil- and gas-related activities (e.g., beachfront development) and predation have the greatest impacts to beach mice. Overall, the incremental contribution of impacts from reasonably foreseeable routine activities and accidental events to the overall cumulative impacts on beach mice is expected to be **negligible**. Under Alternative E, the cancellation of a single lease sale, the impacts on beach mice would be **none** because new impacts would be avoided entirely. However, cumulative impacts from previous lease sales and other non-OCS oil- and gas-related activities would remain. A

full analysis of beach mice can be found in Chapter 4.9.3 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.9.3 of the 2018 GOM Supplemental EIS.

#### **4.10.3.3 Incomplete or Unavailable Information**

BOEM has determined that there is no incomplete or unavailable information regarding the listed beach mice relevant to the potential impacts from a Proposed Action or alternatives, and no such information was essential to a reasoned choice among alternatives. BOEM's existing information and reasonably accepted scientific methodologies from available information on beach mice was used in completing the relevant analysis of impacts.

#### **4.10.3.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

New information (various printed journal articles and internet sources) for beach mice was found after searching relevant literature and government information. Sources searched include the FWS' website, Google Scholar, Elsevier, Cambridge University Press, and the Journal of Mammalogy. This new information provides support for the previous BOEM analyses and does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS as **negligible**. Most of the new information relates to updates of the status of the species prepared by FWS per their requirements. The resulting new information found below is not essential to a reasoned choice among alternatives because BOEM has already considered these issues in its determination of impacts to beach mice. BOEM will continue the review of best available science to keep informed on new data regarding beach mice.

The FWS conducted a 5-Year Review on the status of the Choctawhatchee beach mouse, including new information about impacts due to Hurricane Michael in October 2018 (FWS 2019c). There are four populations of the Choctawhatchee beach mouse, which are found at Topsail Hill Preserve State Park, Grayton Beach State Park, St. Andrews State Park, and Shell Island/West Crooked Island and adjacent private lands. In October 2018, Hurricane Michael impacted the Shell Island/West Crooked Island area and severely damaged the Choctawhatchee beach mouse habitat and population. Approximately 30 ft (9 m) of primary dune was removed and other areas were inundated or washed over. Even with these impacts, there was no change to the FWS' classification or priority ranking of the Choctawhatchee beach mouse. The Choctawhatchee beach mouse population remains as declining. The species status remains endangered.

The FWS conducted a 5-Year Review on the status of the St. Andrew beach mouse, including new information about impacts due to Hurricane Michael in October 2018 (FWS 2019e). Currently, there are three known populations: East Crooked Island on Tyndall Air Force Base and adjacent private lands to the east; Rish Park; and St. Joe State Park. In October 2018, Hurricane Michael hit the area and severely damaged the St. Andrew beach mouse habitat and population. Hurricane Michael severed portions of East Crooked Island and St. Joe State Park and eroded the majority of primary dunes in St. Joe State Park. Both the development of new islands and dune erosion created movement barriers for the mice due to the loss of suitable habitat. With the additional stress of Hurricane Michael across the entire species range, all populations are currently fragile. The habitat

and associated populations are projected to continue to rebound over the next several years; however, another severe impact in the same area could have devastating effects. The species status remains endangered.

The FWS prepared an amended recovery plan for the Perdido Key beach mouse (FWS 2019d). Track tube monitoring indicated that the Perdido Key beach mouse was detected and doing well in three of the five critical habitat units, including Gulf State Park, Perdido Key State Park, and Gulf Islands National Seashore. At that time, threats such as habitat destruction and fragmentation, stochastic events such as hurricanes, and predation from non-native (feral cats) and native predators continue to lower population numbers. The criteria for the recovery plan have not been changed.

Other new information about the Perdido Key beach mouse includes a 5-year Review by FWS on the species status (FWS 2021). There are two populations of the Perdido Key beach mouse, which is found at the Johnson Beach Unit of the Gulf Islands National Seashore and Perdido Key State Park. Efforts were made to re-establish a population at Gulf State Park - Florida Point through the release of captive born individuals in 2010. The 2010 release into Gulf State Park - Florida Point of captive born individuals appeared to re-establish Perdido Key beach mouse in areas of the Gulf State Park - Florida Point through 2014. Later monitoring at the Gulf State Park - Florida Point detected the likelihood of genetic mixing between the introduced mice at Gulf State Park - Florida Point and the wild population at Perdido Key State Park (Greene et al. 2017). Greene et al.'s research demonstrated that captive-born beach mice could be used to reestablish populations when wild populations are too small to provide donors for translocation. Other genetic studies have detected some movement between the three parks. Movement of individuals between the Gulf Islands National Seashore, Perdido Key State Park, and Gulf State Park - Florida Point has been attributed to the construction of frontal sand berms beginning in 2005, which provide connection between the parks. Ongoing monitoring of the Perdido Key beach mouse population between 2015 and 2019 continued to detect Perdido Key beach mice at the three parks. Hurricane Sally (2020) directly impacted the Perdido Key beach mouse areas and severely damaged the habitat and population. Some impact assessment regarding Hurricane Sally impacts to the Perdido Key beach mouse is still underway. Even with these impacts and the continuing impact assessment, there was no change to the FWS' classification or priority ranking of the Perdido Key beach mouse. The Perdido Key beach mouse population remains as declining. The species status remains endangered.

New information about the Alabama beach mouse includes a 5-Year Review by FWS of the species (FWS 2019a). There are two populations of the Alabama beach mouse, one located from Little Lagoon Pass to the tip of Fort Morgan Peninsula and the second with the Gulf State Park. These populations are isolated from one another. Following a series of storm events in the early 2000s, including Hurricanes Ivan (2004) and Katrina (2005), Alabama beach mouse populations were significantly impacted within their range and determined to be extirpated from the Gulf State Park. The Alabama beach mouse was reintroduced to the Gulf State Park through the release of relocated individuals from Bon Secour National Wildlife Refuge and Fort Morgan State Park. The 2010 release into Gulf State Park appears to have re-establish Alabama beach mouse in the park. The construction of frontal sand berms beginning in 2005 along the cities of Gulf Shores and Orange Beach seem to

have provided dispersal corridors and additional habitat for the Alabama beach mouse. The Alabama beach mouse population is improving and continues to recover following the devastating hurricanes of 2004 (Ivan) and 2005 (Katrina). The species status remains endangered. Following the preparation of the 5-Year Review, FWS prepared an amended recovery plan for the Alabama beach mouse, which included delisting criteria of the Alabama beach mouse (FWS 2019b). The previous plan had not identified recovery criteria for delisting.

Other new information includes the development of a Bayesian network model of habitat suitability, including stressors such as non-native predators (feral cats), to develop a decision support tool related to beach mouse habitat availability and suitability (Cronin et al. 2021). The model differs from other previous methodologies that examined extinction risk as a function of human development and storms. The model was developed to estimate habitat availability based on suitability that considered a wide range of criteria that could ultimately determine additional habitat requirements for species downlisting and potential management actions to improve existing habitat. The study found that post-storm recovery and recolonization by mice populations occurs over an extended time period of 5-7 years. Based on existing habitat availability and suitability, the habitat requirements for portions of the Perdido Key and Choctawhatchee beach mice populations may be met based on the modeled habitat. However, this determination was qualified in that it was within the model's probabilistic framework, and incomplete geospatial information still exists. The habitat model could be used to identify habitat quality and prioritize the locations of habitat improvement efforts for future 5-Year Status Reviews conducted by FWS.

Evans and Malcom (2020) conducted four case studies using automated logarithms to detect land-cover change. The case studies compared remote-sensing data of the same areas over two different time periods. The testing utilized open source platforms and were effective at detecting and quantifying this overall habitat change. One case study looked at small-scale changes in a St. Andrew beach mouse wetland or grassland habitat where residential construction occurred. The case study evaluated the logarithms effectiveness in detecting habitat loss and study showed that 0.3 km<sup>2</sup> (0.1 mi<sup>2</sup>) within a 4.7 km<sup>2</sup> (1.8 mi<sup>2</sup>) area was changed. Use of the habitat change comparisons like this have the potential to be applied to future conservation planning or 5-Year Status Reviews conducted for beach mice by FWS.

#### **4.10.3.5 Conclusion**

BOEM has reexamined the analysis for beach mice presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented above. No new information was discovered that would alter the impact conclusion for beach mice presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261. Alternative C would have no impacts because no beach mice habitat exists near the WPA proposed lease sale area. Alternative E, No Action, would only have impacts associated with ongoing activities from past lease sales and non-OCS oil- and gas-related activities.

## 4.10.4 Protected Birds

### 4.10.4.1 Summary

BOEM has reexamined the analysis for protected birds presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.10.4.4**. No new information was discovered that would alter the impact conclusion for protected birds presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of protected birds, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.9.4 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.9.4 of the 2018 GOM Supplemental EIS. **Chapter 4.10.4.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### 4.10.4.2 Analysis of Alternatives A-E Summary

Protected birds are those species or subspecies listed under the ESA by FWS as threatened or endangered due to the decrease in their population sizes or loss of habitat. The protected birds analyzed in this Supplemental EIS (as described in the 2017-2022 GOM Multisale EIS) include those ESA-listed threatened or endangered species that use the OCS or coastal counties/parishes along the GOM during any part of their lifecycle. Other species that met these criteria were excluded if their habitats were more upland or away from the coast (listed in Appendix F of the 2017-2022 GOM Multisale EIS). The habitats of the protected bird species described in this Supplemental EIS vary from upland habitat, freshwater wetlands, estuaries, coastal beaches, and tidal flats to offshore migration and foraging. BOEM has undergone consultation with FWS to minimize the potential impacts to ESA-listed species. The 2018 FWS BiOp states that routine activities are not likely to adversely affect listed birds (FWS 2018). Impacts from routine activities that would impact protected birds, including discharges and wastes (affecting air and water quality), noise, and possibly artificial lighting, would be **negligible**. The listed bird species considered are typically coastal birds and would not be exposed to much of the OCS oil- and gas-related activities. Waste discharges to air or water produced because of routine activities are regulated by USEPA and BOEM, and these discharges are subject to limits to reduce potential impacts; therefore, due to precautionary requirements and monitoring, the impacts to protected birds would be **negligible**. The major impact-producing factors resulting from accidental events associated with a Proposed Action that may affect protected birds include accidental oil spills and response efforts. Major impacts could occur if a large oil spill occurred with direct contact to a protected bird species or if the habitat became contaminated, resulting in mortality of a listed species. However, given the unlikelihood of these co-occurrences, BOEM concludes in the case of an accidental oil spill, impacts would be **negligible to moderate** depending on the magnitude and time and place of such an event. Marine debris produced by OCS oil- and gas-related activities because of accidental disposal into the water may affect protected birds by

entanglement or ingestion. Due to the regulations prohibiting the intentional disposal of items, impacts would be expected **negligible** overall; however, impacts may scale up to **moderate** if the accidental release of marine debris caused mortality of a listed bird, though is unlikely from OCS oil- and gas-related activities due to applicable conditions of approval attached to permits, as opposed to non-OCS oil- and gas-related activities, which are not regulated by BOEM.

Overall, BOEM would expect **negligible** impacts to protected birds considering routine activities, **negligible** to **moderate** considering accidental events and OCS oil- and gas-related cumulative impacts, and **negligible** to **major** considering non-OCS oil- and gas-related cumulative impacts. Due to the precautionary requirements and monitoring discussed in Chapter 4.9.4 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, the incremental contribution of a Proposed Action to the cumulative impacts on protected birds would be **negligible** for any of the action alternatives (i.e., Alternatives A-D). Under the No Action Alternative (i.e., Alternative E), which is the cancellation of a single lease sale, the additional incremental contribution to cumulative impacts on ESA-protected birds or their habitats would be **none** because new impacts would be avoided entirely. Cumulative impacts of current and past activities (including both OCS oil and gas-related and non-OCS oil and gas-related), however, would continue to occur under this alternative. A full analysis of protected birds can be found in Chapter 4.9.4 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.9.4 of the 2018 GOM Supplemental EIS.

#### 4.10.4.3 Incomplete or Unavailable Information

Refer to **Chapter 4.9** (“Birds”) for existing incomplete or unavailable information related to protected birds. The conclusions remain unchanged.

#### 4.10.4.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS

New information was found for protected birds after a search of relevant literature via various printed journal articles and Internet sources (including Ecological and Environmental Safety, Ecotoxicology and Environmental Safety, Journal of Experimental Biology, and Environmental Pollution, Google Advanced Scholar Search, Google Advanced Book Search, the National Audubon Society’s website, and the FWS’ website) were examined to assess recent information regarding protected birds that may be pertinent to a Proposed Action. The new information expands BOEM’s knowledge base with regards to sublethal impacts on birds and describes sublethal impacts to a minimal number of birds. No population-level impacts were described; therefore, it does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Sublethal impacts of oil spills may have consequences on populations of birds of conservation concern because new studies show that even small (sublethal) amounts of external oil on flight feathers or on both flight and body feathers may impair bird take-off and subsequent flight (Maggini et al. 2017a; Maggini et al. 2017b; Perez et al. 2017a; 2017b). Nevertheless, this new information does not change or alter the overall conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, but further informs the impact analysis.

The eastern black rail (*Laterallus jamaicensis jamaicensis*) has been listed as threatened under the ESA, which was effective on November 9, 2020 (85 FR 63764). Wintering and resident eastern black rails within the GOM region are found primarily along the Texas coast, western Louisiana coast, and Florida's Gulf Coast. Eastern black rail sightings in the other Gulf Coast States would be considered a vagrant or an accidental migrant. On April 26, 2021, FWS concurred with our determination that implementation of the Proposed Action is not likely to adversely affect the eastern black rail (refer to **Chapter 5** for additional information).

#### 4.10.4.5 Conclusion

BOEM has reexamined the analysis for protected birds presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS and based on the additional information presented above. No new information was discovered that would alter the impact conclusion for protected birds presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### 4.10.5 Protected Corals

#### 4.10.5.1 Summary

BOEM has reexamined the analysis for protected corals presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.10.5.4**. No new information was discovered that would alter the impact conclusion for protected corals presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for the GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of protected corals within the proposed lease sale areas, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.9.5 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.9.5 of the 2018 GOM Supplemental EIS. **Chapter 4.10.5.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### 4.10.5.2 Analysis of Alternatives A-E Summary

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 by NMFS as threatened due to the decrease in their population sizes. Distribution of those listed species within the U.S. Exclusive Economic Zone ranges from the State of Florida to the Flower Garden Banks National Marine Sanctuary and the U.S. territories of Puerto Rico, U.S. Virgin Islands, and Navassa Island. 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 GOM Lease Sales 259 and 261, and are too distant to be reasonably affected by routine

activities or accidental events occurring in the leased areas. Additionally, the critical habitat designated for the two *Acropora* species is located outside of the GOM and is not expected to be affected by activities associated with the proposed lease sales. Because of their protected status, the relative impacts from a Proposed Action on a particular group of coral colonies could have disproportionately higher population-level effects than what might be experienced by other non-listed coral species. BOEM therefore consults with NMFS to minimize any potential impacts to these species. Though the listed species are protected (i.e., given ESA status), they could experience the same types of potential impact-producing factors from a Proposed Action as other coral species inhabiting live bottom habitats. For a detailed description and impact analysis of live bottom habitats in the GOM, refer to Chapter 4.6 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.9.1 of the 2018 GOM Supplemental EIS. Without effective mitigations, routine activities and accidental events resulting from a Proposed Action could directly impact coral habitats within the GOM.

The site-specific survey information required for post-lease reviews of permit applications would allow BOEM to identify and protect live bottom features (which protected corals may inhabit) from potential harm by proposed OCS oil and gas-related activities by requiring that bottom-disturbing activity be distanced from live bottom features. Assuming adherence to the expected lease stipulations and other post-lease protective restrictions and mitigations, the routine activities related to a Proposed Action could have short-term localized and temporary effects on protected corals, if any. Impacts from reasonably foreseeable routine activities for Alternatives A-D would be **negligible**. While accidental events have the potential to cause severe damage to specific coral communities, the number of such events is expected to be small, and any impacts would be reduced or prevented by the lease stipulations and post-lease distancing requirements. Furthermore, the OCS lease blocks in the EPA that are closest to ESA-defined critical habitat areas for listed corals are not being offered in a lease sale due to the current Presidential withdrawal and are therefore too distant to be reasonably affected by routine activities or accidental events. In addition, many of the protected corals occur within 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 are not proposed for future leasing under any of the alternatives in this Supplemental EIS, 2018 GOM Supplemental EIS, or 2017-2022 Gulf of Mexico Multisale EIS. Therefore, the incremental contribution of activities resulting from a Proposed Action to the overall cumulative impacts on protected corals is expected to be **negligible**. Proposed OCS oil- and gas-related activities would contribute incrementally to the overall OCS oil- and gas-related and non-OCS oil- and gas-related cumulative impacts experienced by corals. The non-OCS oil- and gas-related cumulative impacts to protected corals are expected to be greater than any impacts related to OCS oil- and gas-related activities. Under Alternative E, cancellation of a single lease sale, the impacts on protected corals would be **none** because new impacts would be avoided entirely. However, cumulative impacts from previous lease sales and non-OCS oil- and gas-related activities would remain. A full analysis of protected corals can be found in Chapter 4.9.5 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.9.5 of the 2018 GOM Supplemental EIS.

#### 4.10.5.3 Incomplete or Unavailable Information

Refer to **Chapter 4.7** (“Live Bottom Habitats”) for incomplete or unavailable information related to protected corals. The conclusions remain unchanged.

#### 4.10.5.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS

Various printed and Internet sources, including literature from relevant peer-reviewed journals and reports, were examined to assess recent information regarding protected corals that may be pertinent to a Proposed Action.

New information was found for protected corals after searching relevant literature. Sources searched include the NOAA Fisheries’ website, Google Scholar, Directory of Open Access Journals, Bulletin for Marine Science, Reefbase Online Library, Journal of Marine Research, and Web of Science. The new information updates the description of the affected environment but does not alter the impact conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Limer et al. (2020) used a biophysical model to investigate the dispersal of two species of coral larvae, the mountainous star coral, a protected coral, and the mustard hill coral in the Flower Garden Banks. The results of the modeling indicated that recirculation of the larval coral caused by eddies attributed to the Loop Current could act as a re-seeding mechanism for Flower Garden Banks’ coral populations and make the Flower Garden Banks’ reefs relatively self-sustaining.

Bytingsvik et al. (2020) investigated the sensitivity in the deep-sea carbonate coral *Lophelia pertusa* to the dispersant Corexit 9500 and hydrocarbons in 96-hour tests. Corals showed high sensitivity to all contaminants after measuring the LC<sub>50</sub> (lethal concentration causing 50% mortality) and EC<sub>50</sub> (effective concentration causing 50% reduction in polyp activity). These results are similar to those previously reported in the literature, but the authors also caution against long-term, chronic exposure to these pollutants.

Schwing et al. (2020) provide a review of the impacts of the *Deepwater Horizon* spill on benthic resilience, including corals. For corals specifically, the paper reiterates previous literature regarding coral impacts (i.e., tissue and branch loss, and colony injury) and mortality. Findings include evidence of microbial communities returned to near baseline conditions within 2 years of the spill. Foraminifera assemblages are significantly different post-spill. There is a decrease in evenness (how equal the community is numerically) and an increase in abundance of meiofauna consistent with an increase in opportunistic taxa related to *Deepwater Horizon*-induced stressors. There is a decrease in Shannon diversity (accounts for evenness and abundance) of microfauna. There is also evidence of continuing impacts to the resiliency of local benthic megafauna. In summary, the response and recovery of benthic organisms and communities is spatially and temporally variable, with larger organisms requiring longer to recover.

Michel (2021) compiled a literature study on the effects of oil spills >20,000 bbl on a variety of resources, including corals. For shallow corals, impacts were assessed from three large oil spills (Bahia Las Minas [1986], Gulf War [1991], and Montara [2009]) as well as the Tropics Oil Pollution Investigation in Coastal Systems field experiment. Results were variable, highlighting the unique nature of each oil spill and the influence of many physical and environmental variables on observed coral detriment. Effects from large oil spills on corals can range from sublethal to lethal and include decreased coral cover, decreased diversity and abundance, bleaching, tissue swelling, tissue loss, mucus production, bacterial infections, and increased mortality. Laboratory studies have shown that coral gametes and larvae are particularly sensitive to oil exposure, decreasing settlement and survival even beyond the period of direct exposure. Spawning strategy of corals determines the amount of impact of a large spill on larvae; gametes of broadcast spawners are more likely to be negatively impacted since they can be found in surface waters where there is a greater risk of encountering an oil slick. High levels of ultraviolet radiation typical of the tropics can increase the toxicity of oil components. Response actions to oil spills can also impact corals (e.g., vessel groundings, anchors, and booms). BOEM classifies spills of this magnitude as catastrophic and does not deem them as reasonably foreseeable as a result of the proposed activities. Therefore, the conclusions of the literature study regarding spills of this magnitude do not affect the impact conclusions in the present analysis.

In Goode et al. (2020), the authors provide a lengthy meta-analysis of the literature on the resilience of benthic communities to trawling disturbance. Deep-sea corals play an integral role in community development within benthic communities. Their findings suggest that the mean total abundance of benthic communities will gradually increase after protections are in place, but this response is not the same across all taxonomic groups. Long-lived species, such as deep-sea corals, will likely have low resilience. Moreover, the removal of corals from benthic communities from trawling can provide opportunity for competitor species to grow. The authors conclude that recovery of benthic communities from trawling disturbance will on average be at least several decades after protections are enacted. The authors focus on seamounts rather than undersea canyons populating the Gulf of Mexico and OCS, but their conclusions are still relevant.

Huang et al. (2021) prepared a summary of known studies on plastic impacts to corals. A number of impacts to corals from plastics was identified from the review of studies conducted worldwide. The review identified mechanisms for impacts. The presence of microplastics increased the susceptibility of coral to disease. Plastics caused physical abrasions and injuries to coral tissues, transported foreign microbial communities to reefs, and caused a physical barrier to corals during feeding. While corals can expel plastics, coral ingestion of plastics can result in blockages and the transfer of pathogens and associated chemical contaminants. Laboratory studies demonstrated that plastic ingestion can impact coral energetics, growth, and health.

A laboratory study evaluated larval longevity and competency period (Miller et al. 2020), which is the time period that larvae are able to remain in the water column and still be able to settle and metamorphose, in two endangered corals. The study examined *Orbicella faveolata* (mountain star coral) and the *Acropora* complex (staghorn and elkhorn corals). The *Orbicella faveolata* had a

competency period between 3 and 5 or 4 and 7 days after spawning. The *Acropora palmata* (elkhorn coral) had a competency period of 7-8 or 10-11 days. The longer competency period suggests differences in dispersion potential between protected coral species. Dispersion potential may improve the prediction of connectivity of reef-building coral populations and localized recovery potential of a particular species.

A long-term study (Guzman et al. 2020) evaluated post-spill impacts on subtidal coral reef communities over a 30-year period with data collected over varying intervals. Corals found at locations impacted by a spill were compared to unimpacted controls. Percent cover, diversity, community composition, and recruitment were examined. Two of the species evaluated were the branching corals *Acropora cervicornis* (staghorn coral) and *Acropora palmata* (elkhorn coral). Ball- or boulder-shaped corals were also evaluated. The *Acropora palmata* (elkhorn coral) showed decreased percent cover in the short term and longer term compared to controls for the same species. Species richness was lower in the 10 years following the spill; however, 20 years post-spill, species richness was not significantly different between oiled and control sites. Short-term responses were stronger for branching corals, including the protected elkhorn coral, which could have implications for that protected species' localized populations success following a spill event. Due to multiple other stressors, long-term impacts from the spill to the coral communities studied were not reliably demonstrated.

A proposed rule designating critical habitat for threatened Caribbean corals (*Orbicella annularis*, *O. faveolata*, *O. franksi*, *Dendrogyra cylindrus*, and *Mycetophyllia ferox*) is currently under review (85 FR 76302). The three *Orbicella* species are found within the boundaries of the Gulf of Mexico's CPA and are located at the Flower Garden Banks, which are included in the proposed critical habitat designation. The Flower Garden Banks have protections associated with national marine sanctuary designation and through lease stipulations, which are described in the Bureau of Ocean Energy Management's NTL No. 2009-G39, "Biologically-Sensitive Underwater Features and Areas." The existing protections associated with lease stipulations include specific isobath offsets from the banks, no activity zones, and offsets for discharges. These protections already apply to the areas proposed for critical habitat. The critical habitat designation is not expected to change the mitigating measures already implemented while conducting OCS oil- and gas-related activities in the vicinity of the Flower Garden Banks.

The NOAA Fisheries published the 5-year review of staghorn, elkhorn, pillar, rough cactus, lobed star, mountainous star, and boulder star corals on August 5, 2022 (NMFS 2022). The review evaluated the accuracy of their ESA status and determined whether any changes were needed. It was recommended that pillar coral be uplisted to endangered; no changes were recommended for the remaining corals. The uplisting of pillar coral is not expected to affect the impact conclusions in this analysis, as this coral is not one of the species found within the proposed lease sale areas and its distribution falls too distant to be reasonably affected by routine activities or accidental events occurring in leased areas.

DeLeo et al. (2021) provides an examination of exposure of coral to oil and dispersant constituents. This laboratory study looked at coral response on the genetic level in an effort to identify specific cellular impacts and potential pathways of the impacts. The study identified a range of metabolic, immunological, skeletal growth, and cellular damage on two species of corals that resulted from exposure to oil, dispersant constituents, and a combination of both. The research is a continuation of investigations began following the *Deepwater Horizon* oil spill when it was suggested that the combination of oil and dispersant exposure could be more harmful than oil exposure alone on marine invertebrates. This study provides additional support to previous findings that the combination of oil and dispersant exposure, especially when exposure to the dispersant is prolonged, is more harmful than oil exposure alone.

Corals will likely be impacted due to elevated sea-surface temperatures associated with climate change. Recent monitoring at the Flower Garden Banks (Johnston et al. 2019a) demonstrated resilience of the coral communities after a bleaching event in 2016. The bleaching event was preceded by seawater temperatures exceeding 30°C (86°F) for 36 and 21 days, respectively, at the East and West Flower Garden Banks. Following the 2016 bleaching event, which was the most severe documented for the Flower Garden Banks, post-bleaching monitoring documented full recovery of coral colonies by August 2017. While the study did not specifically describe individual species recovery, endangered coral species inhabit the Flower Garden Banks. In particular, the boulder star coral *Orbicella franksi* is a common coral species found at the Flower Garden Banks. Monitoring was conducted during previous Flower Garden Banks' long-term monitoring. The monitoring documented that there was no significant decline in coral cover from 2016 to 2017.

An investigation of heat stress on corals (Levas et al. 2018), which included the endangered mountainous star coral *Orbicella faveolata*, exposed corals to elevated temperatures and monitored the corals after they were returned to the reef for a variety of characteristics, including endosymbiont concentrations, energy reserves, and calcification, and then determined recovery. All three species, including the endangered mountainous star coral, recovered within a year. Levas et al. (2018) suggest that some species of corals, including endangered corals, are resilient through isolated beaching events tied to elevated sea-surface temperatures.

In August 2022, SCTLD-like lesions were observed on brain and star coral species on the East and West Flower Garden Banks coral caps. For more information on this event and the FGBNMS' response, refer to **Chapter 4.7.1.4**. The protected mountainous star, boulder star, and lobed star corals (*Orbicella* spp.) found within the FGBNMS are considered to have intermediate susceptibility to SCTLD; elkhorn coral has low or no susceptibility (Johnston 2021). While the spread of disease to protected corals could result in disproportionately greater population impacts due to their threatened status, it is currently unknown what the ultimate impact of this SCTLD-like disease will be to coral communities in the FGBNMS. Due to the intermediate to low susceptibility of these particular coral species to SCTLD, combined with the strategy and response plan created and implemented by the FGBNMS (Johnston 2021), this event is not expected to alter previous impact conclusions in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### 4.10.5.5 Conclusion

BOEM has reexamined the analysis for protected corals presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the information presented above. No new information was discovered that would alter the impact conclusion for protected corals presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### 4.11 COMMERCIAL FISHERIES

#### 4.11.1 Summary

BOEM has reexamined the analysis for commercial fisheries presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.11.4**. Updated data on baseline commercial fishing activity has become available. However, no new information was discovered that would alter the impact conclusion for commercial fisheries presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of commercial fisheries, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.10 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.10 of the 2018 GOM Supplemental EIS. **Chapter 4.11.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### 4.11.2 Analysis of Alternatives A-E Summary

The Gulf of Mexico is home to a large and complex commercial fishing industry. Finfish and shellfish landings in the Gulf of Mexico comprised 19 percent of total U.S. landings in 2014 (NMFS 2016). Some of the most economically important commercial fisheries in the Gulf of Mexico 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.). The impacts of a Proposed Action on fish populations are presented in **Chapter 4.8**. Routine activities such as seismic surveys, drilling activities, and service-vessel traffic can cause space-use conflicts with fishermen. Structure emplacement could have positive or negative impacts depending on the location and species. For example, structure emplacement prevents trawling in the associated area and, thus, could impact the shrimp fishery. On the other hand, production platforms can facilitate fishing for reef fish such as red snapper and groupers. The eventual removal of production platforms would reverse these positive and negative impacts. Therefore, a Proposed Action could cause **beneficial (low) to minor** impacts to commercial fisheries by affecting fish populations or by affecting the socioeconomic aspects of commercial fishing. Accidental events, such as oil spills, could cause

fishing closures and have other impacts on the supply and demand for seafood. However, accidental events that could arise from a Proposed Action would likely be small and localized and thus would have **negligible to minor** impacts. A Proposed Action would be relatively small when compared with the overall OCS Oil and Gas Program, State oil and gas activities, overall vessel traffic, tropical storms/hurricanes, economic factors, Federal and State fisheries management strategies, and other non-OCS oil and gas-related factors. Therefore, the *incremental contribution* of a Proposed Action to the cumulative impacts on commercial fisheries would range from **beneficial (low) to minor** adverse effects for any of the action alternatives. The exact impacts would depend on the locations of activities, the species affected, the intensity of commercial fishing activity in the affected area, and the substitutability of any lost fishing access. Alternative E, the cancellation of a single lease sale, would prevent these impacts from occurring, except for potential **negligible** impacts arising from adjustments to incomes in the economy. Under Alternative E, the cancellation of a lease sale, fisheries would still be subject to the impacts from the OCS Oil and Gas Program, as well as the impacts from non-OCS oil- and gas-related activities. A full analysis of commercial fisheries can be found in Chapter 4.10 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.10 of the 2018 GOM Supplemental EIS.

#### **4.11.3 Incomplete or Unavailable Information**

BOEM has determined that there is incomplete or unavailable information related to commercial fisheries. Some of this incomplete or unavailable information relates to fish populations that support commercial fishing, which is discussed in **Chapter 4.8**. For example, there is incomplete or unavailable information regarding the chronic, long-term impacts of the exposure of commercially valuable fish and invertebrates to oil. This information is unavailable because these impacts would only become evident over time. However, research into this subject in the northern GOM has shown that species who live in close association with contaminated sediments, such as tilefish (*Lopholatilus chamaeleonticeps*), may be subject to repeated exposure to trapped contaminants and experience sublethal impacts such as reduced fitness (Snyder et al. 2019). In lieu of the incomplete or unavailable information, BOEM used various data sources and studies, including the most recent NMFS landings data, as well as the information in Carroll et al. (2016), to estimate the affected environment and impacts of OCS oil- and gas-related and non-OCS oil- and gas-related activities for commercial fishing. BOEM has determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives because existing data sources are sufficient for BOEM to reasonably estimate impacts. BOEM will continue to refine its approaches to alleviate the risk attributable to this incomplete or unavailable information.

#### **4.11.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

New information was found for commercial fisheries after searching standard sources of commercial fishing data such as Federal and State agency websites, Google Scholar, Elsevier, Springer, Wiley Publishing, and Inter-Research. This new information updates and supports previous BOEM analyses. Therefore, it does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

The NOAA Fisheries Service reports each year to the Congress and Fishery Management Councils on the status of all fish stocks in the Nation. The Gulf of Mexico Fishery Management Council provides the current information on commercial fishing rules for U.S. Federal waters of the Gulf of Mexico (Gulf of Mexico Fishery Management Council 2021). The NMFS's *Fisheries of the United States, 2019* is an annual update to U.S. fisheries statistics, such as data on landings, consumption, and prices (NMFS 2021b). The NMFS' *Fisheries Economics of the United States, 2017* (NMFS 2018) provides more detailed breakdowns of fisheries statistics by state and provides estimates of the economic impacts of commercial fisheries in each state. This report shows that landings revenues in the Gulf of Mexico increased from \$912 million in 2016 to \$980 million in 2017. Bruce et al. (2018) analyzed the impacts of seismic surveys on fisheries catch rates. This study found little evidence of consistent catch rate changes subsequent to a seismic survey. Guiry et al. (2021) analyzed the historical sheepshead populations in the Gulf of Mexico and found evidence for large-scale population depressions due to rapid human population growth and sustained harvesting pressure. While these reports expand the knowledge base about commercial fisheries, none of the new information discovered since publication of the 2018 GOM Supplemental EIS would alter the analyses or change the conclusions.

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). Moore et al. (2021) estimated the economic impact of climate change from 2021 to 2100 on low and high emission environments on 16 major U.S. fisheries and found a net loss of \$2.1 billion consumer surplus on low emission and \$4.2 billion on high-emission environments when discounted at 3 percent.

The COVID-19 pandemic continues to negatively affect fisheries in the GOM (Bennett et al. 2020; Peters 2020). White et al. (2021) assessed past and present landings and trade data, and found substantial declines in fresh seafood catches, imports, and exports relative to the previous year, while frozen seafood products were generally less affected. The Coronavirus Aid Relief and Economic Security Act earmarked \$300 million in relief funds for fisheries and aquaculture (NMFS 2020). Additional allocation of \$255 million in fisheries assistance funding was provided by the Consolidated Appropriations Act of 2021 to the states with coastal and marine fishery participants who have been negatively affected by COVID-19 (NMFS 2021e). The Gulf States Marine Fisheries Commission in coordination with NOAA Fisheries is working to distribute the funds in the GOM region (Gulf States Marine Fisheries Commission 2020). As the COVID-19 pandemic is ongoing, the full extent of these impacts is unknown and will remain uncertain for the foreseeable future. This incomplete or unavailable information regarding potential impacts to commercial fisheries may be relevant to determining alterations to the baseline. However, such a determination is not possible at this time because the pandemic is an ongoing, fluid event. BOEM continues to monitor the effects of the event as they develop.

### 4.11.5 Conclusion

BOEM has reexamined the analysis for commercial fisheries presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regards to the updated scenario provided in **Chapter 3**. No new information was discovered that would alter the impact conclusion for commercial fisheries presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## 4.12 RECREATIONAL FISHING

### 4.12.1 Summary

BOEM has reexamined the analysis for recreational fishing presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.12.4**. Updated data on baseline recreational fishing activity have become available. However, no new information was discovered that would alter the impact conclusion for recreational fishing presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of recreational fishing, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.11 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.11 of the 2018 GOM Supplemental EIS. **Chapter 4.12.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### 4.12.2 Analysis of Alternatives A-E Summary

Recreational fishing is a popular pastime in many parts of the Gulf of Mexico. The Gulf of Mexico's extensive estuarine habitats (**Chapter 4.4.1**), live bottom habitats (**Chapter 4.7**), and artificial substrates (including artificial reefs, shipwrecks, and oil and gas platforms) support several valuable recreational fisheries. The NMFS estimates that there were \$10.4 billion in trip and durable goods expenditures in 2015 related to recreational fishing in the Gulf of Mexico (NMFS 2017). Some of the key recreational species in the Gulf of Mexico are seatrouts (*Cynoscion spp.*), red drum (*Sciaenops ocellatus*), red snapper (*Lutjanus campechanus*), striped mullet (*Mugil cephalus*), Atlantic croaker (*Micropogonias undulatus*), and Spanish mackerel [*Scomberomorus maculatus*] (NMFS 2017). Alternatives A-D can affect recreational fishing by affecting fish populations or by affecting the socioeconomic aspects of recreational fishing. The impacts of Alternatives A-D on fish populations are presented in **Chapter 4.8**. Routine activities could cause **beneficial (low)** to **minor** impacts on recreational fishing because disruptions to fish populations could reduce landings in proportion to the amount of recreational fishing activities in an area (refer to **Chapter 4.12.1**). Vessel traffic can cause space-use conflicts with anglers. Structure emplacement generally enhances recreational fishing, although this positive effect would be offset during decommissioning unless a structure was

maintained as an artificial reef. Accidental events, such as oil spills, can cause **negligible** to **minor** impacts due to the resulting fishing closures and the impacts to the aesthetics of fishing in an area. However, accidental events that could arise would likely be small and localized. Alternatives A-D should also be viewed in light of overall trends in OCS platform decommissioning, State oil and gas activities, overall vessel traffic, tropical storms/hurricanes, economic factors, and Federal and State fisheries management strategies. The *incremental contribution* of a Proposed Action to the cumulative impacts of Alternatives A-D on recreational fisheries are expected to be **beneficial (low)** to **minor** because of the limited amount of activity and also the positive and negative impacts would partially offset each other. Alternative E, the cancellation of a single lease sale, would cause some economic adjustments (refer to **Chapter 4.15.2**), which could cause **negligible** impacts to recreational fishing activities. For example, Alternative E would cause workers in the oil and gas industry's supply chain to lose income, which could slightly lessen their propensity to go recreational fishing. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative. A full analysis of recreational fishing can be found in Chapter 4.11 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.11 of the 2018 GOM Supplemental EIS.

#### **4.12.3 Incomplete or Unavailable Information**

BOEM has identified incomplete or unavailable information regarding the extent to which recreational fishing is dependent upon OCS platforms, 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 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. BOEM does not expect the incomplete or unavailable information to significantly change its estimates of the impacts of the OCS Oil and Gas Program on recreational fishing activity because BOEM still has enough baseline data to reasonably estimate impacts. Therefore, BOEM has determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives. BOEM will continue to refine its approaches to alleviate the risk attributable to this incomplete or unavailable information.

#### **4.12.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

New information was found for recreational fishing after searching standard sources of recreational fishing data and publications, such as Federal and State agency websites, Google Scholar, Elsevier, Research Gate, Springer, Wiley Publishing, and Inter-Research. This new information updates and supports previous BOEM analyses. Therefore, it does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

The NMFS' *Fisheries of the United States, 2019* (NMFS 2021b) is an annual update to U.S. fisheries statistics and includes a national overview of recreational fishing. The NMFS' *Fisheries*

*Economics of the United States, 2017* (NMFS 2021a) provides more detailed breakdowns of fisheries statistics by state and provides estimates of the economic impacts of recreational fishing in each state. The Texas Parks and Wildlife Department collects and monitors data on marine recreational fishing activity in Texas (NMFS 2021b). The NMFS releases data on recreational fishing activity in Mississippi, Alabama, and West Florida (NMFS 2021b). Beginning in 2014, NMFS did not provide updated data for Louisiana, which is when the Louisiana Department of Wildlife and Fisheries assumed responsibility for recreational fishing data. The Louisiana Recreational Creel Survey, which provides weekly estimates of recreational fish harvests, was certified by NOAA Fisheries in January 2018 as an alternative to NOAA's Marine Recreational Information Program's surveys (Louisiana Department of Wildlife and Fisheries 2020). There have been recent changes to the Marine Recreational Information Program's methodologies for collecting and reporting recreational fishing data (NMFS 2021d). Over the last several years, there have been variations in the recreational fishing statistics, but these data variations do not rise to the level of significance necessary to alter the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. 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 GOM red snapper Federal recreation seasons.

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 foregone landing values ranging from \$21.8 to \$46.0 million, lost 145-324 jobs per year from 2011 to 2013, and lost labor income was estimated at \$1.8-\$8 million per year.

The COVID-19 pandemic continues to negatively affect fisheries in the GOM (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). An additional allocation of \$255 million in fisheries assistance funding was provided by the Consolidated Appropriations Act of 2021 to states with coastal and marine fishery participants who have been negatively affected by COVID-19 (NMFS 2021e). The Gulf States Marine Fisheries Commission, in coordination with NOAA Fisheries, is working to distribute the funds in the GOM region (Gulf States Marine Fisheries Commission 2021). Recreational fishing experienced largely 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 2021c; Upton 2020). For the January through June 2020 time period, 94 percent of charter boat operators in NOAA's Southeast Region experienced revenue losses of 58 percent on average, compared to the same time period in 2019. Some 64 percent of the operators shutdown completely for 1-3 months (NMFS 2021f).

The Gulf of Mexico region experienced a 50 percent reduction of aggregate fishing trips in 2020 compared to previous years due to decreased access to fishing possibly tied to COVID-19 mitigation policies, reduced resources for fishing trips, and fears of COVID-19 exposure through fishing (Apriesnig and Thompson 2021). Midway et al. (2021) conducted a survey of recreational anglers in 10 U.S. states and found that a small overall increase in the fishing effort was reported, but access restrictions to fishing locations vary by state. The increase in the fishing effort was mainly due to lost jobs or lost work hours of anglers. Many anglers reported that fishing helped with mental stress and family bonding during the pandemic.

As the COVID-19 pandemic is ongoing, the full extent of these impacts is unknown and will remain uncertain for the foreseeable future. This incomplete and unavailable information regarding potential impacts to recreational fishing may be relevant to determining alterations to the baseline. However, at this time such a determination is not possible because the pandemic is an ongoing, fluid event. BOEM continues to monitor the effects of the event as they develop.

#### **4.12.5 Conclusion**

BOEM has reexamined the analysis for recreational fishing presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. No new information was discovered that would alter the impact conclusion for recreational fishing presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### **4.13 RECREATIONAL RESOURCES**

#### **4.13.1 Summary**

BOEM has reexamined the analysis for recreational resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.13.4**. Updated data on the number of visitors and the amount of visitor spending supported by parks along the Gulf Coast have become available. However, no new information was discovered that would alter the impact conclusion for recreational resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of recreational resources, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.12 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.12 of the 2018 GOM Supplemental EIS. **Chapter 4.13.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### 4.13.2 Analysis of Alternatives A-E Summary

Recreational resources are natural or manmade things that are used as part of activities that are primarily for human enjoyment. The GOM is home to various resources that support recreational activities. These include ocean-based resources as well as resources in the counties and parishes along the Gulf of Mexico. Alternatives A-D would contribute to the **negligible to minor** space-use conflicts (from vessel traffic) and visual impacts (from the visibility of OCS structures) that arise due to the broader OCS Oil and Gas Program. Structure emplacements can have **beneficial (low)** impacts on recreational fishing and diving because platforms often act as artificial reefs, but the eventual removal of these structures would lead to **negligible to minor** negative impacts. Oil spills can have a **negligible to minor** negative effect on beaches and other coastal recreational resources. Alternatives A-D should also be viewed in light of the overall OCS Oil and Gas Program, as well as various non-OCS oil- and gas-related factors, such as beach/wetlands erosion, beach disruptions, and economic factors and activities that can cause space-use conflicts and aesthetic impacts such as commercial and military activities. Because of the relatively small contribution of any given lease sale under any of the Proposed Action alternatives (i.e., Alternatives A-D) to the overall OCS Oil and Gas Program, in addition to other non-OCS oil- and gas-related activities, the *incremental contribution* of a Proposed Action to the cumulative impacts on recreational resources is expected to be **beneficial (low) to minor** adverse effects. Under Alternative E, the cancellation of a single lease sale, there could be **negligible** impacts to recreational resources due to the small economic adjustments. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this alternative. A full analysis of recreational resources can be found in Chapter 4.12 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.12 of the 2018 GOM Supplemental EIS.

### 4.13.3 Incomplete or Unavailable Information

There is some incomplete or unavailable information regarding the visual impacts from a Proposed Action. In particular, the perception of people towards the visibility of structures that could arise in certain areas are not fully known. 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 Proposed Action. In addition, existing information allows for sufficient estimates of the overall dependence of visual impacts to factors such as distance, height, brightness, and general location. BOEM used generally accepted scientific principles to estimate the visual impacts of a Proposed Action, including literature sources, data sources, and photographic evidence. This evidence suggests that the incremental visual impacts of a Proposed Action would be **negligible to minor**. In addition, BOEM has issued an Information to Lessees and Operators to ensure that visual impacts near the Gulf Islands National Seashore are considered at BOEM's site-specific review stage, and BOEM has a stipulation to reduce visual impacts for leases within 15 miles of Baldwin County, Alabama.

#### **4.13.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

Various sources (including Internet searches related to the Gulf Islands National Seashore, economic conditions, and oil-spill impacts) were examined to assess recent information regarding recreational resources that may be pertinent to a Proposed Action. A new report by Cullinane Thomas et al. (2019) provides estimates of the number of visitors, amount of spending, number of jobs, and amount of income in 2017 supported by each national park along the Gulf Coast. The number of visitors and the amount of visitor spending supported by national parks along the Gulf Coast experienced slight annual variations from 2014 to 2017, but these variations do not alter the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

New information was found for recreational resources after searching relevant literature and government information. This new information updates and supports previous BOEM analyses. Therefore, it does not change the impact conclusions for recreational resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Based on the latest available data from NOAA Economics: National Ocean Watch, the tourism and recreation sector was the largest employer in the Gulf of Mexico ocean economy in 2016 (NOAA and Office for Coastal Management 2019). A new report by Cullinane Thomas and Koontz (2021) provides estimates of the number of visitors, amount of spending, number of jobs, and amount of income in 2019 supported by each National Park Service unit along the Gulf Coast. The number of visitors and the amount of visitor spending supported by National Park Service units along the Gulf Coast experienced slight annual variations from 2014 to 2019.

The U.S. Travel Association produces a plethora of data and research on travel and tourism in the U.S., including estimated total annual travel and tourism spending by state. In 2019, domestic and international travelers spent \$82 billion in Texas, \$13.9 billion in Louisiana, \$7.1 billion in Mississippi, \$11.6 billion in Alabama, and \$112.6 billion in Florida (U.S. Travel Association 2020); however, these estimates focus only on spending by visitors, which excludes spending on recreational activities by local residents. Therefore, the total economic impact of the recreation and tourism industry in the Gulf Coast States is likely greater than these estimates.

The NOAA provides a list of Federal and State tools and resources online related to harmful algal blooms in the Gulf of Mexico, including forecast bulletins and a monitoring system, which aim to help stakeholders mitigate issues related to harmful algal blooms (NOAA 2021). There are potential health consequences for beachgoers who may interact with harmful algal blooms, such as respiratory, throat, eye, and skin irritations (CDC 2021b). The recent opening of the Bonnet Carré Spillway in 2019 increased the flow of freshwater into Lake Pontchartrain, Lake Borgne, and Mississippi Sound, causing algae blooms off the Gulf Coast, which resulted in many beach closures and the disruption of some recreational activities and seasonal tourism jobs in the area over the summer months (Fitzhugh 2019; Hauser 2019; Sharp 2019). All Mississippi Gulf Coast beaches and waters were reopened by October 2019 with no observed impacts from the algae blooms to the Gulf Islands National Seashore

(Walck 2019). While hotel revenue along the Mississippi Gulf Coast dropped nearly 3-8 percent in June and July, it is estimated that beach vendors, fishing charters, and other support businesses saw revenue declines of up to 70 percent (Weatherly 2019a). In January 2020, it was announced that low-interest Economic Injury Disaster Loans of up to \$2 million would be available for small businesses and private nonprofit organizations, including tourism-related businesses, on the Gulf Coast that were negatively impacted by the algae blooms (Cruz 2020; Morris et al. 2020; SBA 2020).

Recreation and tourism activities are influenced by the state of the overall national economy as higher levels of disposable income allow consumers to dedicate more money to travel and leisure activities. The recent COVID-19 pandemic, which spreads from person-to-person, has led to severe economic disruption in the United States as many states and cities have issued stay-at-home orders for extended lengths of time. Oxford Economics (2020) has modeled the expected downturns for the U.S. travel industry in 2020 resulting from COVID-19 and estimates that travel sector revenue losses will exceed any other sector on the national scale, outpacing by more than nine times the impact of 9/11 on travel sector revenue. Cruises, the global tourism sub-sector most often in the news as the pandemic initially spread with many ships stuck at sea, may not be able to resume ships setting sail until there is a vaccine or until rapid testing can occur pre-boarding (Gössling et al. 2020). As of July 2020, uncertainty abounds with regards to the timing and scale of regional impacts related to COVID-19 as the virus continues to spread and the number of deaths continue to increase in the United States. For example, tourists began returning to Alabama beaches the first weekend of May 2020 after 42 days of closures due to COVID-19, including what is typically peak spring break travel season (Busby 2020). Even though May 2020 was a record-breaking month for some Alabama short-term coastal rental companies and tour operators, the losses experienced in the preceding months due to COVID-19 are not likely to be fully recovered (Sharp 2020). Counties across the Florida panhandle faced a 2-month ban on short-term vacation rentals that was lifted on May 19, 2020, but only with continued restrictions on bookings from selected states with high coronavirus infection rates and deaths, further demonstrating that impacts will vary by location and time, especially given the uncertainty of regional tourism demand and travel restrictions during the summer months (Harress 2020). Tourism and recreation are sensitive to disposable income. During this period of the 2<sup>nd</sup> quarter of 2020, the U.S. gross domestic product fell at an annual rate of 32.9 percent (following a fall of 5.0% in the first quarter), and personal expenditures fell \$1.57 trillion (following a fall of \$232.5 billion during the quarter before) (BEA 2020b). According to the U.S. Bureau of Economic Analysis, although the attributions cannot be precise, these losses were due to COVID-19, and they occurred at a time when impacts were beginning to be mitigated by government assistance payments and the lifting of “stay-at-home” orders. These problems are COVID-19 related. The Centers for Disease Control and Prevention (CDC) (2021a) tracks daily cases of COVID-19 infections, which illustrates this unpredictability. For example, despite policies and vaccines, the CDC has tracked the rise and fall of three waves of new cases since the original outbreak. For example, both Louisiana and Texas experienced large waves of new cases that peaked in July 2020, November-January 2021, and May-September 2021. The course of COVID-19 and the responses of businesses and their customers has remained unpredictable and is probably the greatest uncertainty regarding this industry. BOEM will continue to monitor this issue.

### 4.13.5 Conclusion

BOEM has reexamined the analysis for recreational resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. No new information was discovered that would alter the impact conclusion for recreational resources presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

## 4.14 ARCHAEOLOGICAL RESOURCES

### 4.14.1 Summary

BOEM has reexamined the analysis for archaeological resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.14.4**. No new information was discovered that would alter the impact conclusion for archaeological resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of archaeological resources, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.13 of the 2017-2022 GOM Multisale EIS and Chapter 4.13 of 2018 GOM Supplemental EIS. **Chapter 4.14.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

### 4.14.2 Analysis of Alternatives A-E Summary

Archaeological resources are any material remains of human life or activities that are at least 50 years of age and can provide scientific or humanistic understanding of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques, such as controlled observation, contextual measurement, controlled collection, analysis, interpretation, and explanation (30 CFR § 550.105). Both precontact- and historic-period archaeological resources may be found on the OCS. Precontact refers to Native American archaeological sites or artifacts that date prior to the arrival of Europeans in North America beginning in the late 15<sup>th</sup> century A.D. This includes sites associated with the first humans to occupy areas of the Gulf Coast that are now submerged on the OCS. Historic resources are those that date to after European arrival in North America; on the Gulf of Mexico OCS, these include historic shipwrecks, aircraft, and a single historic lighthouse, the Ship Shoal Light.

Regardless of planning area, the greatest potential impact to precontact and historic archaeological resources as a result of a Proposed Action under any of the action alternatives is site specific and would result from direct contact to the resource from an offshore activity or accidental event. For the OCS Oil and Gas Program, this includes the placement of drilling rigs and production systems on the seafloor; pile driving associated with platform emplacement; pipeline placement and installation; the use of seismic receiver nodes and cables; the dredging of new channels, as well as

maintenance dredging of existing channels; anchoring activities; post-decommissioning activities, including site-clearance trawling; the masking of archaeological resources from industry-related infrastructure and debris; and accidental oil spills and associated cleanup activities.

During post-lease activities, each permitted action would be assessed for site-specific potential impacts during the permit application process. Archaeological surveys, where required prior to an operator conducting OCS oil- and gas-related activities on a lease, are expected to be effective at identifying possible archaeological sites. The technical requirements of the archaeological resource reports are detailed in NTL No. 2005-G07, "Archaeological Resource Surveys and Reports." Under 30 CFR § 250.194(c), 30 CFR § 250.1010(c), and 30 CFR § 550.194(c), lessees are required to immediately notify BOEM's and BSEE's Regional Directors if an archaeological resource is discovered during their operations.

Accidental events producing oil spills may threaten archaeological resources along the Gulf Coast. Should a spill contact an archaeological site, damage might include direct impact from oil-spill cleanup equipment, contamination of materials, and/or looting. A major effect from an oil-spill impact would be contamination of a historic coastal site, such as a historic fort or lighthouse. It is expected that any spill cleanup operations would be considered a Federal action for the purposes of Section 106 of the National Historic Preservation Act and would be conducted in such a way as to minimize impacts to archaeological resources to the extent possible. Recent research suggests that the impact of direct contact of oil on historic properties may be long term and not easily reversible without risking damage to fragile historic materials (Chin and Church 2010).

The potential for accidental spills is low, their impacts would generally be localized, and the cleanup efforts would be regulated. Therefore, a Proposed Action is not expected to result in impacts to archaeological resources; however, should such impacts occur, unique or substantial archaeological information could be lost, and this impact could be irreversible.

There is also the potential for debris from vessels and offshore structures to be lost on the OCS. Debris resulting from accidental events could cause impacts to archaeological resources similar to those expected from routine activities, such as damage through direct physical contact and/or the inability to identify the resources in geophysical survey data due to magnetic or acoustic signal masking.

In conclusion, a Proposed Action's post-lease activities, including the drilling of wells and installation of platforms, installation of pipelines, anchoring, the removal of platforms and other structures installed on the seafloor, and site clearance activities, as well as accidental events such as loss of debris, may result in **negligible** to **major** impacts to archaeological sites. **Major** impacts could potentially occur if the mitigations described in Chapter 4.13 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS were not applied to post-lease activities and there was resulting disturbance of archaeological resources. When archaeological resources are identified, evaluated, and avoided or mitigated, the *incremental contribution* of a Proposed Action is expected to result in **negligible**, long-term cumulative impacts to archaeological resources. However, if an archaeological

site were to be impacted due to a failure to properly identify, evaluate, and avoid or mitigate it, those impacts may range from **negligible to major**. Under Alternative E, cancellation of a single lease sale, the impact-producing factors discussed in Chapter 4.13 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS would not take place for that or those lease sale; therefore, the impacts would be **none**. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under Alternative E. A full analysis of archaeological resources can be found in Chapter 4.13 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.13 of the 2018 GOM Supplemental EIS.

#### 4.14.3 Incomplete or Unavailable Information

There is incomplete or unavailable information regarding the location of individual archaeological resources in the Gulf of Mexico. The locations of all archaeological resources in the GOM cannot be determined at this time because the overall costs of obtaining that information through geophysical surveys of the entire GOM are exorbitant. However, significant archaeological resources potentially may be located throughout the OCS, as has been demonstrated through existing archival research, analysis of historic navigation routes, industry surveys, and BOEM's studies (BOEM 2021e). This incomplete information may be relevant to adverse impacts because the locations and integrity of many archaeological resources remain unknown. Nevertheless, this incomplete information would not be available within the timeline contemplated in the NEPA analysis of this Supplemental EIS. It would take several years before data confirming the presence (or lack thereof) of archaeological resources, and the status of each, could be investigated, analyzed, and compiled. Archaeological sites within the GOM have the potential to be buried, embedded in, or laying on the seafloor. The seafloor is comprised of highly variable bathymetric and geophysical regimes, which differentially affect the ease and ability to identify, ground truth, and evaluate archaeological sites. This variability, combined with the scope of the acreage within the GOM, results in the aforementioned exorbitant costs and time factors.

Future site- or lease-specific, remote-sensing surveys of the seafloor, where required, could be used to identify potential resources within areas of proposed seafloor impact (NTL No. 2005-G07, "Archaeological Resource Surveys and Reports"). The results of these surveys are reviewed in tandem with credible scientific evidence from previously identified sites, regional sedimentology, and physical oceanography that is relevant to evaluating the adverse impacts on resources that are part of the human environment. The survey data, when available, are analyzed by industry and BOEM's archaeologists prior to the authorization of any new or significant bottom-disturbing impacts and, if necessary, avoidance of potential archaeological resources is required. Archaeological surveys are expected to be effective in identifying resources to allow for mitigation of impacts and protection of the resource during OCS oil- and gas-related activities. A Proposed Action is not expected to have a reasonably foreseeable significant impact because BOEM's evaluation of such impacts is based upon pre-disturbance and site-specific surveys, the results of which BOEM uses to require substantial avoidance of any potential resource that could be affected by the proposed activity. Therefore, BOEM has determined that the gaps in information on the presence or status of archaeological resources is not essential to a reasoned choice among alternatives.

#### 4.14.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS

New information was identified for archaeological resources after searching relevant literature. BOEM's archaeologists regularly review the major marine and maritime archaeology journals for recently published research, including *The Journal of Maritime Archaeology*, *Historical Archaeology*, *The International Journal of Nautical Archaeology*, *American Antiquity*, etc., as well as research indexes such as JSTOR. This new information updates and supports previous BOEM analyses. Therefore, it does not change the conclusions presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

Three recent articles (Hamdan et al. 2018; Mugge et al. 2019; Salerno et al. 2018) stem from research funded by BOEM to investigate the impacts of oil exposure to historic shipwrecks and their microbial environments as a result of the *Deepwater Horizon* explosion, oil spill, and response. Hamdan et al. (2018) found that analysis of 16S rRNA sequence libraries, sediment radiocarbon age data, sedimentation rates, and hydrocarbons revealed that the mid-20<sup>th</sup> century German U-boat *U-166* and the early 19<sup>th</sup> century wooden-hulled sailing vessel known as the *Mardi Gras Wreck* (16GM01) were exposed to deposited oil during a rapid sedimentation event following the Mississippi Canyon 252, Macondo well blowout and oil spill in 2010. Impacts to shipwreck microbiomes included a significant increase in Piscirickettsiaceae-related sequences in surface sediments and reduced biodiversity relative to unimpacted sites. Additionally, microbiome community structure, similar to that found at *U-166* and the *Mardi Gras Shipwreck*, was identified at the shipwreck known as the *Mica Wreck*, but the physical and chemical parameters were different, potentially indicating indirect effects from the oil spill (Hamdan et al. 2018). Mugge et al. (2019) concluded that metal loss on experimental carbon steel disks placed at the study sites was increased at sites within the spill plume, and time-series imagery indicates that the rate of metal loss on *U-166* has accelerated since the spill.

Salerno et al. (2018) documents 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 steel shipwrecks. Experiments were performed to determine the impacts of crude oil, dispersed crude oil, and dispersant on the community structure and function of microorganisms in seawater and on biofilms formed on carbon steel, a common ship hull construction material. Steel corrosion was also monitored to illustrate how oil spills may impact the preservation of steel shipwrecks. Overall, functional gene analyses revealed a decrease in genes (predicted using PICRUSt and observed in sequenced metagenomes) associated with hydrocarbon degradation in dispersant-treated biofilms. This study indicates that exposure to oil and dispersant could disrupt the composition and metabolic function of biofilms colonizing metal hulls, as well as corrosion processes, potentially compromising shipwrecks as ecological and historical resources (Salerno et al. 2018).

Rees et al. (2019) assessed eight Native American sites on Louisiana's Gulf Coast for the effects of the *Deepwater Horizon* oil spill in 2010. Crude oil and dispersant used during the cleanup response were detected in redeposited shoreline middens and intact archaeological contexts. The proximate impacts on the archaeological record include contamination of artifacts, ecofacts, and

samples, with the potential for long-term impacts on radiocarbon dating and archaeometry. Pretreatment can mitigate the effects of contaminants on radiocarbon dating and elemental analyses. Other analytical methods, such as absorbed pottery residue analysis, are more adversely affected by a combination of crude oil and dispersant. Integrated cultural resources management planning should take into account the potential effects of an oil spill on archaeological sites and the increased time and cost expenditures for field and lab research in hazardous conditions and with contaminated collections.

Evans (2016) conducted additional remote-sensing and subsurface sampling investigations of potential prehistoric archaeological features on the Gulf of Mexico OCS that had been previously identified in oil and gas industry surveys. This study sought to improve upon earlier research by expanding tested areas into deeper water and using different analyses to determine the most effective methods for paleolandscape identification. Evans (2016) confirmed that paleosurfaces containing resources that were available and desirable for potential human occupants remain intact in the northwestern Gulf of Mexico OCS in areas that are currently up to 30 m (98 ft) below sea level and 48 km (30 mi) offshore. No features that had been anthropogenically modified were conclusively identified, nor were they expected to be given the study's data collection limitations. Evans (2016) recommended that future work at the study areas include additional coring or excavating 1 m x 1 m (3.3 x 3.3 ft) units at burned features and an interpreted shell deposit to determine if they are naturally occurring or human modified. Evans (2016) also recommended that BOEM reevaluate agency programmatic guidance on NTL-compliant geophysical surveys to improve resolution of paleochannels, including running survey lines both parallel and perpendicular to channel features, staggering the direction of adjacent survey lines, and conducting more subsurface sampling to confirm the presence or absence of potential archaeological surfaces. Finally, Evans (2016) emphasized that BOEM should coordinate additional research on prehistoric archaeology as part of the agency's management strategy and to inform NTL survey guidance.

Heinrich et al. (2020) attempted to develop a model for Late Pleistocene to recent modification of the northern GOM coastal plain during Holocene transgression in order to evaluate the preservation potential of paleosurfaces within the study area. The study relied on existing subsurface data collected from numerous sources, including hazard and archaeology surveys conducted by the oil and gas industry to meet BOEM's regulatory requirements. Heinrich et al. (2020) identified several issues with how lease block hazard and archaeological surveys identify paleolandforms, which has significant implications for the identification of avoidance areas for the protection of potential archaeological resources. There is no common nomenclature for identified paleolandforms and other geomorphic structures. For example, the most common terms used are *paleochannel* and *channel*. The reevaluation of these features, however, identifies most of these features as either paleovalleys or channel belts. Both are significantly wider and more variable than inset paleochannels. The data are too fragmentary and inconsistent to determine the interrelationships between fluvial features. As this study did not have representative seismic data for each of the originally identified fluvial features, they could not be reinterpreted. Lastly, the features mapped in these surveys likely vary in age from Late Marine Isotope Stage (MIS) 5 (130-80 thousand years ago) to either late MIS 2 (Last Glacial Maximum) or early MIS 1 (Holocene), i.e., any features dating later than late MIS 2 (~20-15 thousand years ago) are too old to contain preserved archaeological deposits. Many, if not most, archaeological surveys

identify areas of avoidance based solely on the presence of a preserved subsurface paleolandform feature, regardless of the type or age of said feature.

In terms of mapping submarine paleolandforms and potential paleolandscapes, Heinrich et al. (2020) made the recommendations below.

- Regional terminology should be standardized.
- There needs to be clear definition of, recognition of, and differentiation among paleovalleys, paleochannels, and channel belts.
- A type-seismic section for specific paleovalleys, paleochannels, and channel belts mapped for that block should be included in the report.
- Geophysical data should be submitted with block survey reports for BOEM analysis and development of regional geologic models from multiple block surveys and archiving for future or alternate uses such as sand resources identification.
- Geologic sampling to ground-truth geophysical data and absolute dating of potential paleolandscapes within fluvial valleys should be conducted using appropriate techniques.
- Block survey data (not just interpreted map products) should be applied to develop a regional geologic model and conceptual model for shelf evolution.
- When new surveys are conducted, BOEM should provide regional models to operators for edge matching with previous studies and context locally for their study area.
- BOEM should digitize and make readily available online the U.S. Geological Survey seismic lines of Suter and Berryhill Jr. (1985) and other regional surveys conducted by the U.S. Geological Survey and Landsat Ground Station that are preserved only as analog or paper forms.
- Uniform classification schemes, nomenclature, and recognition criteria for submerged landforms and potential paleolandscapes should be developed.

Finally, Heinrich et al. (2020) concluded that a better understanding is needed of the depositional and/or erosional response during marine transgression within valley estuarine systems to determine preservation potential of prehistoric landscapes within valley fill packages and recommended that BOEM's avoidance criteria should be developed based on a strong understanding of shelf and/or valley-fill evolution in response to sea-level rise. The results of this study demonstrate the possibility that many of the paleofluvial systems being avoided in the vicinity of the study area are far too old for potential human occupation.

The recent studies published by Evans (2016) and Heinrich et al. (2020) do not alter the conclusion of the 2018 GOM Supplemental EIS that potential impacts to cultural resources from

impact-producing factors range from negligible to major. BOEM's archaeologists acknowledge the limitations of BOEM's recommended survey guidance identified by these recent studies and will consider their recommendations in more detail to determine if they are appropriate and feasible to incorporate into BOEM's resource management practices.

#### **4.14.5 Conclusion**

BOEM has reexamined the analysis for archaeological resources presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS with regard to the updated scenario provided in **Chapter 3** and based on the information presented above. No new information was discovered that would alter the impact conclusion for archaeological resources presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### **4.15 HUMAN RESOURCES AND LAND USE (INCLUDING ENVIRONMENTAL JUSTICE)**

#### **4.15.1 Land Use and Coastal Infrastructure**

##### **4.15.1.1 Summary**

BOEM has reexamined the analysis for land use and coastal infrastructure presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapters 4.15.1.4, 4.15.2.4, and 4.15.3.4**. No new information was discovered that would alter the impact conclusion for land use and coastal infrastructure presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of land use and coastal infrastructure, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.14.1 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.14.1 of the 2018 GOM Supplemental EIS. **Chapter 4.15.1.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

##### **4.15.1.2 Analysis of Alternatives A-E Summary**

A current snapshot of land use and coastal infrastructure in the GOM reveals a physically, culturally, and economically diverse landscape, with the petroleum industry playing a substantially larger role in some states (i.e., Texas and Louisiana) than in the rest of the GOM region. The counties and parishes along the Gulf Coast represent some of the most valuable coastline in the U.S., including miles of recreational beaches and an extended system of barrier islands. Land uses vary from urban centers with manufacturing and service industries to rural areas with farming, ranching, and hundreds of thousands of acres of wetlands and protected habitat. These counties and parishes vary in their histories and in the composition and economic activities of their respective local governments.

Oil and gas exploration, production, and development activities on the OCS are supported by an expansive onshore network of coastal infrastructure that includes hundreds of large and small companies. Routine operations associated with a Proposed Action are not expected to produce any major impacts to land use and coastal infrastructure because OCS oil- and gas-related activities are supported by this long-lived, wide-ranging onshore network. Potential impacts from routine operations could range from **negligible** to **moderate**, depending on the location, scale, and type of activity. The impacts of reasonably foreseeable accidental events such as oil spills, chemical and drilling fluid spills, and vessel collisions are not likely to last long enough to adversely affect overall land use or coastal infrastructure in the analysis area and would therefore be **negligible** to **moderate**. The cumulative analysis includes impacts that could result from a lease sale combined with baseline conditions, all past, present, and future OCS oil- and gas-related lease sales and activities, as well as all past, present, and reasonably foreseeable future actions that are external to OCS oil- and gas-related activities. Activities relating to all past, present, and future OCS oil- and gas-related activities are expected to minimally affect the current land use of the analysis area because most subareas have standard land-use zoning requirements, strong industrial bases, and designated industrial parks. Non-OCS oil- and gas-related activities contribute substantially to the cumulative impacts on land use and coastal infrastructure, while the *incremental contribution* of a Proposed Action to cumulative impacts is expected to be **minor**. Impact-level definitions (i.e., beneficial, negligible, minor, moderate, and major) specific to land use and coastal infrastructure can be found in Chapter 4.14.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

For any of the action alternatives (i.e., Alternatives A-D), the cumulative impacts on land use and coastal infrastructure could range from **beneficial** to **moderate** for OCS oil- and gas-related activities and from **beneficial** to **major** for non-OCS oil- and gas-related activities depending on the specifics of each situation, whether the impacts are measurable, how long the impacts would last, and the size of the affected geographic area as defined in Chapter 4.14.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Under Alternative E, cancellation of a single lease sale, the direct impacts as a result of a lease sale would be **none**, and there would be no incremental contribution of impacts to land use and coastal infrastructure beyond a temporary negative economic impact for the oil and gas industry and coastal states, such as Louisiana, that are more dependent on oil and gas revenues. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under this Alternative E. A full analysis of land use and coastal infrastructure can be found in Chapter 4.14.1 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.14.1 of the 2018 GOM Supplemental EIS.

#### 4.15.1.3 Incomplete or Unavailable Information

BOEM has identified incomplete information regarding the potential impacts of coastal land loss on land use and coastal infrastructure. This incomplete information may be relevant to adverse impacts because it is not completely known how subsidence, sea-level rise, and erosion is affecting industry or what plans industry is making to mitigate current or future impacts. Because there are hundreds of large and small property-owning businesses spread across the coastal zone, which

directly and indirectly support the offshore petroleum industry, the identity of these properties and the possibilities of losses due to subsidence, sea-level rise, and erosion cannot be completely determined and quantified at this time.

BOEM has employed reasonably accepted scientific methodologies to extrapolate from existing information on dredged material and other approaches used to mitigate for land loss in completing its analysis and formulating the conclusions presented here. For a more detailed discussion on deltaic land loss, refer to **Chapter 4.4.2** (“Coastal Barrier Beaches and Associated Dunes”). In the case of coastal ports, for example, dredged materials from navigation slips are used to fill in property and mitigation habitat areas for wildlife and to act as a barrier to protect ports from storm surges (Volz 2013). This example shows that, although BOEM does not possess a complete understanding of what industrial infrastructure improvements may occur, such as mitigation for land loss, industry would most likely mitigate as necessary to protect existing and growing infrastructure. With each passing year, the pressure increases to act and protect critical oil and gas infrastructure (Traywick 2016). Like any industrial infrastructure improvements, future adaptations would occur on an as-needed basis or as new technologies become available. Given that coastal infrastructure will continue to be subject to the impacts of coastal land loss and routine tropical storm activity, considerable motivation to protect existing infrastructure will continue; therefore, BOEM has determined that the information is not essential to a reasoned choice among alternatives. BOEM continues to monitor industry and its infrastructure footprint over time to document short- and long-term impacts of continued land loss.

#### **4.15.1.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

BOEM has researched the availability of new information that may affect land use and coastal infrastructure, including Internet sources such as Federal and State agency websites, academic journals, and trade publications. The new information described below represents changes to the baseline affected environment and is relevant to the cumulative rather than to the routine and accidental impact analyses for land use and coastal infrastructure. This new information further supports BOEM’s previous analyses and provides additional support for the cumulative analysis conclusion that non-OCS oil- and gas-related factors contribute substantially to the cumulative impacts on land use and coastal infrastructure. Therefore, the overall impact conclusions in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS remain unchanged.

The developments discussed in this paragraph are directly related to the longstanding onshore shale boom and are relevant to the cumulative impact analysis for land use and coastal infrastructure rather than analysis of impacts related to routine OCS oil- and gas-related operations. Also, these operations provide additional support for the conclusion that non-OCS oil- and gas-related factors contribute substantially to the cumulative impacts on land use and coastal infrastructure and that their long-term trends can be difficult to predict. Levels of oil exports have risen rapidly since the U.S. oil export ban was lifted, leading to plans for the expansion of existing *onshore* oil export terminals and the construction of new terminals as companies strive to meet foreign demand (Energy Information Administration 2018a; Ngai and Sims 2017). Some of these projects have faced obstacles with

debates over how they may affect existing ports, such as the Port of Corpus Christi in Texas (Druzin 2018a), and other projects, such as the Mid-Barataria Sediment Diversion in Plaquemines Parish, Louisiana (Schleifstein 2018a). Increased foreign demand for U.S. oil also has resulted in plans for construction of additional *offshore* oil export terminals to load very large crude carriers. Existing ports and terminals are undergoing modifications, such as improving current infrastructure and widening canals to accommodate demand (Doyle 2018; Reuters 2018). Increased demand for natural gas exports and applications for permits to construct natural gas liquefaction plants are generally on the rise (FERC 2018a; 2018b; Magill 2017; WGNO 2016), though one gas-to-liquids plant proposed for Lakes Charles, Louisiana, has been abandoned as no longer economically viable (Griggs 2017). In 2017, a new small-capacity refinery came online in Corpus Christi, Texas (Energy Information Administration 2018b). A new pipeline landfall is planned in south Texas, originating in Texas State waters (Passut 2017), and a subsea pipeline is under construction between Texas and Mexico (Nagarin 2017; Offshore Technology 2017). Four pipelines are proposed in Louisiana to connect liquefied natural gas (LNG) facilities to existing pipelines (NOAA 2016).

Currently, the fate of many planned LNG projects is uncertain. A recent study (Energy Information Administration 2021d) finds that the future competitiveness of coastal Gulf of Mexico LNG exports would be sensitive to the price of oil. The study predicts a growing demand for United States LNG exports over the next 50 years with high petroleum prices but that, beyond 2025, if prices remain around \$50 per barrel, no LNG facilities that are not currently planned would be undertaken. The buildup of additional LNG export facilities may or may not add substantially to the GOM's petroleum-related infrastructure. As current onshore pipeline capacity has decreased, more companies are transporting crude oil by rail and truck from the Permian Basin in Texas to Gulf Coast export terminals (Druzin 2018b).

In 2020, COVID-19 caused a world-wide economic slowdown that brought steep declines in demand for U.S. oil and gas products. By April 2020, in the face of the slowdown and such mitigation efforts as "stay at home" orders, U.S. consumption of petroleum products was 31 percent lower from the average values the months before. Demand had crashed to 1990s levels but appeared to be stabilizing (Energy Information Administration 2020). In 2020, the COVID-19 pandemic also began negatively impacting land use and coastal infrastructure. These impacts are ongoing, widespread, and not completely understood because they are still unfolding. From the initial stay-at-home orders and business closures to the early re-openings that led to a surge in new cases and renewed public health restrictions to prevent the spread of the virus, the pandemic continues to disrupt daily living. As a consequence, the Nation is experiencing a severe economic downturn (BEA 2020a) with historic unemployment (BLS 2020) and serious impacts to the fiscal health of local and State governments, public services, housing, and energy markets (Energy Information Administration 2020; Garnham 2020; McNichol and Leachman 2020; Pagano and McFarland 2020). The two main drivers of the dramatic and negative reversal in the energy markets included the COVID-19 pandemic, which caused a steep drop in energy demand, and the flooding of the market by feuding OPEC nations. These events are producing long-term structural changes in the oil and gas industry (Dismukes 2020). The effects of these disruptive events will continue to ripple throughout the economy and likely affect land use and coastal infrastructure in multiple ways. For example, unemployed persons may not be able

to pay their rent, which means decreased revenues for landlords who need to pay their mortgages and make repairs to properties, leading to a greater likelihood of evictions for renters, foreclosures for the landlords, and increased likelihood of blight from lack of property maintenance. Homeowners face the same issues, and these negative effects flow to lending institutions, local businesses, and local and State governments. Plans for land development or infrastructure expansion will necessarily shift or disappear. Property values in some areas may decline and public services will likely decrease. Experts are predicting long-term negative effects for the energy sector in Louisiana (Mosbrucker 2020), which likely holds true for other states with a large energy sector. At this point, we do not have a complete picture of all the effects related to the pandemic and commodity price collapse, but BOEM will monitor the situation as it continues to unfold.

Evidence was found of new developments that address the ongoing issue of incomplete or unavailable information related to coastal land loss. A transportation project to elevate Louisiana Highway 1 (LA 1), which connects Port Fourchon with the rest of the Nation, has moved into Phase 2E, which will improve and widen the elevated highway curve at Leesville, Louisiana, and extend LA 1 to the north (LA 1 Coalition 2018). Previously, analysts have noted that \$100 billion of oil and gas infrastructure is under threat of inundation in coastal Louisiana (Traywick 2016). Since that analysis, studies have updated subsidence rates along much of coastal Louisiana, finding the rates to be higher than previously known (Nienhuis et al. 2017), and have identified communities and areas at higher risk of flooding and effective inundation under different sea-level rise scenarios, including large areas in Louisiana and Texas (Dahl et al. 2017; Spanger-Siegfried et al. 2017). The National Institute of Environmental Health Sciences (2014) found that more needs to be done to gain a better understanding of how environmental changes affect coastal communities and infrastructure, especially Gulf Coast energy infrastructure (Schleifstein 2018b). Particularly susceptible to storm damage and land loss, the State of Louisiana has invested over \$800 million in projects to restore its barrier islands, and the State's 2017 Coastal Master Plan calls for an additional \$1.5 billion over the next 50 years in storm protection and coastal restoration projects (Baurick 2018). The Fourth National Climate Assessment describes the many impacts of climate change to land use and coastal infrastructure, such as increasingly severe flooding, and identifies measures being taken or planned for the future to mitigate those negative effects (U.S. Global Change Research Program 2018). Extreme precipitation and flooding events are expected to increase in frequency (Scott 2019). BOEM will continue to monitor developments related to incomplete or unavailable information regarding the potential impacts of coastal land loss on land use and coastal infrastructure.

On September 14, 2021, Hurricane Nicholas made landfall 50 mi (80 km) south of Houston as a Category 1 hurricane, 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, protected the New Orleans urban area from Hurricane Ida's devastating flooding but failed to protect coastal and outlying areas. Hurricane Ida's infrastructure damages are substantial, and production was not expected to

return to normal until October 2021. Infrastructure repairs are expected to take much longer (Energy Information Administration 2021b; Small 2021).

#### 4.15.1.5 Conclusion

BOEM has reexamined the analysis for land use and coastal infrastructure presented in the 2017-2022 GOM Multisale EIS and 2108 GOM Supplemental EIS based on the new information presented above. No new information was discovered that would alter the impact conclusion for land use and coastal infrastructure presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### 4.15.2 Economic Factors

#### 4.15.2.1 Summary

BOEM has reexamined the analysis for economic factors presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented in **Chapter 4.15.2.4**. No new information was discovered that would alter the impact conclusion for economic factors presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. The analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of economic factors, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action, are presented in Chapter 4.14.2 of the 2017-2022 GOM Multisale EIS and Chapter 4.14.2 of the 2018 GOM Supplemental EIS. The following information is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

#### 4.15.2.2 Analysis of Alternatives A-E Summary

Economic factors explain and quantify the human behaviors that determine the positive and negative impacts of the proposed alternatives. Chapter 4.14.2.1 of the 2017-2022 GOM Multisale EIS provides detailed economic and demographic data for Gulf of Mexico economic impact areas, provides background research regarding the offshore oil and gas industry, and presents data from the Office of Natural Resources' revenue regarding sales volumes, sales values, and revenues received from offshore oil and gas activities.

A lease sale (Alternatives A-D) would lead to **beneficial** impacts arising from industry expenditures, government revenues, corporate profits, and other market impacts. Some of these impacts would be concentrated along the Gulf Coast, while others would be widely distributed. A lease sale could also lead to negative economic impacts (**negligible to minor**) arising from accidental events and disruptions to other industries. There would be some differences in economic impacts among the alternatives (i.e., Alternatives A-D), corresponding to the differences in the scales and distributions of

likely activities. Chapter 4.14.2 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS presents detailed estimates of the economic impacts of Alternatives A-D. The alternatives should be viewed in light of the OCS Oil and Gas Program, as well the numerous forces that can affect energy markets and the overall economy. Most of the *incremental contribution* of cumulative impacts from a Proposed Action on economic impacts are forecast to be **beneficial**, although there would be some **minor** adverse impacts. Alternative E, cancellation of a single lease sale, would negatively impact firms and employees that depend on recurring leases; therefore, the impacts of Alternative E would be **negligible to minor**, with some partially offsetting **beneficial** impacts. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under Alternative E. A full analysis of economic factors can be found in Chapter 4.14.2 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.14.2 of the 2018 GOM Supplemental EIS.

#### 4.15.2.3 Incomplete or Unavailable Information

BOEM has identified incomplete information regarding 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, accidental events, and cumulative impacts. This information is difficult to obtain since most data sources do not adequately differentiate between onshore and offshore oil and gas 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 example, BOEM used the MAG-PLAN Model to estimate the impacts of the alternatives and OCS Oil and Gas Program. Elliott et al. (2020) suggest that the COVID-19 post-pandemic era may change how we conduct environmental research related to the green transition, pricing carbon externalities, and the role of uncertainty. BOEM may not fully understand the implications of raising royalty rates on BOEM's lease sales to offset future climate costs, but BOEM will continue to develop the approach to refine economic impacts estimation methodologies of different alternative scenarios. The economic impacts arising from the OCS Oil and Gas Program are generally positive, not adverse. Therefore, the incomplete or unavailable information, while relevant, is not essential to a reasoned choice among alternatives.

#### 4.15.2.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS

New information was found for economic factors after searching relevant literature. BOEM searched various Internet sources and standard sources of economic data. This new information further supports the impact conclusions for economic factors presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Therefore, the analysis and potential impacts detailed and summarized in those NEPA documents still apply for GOM Lease Sales 259 and 261.

BOEM aggregates 133 counties and parishes along the Gulf of Mexico region into 23 economic impact areas based on economic and demographic similarities among counties and parishes (Varnado and Fannin 2018). BOEM also developed the Cumulative Impacts Model (CIM) and Lifecycle Impacts Model (LCIM), which both build upon previous economic and financial analysis

frameworks developed by BOEM, to enhance its capacity for assessing the economic and fiscal impacts of OCS oil- and gas-related activities in the Gulf of Mexico (DOI 2021; Price et al. 2020). The Office of Policy Analysis released the *U.S. Department of the Interior: Economic Report, FY 2019* (DOI 2021). This report estimates that U.S. offshore oil and gas activities supported 270,600 jobs and \$31.78 billion in domestic value-added in Fiscal Year 2019. BOEM's regularly updated "Fair Market Value" webpage describes the rental rates, royalty rates, and other terms associated with Gulf of Mexico leases (BOEM 2021b). Some OCS oil- and gas-related activities are subject to partial or full royalty exemptions. BOEM's "Royalty Relief Information" webpage provides more information regarding BOEM's royalty relief programs (BOEM 2020d).

The Energy Information Administration's *Annual Energy Outlook 2021* presents modeled forecasts of various energy market variables through 2050 (Energy Information Administration 2021a). The Energy Information Administration's *Short-term Energy Outlook* provides monthly short-term (2-year) forecasts of energy market variables and analyses of recent energy market developments (Energy Information Administration 2021c). The GOM offshore production is expected to be sustained despite current market conditions, which is partially a result of deepwater discoveries that occurred during exploration before the 2015 price collapse. Committed deepwater GOM developments have continued according to schedule, while some nearshore operators have recently had to shut-in production (Redden 2020). 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. *Offshore (2021)* provides a monthly update of developments in the offshore oil and gas industry, including analysis of recent industry reports focused on the impacts of the 2020 oil price crash and the COVID-19 pandemic. Now, demand is returning as the U.S., China, and other parts of the world reopen for business as the impact from the pandemic diminishes.

The NOAA supplies updated data estimates for employment, wages, and the gross domestic product for the six economic sectors that depended on the Gulf of Mexico in 2018 (NOAA and Office for Coastal Management 2021). These sectors are marine construction, mineral extraction, tourism and recreation, living resources, ship and boat building, and marine transportation. Dismukes and Upton Jr. (2020) provide additional information regarding issues facing the Gulf of Mexico region's energy economy. This report also provides impacts of COVID-19, forecasts regarding energy prices, energy production, capital expenditures, LNG development, and overall energy employment. Kaiser and Narra (2018) provide a robust overview of GOM oil and gas infrastructure inventories and trends, as well as an operating cost data analysis and a decommissioning forecast for shallow and deepwater regions. Recent changes in the U.S. tax law codified in the Tax Cuts and Jobs Act of 2017 (U.S. Congress 2017) reduced the corporate income tax rate and changed the rate structure, which would likely contribute positively to corporate profits. Given the global decline in economic activity due to COVID-19, overall world-wide oil and gas activity in 2020 fell more than expected, and it did in the GOM region as well. Activities reached mid-year lows but, since then, oil and gas prices have stabilized and reached to the 2018 level (Dismukes and Upton Jr. 2020). The year 2021 saw a significant surge in oil prices because of the U.S. and world market's reopening. Petroleum demand is driven primarily by the transportation sector, and demand and prices are projected to slowly increase over the next 3 years (Dismukes and Upton Jr. 2020). The short-term energy outlook remains

uncertain due to ongoing recovery from the COVID-19 pandemic (Energy Information Administration 2021c). Gulf Coast oil production is anticipated to decline from its high of 8.0 million barrels per day in 2019 to 7.6 million barrels per day in 2023. Thus, both U.S. and Gulf Coast oil production are anticipated to decline over the next 3 years (Dismukes and Upton Jr. 2020).

#### 4.15.2.5 Conclusion

BOEM has reexamined the analysis for economic factors presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. No new information was discovered that would alter the impact conclusion for economic factors presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### 4.15.3 Social Factors (Including Environmental Justice)

#### 4.15.3.1 Summary

BOEM has reexamined the analysis for social factors presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. No new information was discovered that would alter the impact conclusion for social factors presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Further, the analysis and potential impacts detailed and summarized in those documents still apply for GOM Lease Sales 259 and 261 for Alternatives A-E.

A detailed description of social factors, along with the full analyses of the potential impacts of routine activities, accidental events, and cumulative impacts associated with a Proposed Action are presented in Chapter 4.14.3 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 4.14.3 of the 2018 GOM Supplemental EIS. **Chapter 4.15.3.2** is a summary of the resource description and impact analysis incorporated from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. An environmental justice determination follows in **Chapter 4.15.3.2**.

#### 4.15.3.2 Analysis of Alternatives A-E Summary

The petroleum industry as a whole in the Gulf of Mexico region has matured over several decades and is well-developed, expansive, extensive, and deeply intertwined in the regional communities and economies of the five coastal states, i.e., Texas, Louisiana, Mississippi, Alabama, and Florida. Potential social impacts resulting from a Proposed Action would occur within the larger socioeconomic context of the GOM region. The affected environment of the analysis area is quite large geographically and in terms of population (133 counties and parishes with over 22.7 million residents). This long-lived, well-developed, and extensive industry functions within a much larger context, a socioeconomic framework that weaves through the region in a complex, inter-connected grid-like manner. Nothing occurs as an isolated event but rather results from and simultaneously triggers other events, all of which are experienced at varying degrees of negative or positive impact. The impacts from routine activities related to a Proposed Action are expected to be **negligible to moderate**, widely distributed, and to have limited impact because of the existing extensive and widespread support system for the petroleum industry and its associated labor force. Outside of a

low-probability catastrophic oil spill, which is not reasonably foreseeable and not part of a Proposed Action, any potential accidental events 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 and would therefore range from **negligible** to **moderate**. In the cumulative analysis, impacts from OCS oil- and gas-related activities would range from **beneficial** to **moderate**. Non-OCS oil- and gas-related factors, which include all human activities, natural events, and processes, actually 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, and these result in **beneficial** to **major** impacts. The *incremental contribution* of a Proposed Action to cumulative impacts would be **minor**. Alternative E would result in the cancellation of a single lease sale and, thus, the overall incremental impacts as a result of Alternative E would be **none** because new impacts would be avoided entirely. Cumulative impacts of current and past activities (OCS oil- and gas-related and non-OCS oil- and gas-related), however, would continue to occur under Alternative E.

Coastal populations experience cumulative impacts that occur from all human activities and natural processes and events. The cumulative analysis includes impacts that could result from a lease sale combined with baseline conditions, all past, present, and future OCS oil- and gas-related lease sales and activities, as well as all past, present, and reasonably foreseeable future actions that are external to OCS oil- and gas-related activities. Within this divided analytical framework of OCS oil- and gas-related and non-OCS oil- and gas-related impacts, the largest quantity of impact-producing factors for coastal populations occur as non-OCS oil- and gas-related impacts because OCS oil- and gas-related activities form a very small part of the greater, complex socioeconomic structure in the GOM. The *incremental contribution* of a Proposed Action to cumulative impacts of a single lease sale would be **minor** for communities and people in the Gulf Coast region.

*Environmental Justice Determination:* The oil and gas industry in the GOM region is expansive and long-lived, developing over 80 decades with substantial infrastructure in place to support both onshore and offshore activities. BOEM's scenario estimates call for 0-1 new gas processing plant and 0-1 new pipeline landfall over the 50-year life of a single Proposed Action. Impacts to GOM populations from a Proposed Action would be immeasurably small for environmental justice since these low-income and minority communities are located onshore and distant from Federal OCS oil- and gas-related activities. Also, since these vulnerable populations are located within the larger context of onshore and State-regulated nearshore oil and gas activities that are connected to downstream infrastructure over which BOEM has no regulatory authority, BOEM has determined that a Proposed Action would not produce environmental justice impacts in the GOM region. A full analysis of social factors and an environmental justice determination can be found in Chapter 4.14.3 of the 2017-2022 GOM Multisale EIS, which is summarized and updated in Chapter 4.14.3 of the 2018 GOM Supplemental EIS.

#### 4.15.3.3 Incomplete or Unavailable Information

BOEM has identified unavailable information that is relevant to people and communities regarding the impacts of the *Deepwater Horizon* explosion, oil spill, and response. This information

cannot be obtained because long-term health impact studies, subsistence studies, and the NRDA restoration process are ongoing, and data from these efforts would be unavailable and unobtainable for some time. In order to fill this data gap, 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 a lease sale and not reasonably expected to occur, may have adverse impacts on residents in GOM coastal communities. Research into possible long-term health impacts of the *Deepwater Horizon* explosion, oil spill, and response continues (Abramson et al. 2010; NIEHS 2014; Substance Abuse and Mental Health Services Administration and CDC 2013). Because long-term health impacts to coastal populations are unknown, this information may be relevant to the evaluation of impacts from the *Deepwater Horizon* explosion, oil spill, and response; therefore, BOEM continues to seek additional information as it becomes available and bases the previous analysis on the best information currently available. Although long-term health impacts to people and communities may be relevant to this analysis, BOEM has determined that the incomplete or unavailable information is not essential to a reasoned choice among alternatives based on the information discussed above.

#### **4.15.3.4 New Information Available Since Publication of the 2018 GOM Supplemental EIS**

Various printed and Internet sources (including peer-reviewed research publications, JSTOR, Google Scholar, WorldCat; Nola.com; AL.com; National Academies of Sciences, U.S. Department of Health and Human Services, National Institutes of Health; USEPA; USDOC, Bureau of the Census and Bureau of Labor Statistics; USDHS, Federal Emergency Management Agency; USDOE, Energy Information Administration; RestoreTheGulf.gov website; *Deepwater Horizon* Oil Spill Portal; Louisiana Department of Environmental Quality; Mississippi Department of Environmental Quality; Alabama Department of Environmental Management; State of Florida Department of Environmental Protection; Louisiana Recovery Authority; Louisiana Office of Community Development; Gulf Coast Ecosystem Restoration Council; Alabama Gulf Coast Recovery Council; RESTORE Mississippi; RESTORE the Texas Coast; Florida Department of Environmental Protection; Port Houston; The Greater Lafourche Port Commission; LA1 Coalition; Reuters; Rigzone; Marine Ecosystems and Management (MEAM) Newsletter; *Offshore Magazine*; *Workboat*; and *Oil and Gas Journal*) were examined to assess recent information regarding social factors that may be pertinent to a Proposed Action. New research has been published concerning the current and projected future impacts of coastal land loss, subsidence, climate change, and sea-level rise on communities in southern Louisiana, the Gulf of Mexico, and the U.S. more generally (Colten et al. 2018; Dahl et al. 2017; Hardy et al. 2018; Simms 2017); marginalized communities in southern Louisiana (Colten et al. 2018; Hemmerling and Colten 2017); and the health impacts of the *Deepwater Horizon* oil spill (Croisant et al. 2017; Gam et al. 2018; Kwok et al. 2017; McGowan et al. 2017; Peters et al. 2017; Rung et al. 2016; Rung et al. 2017; Strelitz et al. 2018). While the information continues to expand on BOEM's knowledge of these issues, none of the new information that would change BOEM's conclusions since publication of the 2018 GOM Supplemental EIS.

New information was found for social factors (including environmental justice) after searching relevant sources. Sources checked for new information include the following: JSTOR; Google Scholar; WorldCat; Nola.com; AL.com; National Academies of Sciences; USEPA; U.S. Department of Energy, Energy Information Administration; U.S. Department of Commerce, Census Bureau; Louisiana Department of Environmental Quality; Louisiana's CPRA; Louisiana Office of Community Development; Gulf Coast Ecosystem Restoration Council; Alabama Gulf Coast Recovery Council; RESTORE Mississippi; RESTORE the Texas Coast; Florida Department of Environmental Protection; Port Houston; The Greater Lafourche Port Commission; Marine Ecosystems and Management (MEAM) Newsletter; *Offshore Magazine*; *Workboat*; *Oil & Gas Journal*; *Deepwater Horizon* Oil Spill Portal; and *Deepwater Horizon* Project Tracker. The new information discovered and described below represents changes to the baseline affected environment and catastrophic oil-spill impacts (which are not reasonably foreseeable) and is relevant to the cumulative and catastrophic oil-spill impacts instead of the routine impact analysis for social factors (including environmental justice). Because this new information serves to supplement our existing baseline and cumulative analyses, the overall impact conclusions in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS remain unchanged.

Since preparation of the 2018 GOM Supplemental EIS, a considerable amount of research has been published concerning the current and projected future impacts of coastal land loss, subsidence, sea-level rise, and climate change on communities in southern Louisiana, the Gulf Coast, and the U.S. more generally. Also published are works on marginalized communities and disaster or disaster prevention in southern Louisiana and Houston, on planning and flooding in Louisiana, and on the impacts of the opening of the Bonnet Carré spillway on coastal Mississippi, new research on the impacts of the *Deepwater Horizon* explosion and oil spill, and information on the impacts of the COVID-19 pandemic and the subsequent oil price drop of early 2020.

Dahl et al. (2017) analyzed the rates of socioeconomic vulnerability and three projections of sea-level rise to identify communities that, without intervention, would experience effective inundation (inundations regular enough to disrupt normal functioning) and would have a high percentage of residents lacking the means to respond. They concluded that most of the south Louisiana and east Texas coasts would fit into this category by 2035 in the intermediate low scenario. In the intermediate high scenario, additional socially vulnerable communities in central Texas, southern Louisiana, eastern Mississippi, western Alabama, and the Gulf Coast of Florida would experience effective inundation. Hauer (2017) predicts that, by 2100 and in the absence of adaptation, Florida and Louisiana are the U.S. states 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). This kind of population movement would have significant impacts on the coastal communities and how they interact with the offshore oil and gas industry by altering community function and changing the distribution of populations, markets, and available labor.

Hemmerling and Colten (2017) identified potential geographic and demographic impacts of OCS oil- and gas-related hazards on minority and low-income populations in three coastal Louisiana parishes using GIS techniques to integrate locations of OCS oil- and gas-related activities, census

data, and transportation data from the early 2000s. The study considered the locations of residences and key subsistence resources. The authors concluded that there was very little evidence of systematic environmental injustice in the siting procedures of various oil-related industries. In most cases, the demographic makeup of the community changed after the facilities were constructed, either increasing or reducing the percentage of minorities in the area. The authors noted environmental justice concerns, especially ensuring residents' access to accurate and up-to-date data about neighborhood and environmental health risks for informed decisionmaking about their residence, subsistence, and cultural activities. Hemmerling et al. (2020a) also 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. Hemmerling et al. (2021) examined 30 years of changing trends in exposure to risk 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) find that, at the beginning of the period they examined, there was a general toward trend toward diminishing levels of risk exposure in coastal Louisiana and other rural areas. However, in the coastal zone, this trend reverses, and hazard exposures intensify as the offshore petroleum industry begins to intensify, and this wider range of upstream and downstream industry industrial activities began to concentrate in the area. The authors note that this has disproportionately impacted Native Americans and Asians living on the coast. In recent years, Louisiana has experienced increased releases of toxic chemicals from petrochemical plants, increasing the hazards to which nearby communities are exposed (Schleifstein 2019a). The State of Louisiana, Department of Environmental Quality's budget and staffing have also been significantly reduced, raising questions about the agency's ability to enforce environmental regulations (Schleifstein 2019b). Louisiana is additionally facing increasing fiscal responsibility to plug growing numbers of wells abandoned by bankrupt oil and gas companies, a situation worsened by a State agency in charge of regulating the oil and gas industry that has not fulfilled its legal obligations (Schleifstein 2020).

Research continues on coastal Louisiana communities' relationship with climate change, land loss, coastal restoration, and related processes. Colten et al. (2018) and Simms (2017) use interviews with coastal Louisiana residents to explore migration decisions in the face of coastal land loss and restoration efforts. Colten et al. (2018) explain that, while mobility was a key practice after hurricanes and oil spills in the past, those were different economic, social, and ecological circumstances. Residents currently resisting migration, especially forced migration in the face of large-scale coastal restoration projects, do so for multiple reasons, including their histories of traumatic relocations, their attachment to place, economic exigencies, and in protest of Louisiana's history of discriminating against disadvantaged populations and rural areas in its protection and restoration decisions. The authors noted that the State has, at the time of publication, no plan to work with communities impacted by coastal restoration and that, as people leave, the conditions will continue to deteriorate for those who stay. Simms (2017) emphasizes the livelihood, cultural, and social connections to place, including practices that increase resilience in disaster, which could be destroyed in forced or unplanned migrations. At the time, policy discussions did not currently take these practices into account, which could likely have detrimental effects on the populations and cultures of southern Louisiana. Colten

(2019) details how human adaptation to climate change in southern Louisiana has been disjointed and focused on short-term solutions, leading to poor adaptation at the larger scale and longer term. Similarly, in Louisiana, planning for flooding often rests at the level of local community organizations that can favor development, regardless of flood risk, leading to increasingly costly and destructive flood events (Colten and Grismore 2018).

In recognition of the challenges faced in southern Louisiana and the need for holistic, community-based adaptation and risk planning, LA SAFE conducted a series of community meetings in coastal communities and combined the results with scientific data on expected coastal changes and planning expertise to produce a compilation of community-based adaptation strategies (Louisiana's Strategic Adaptations for Future Environments 2019). Research on coastal planning in Louisiana found that participatory modeling can be used successfully as a tool to incorporate traditional ecological knowledge in coastal restoration planning and as a way to increase participation from local residents and build their trust in the State, its agents, and the process (Hemmerling et al. 2019). Research with a State-recognized Tribe in Terrebonne Parish, Louisiana, found that Tribal communities are particularly susceptible to harms from environmental change because the environment is connected to cultural knowledge tied to health and well-being, and separation from or alteration of that environment can therefore threaten the knowledge and its contribution to health and well-being (Billiot et al. 2019). The authors suggest that this is further evidence that marginalized communities or communities that rely more closely on the land will be more susceptible to climate change and its impacts. In Louisiana, coastal planning has become increasingly centralized and science based. However, that approach ignores histories of discrimination and inequity and comes at a cost to small rural communities and their subsistence, minority, and low-income residents. Planning could be improved with the incorporation of additional safeguards, participation, and local knowledge (Hemmerling et al. 2020b).

Climate change and its impacts and its anticipated impacts have been widely studied. The Fourth National Climate Assessment (U.S. Global Change Research Program 2018) emphasizes that climate change brings new risks to communities but that the impacts are unevenly distributed. Already vulnerable groups are more likely to feel negative impacts. Indigenous peoples are among those groups with an increased likelihood of experiencing negative impacts, including impacts to their livelihoods and economies, and physical, mental, and indigenous values-based health. Attempts at adaptation may be blocked by preexisting institutional barriers and a lack of published information on these resources. Ongoing attempts to develop Tribal sovereignty and cultural and language revitalization may be particularly threatened by climate change (Jantarasami et al. 2018). Hardy et al. (2018) noted that communities face varied and varying exposure to and impacts from climate change due to how their dynamic social and economic situations do or do not make them vulnerable to these changes. Beyond the physical characteristics of place, they identify four social and economic factors that influence community vulnerability to climate change, i.e., specifically, access to resources, culture, governance, and information. They emphasized that, to be successful, attempts to reduce or understand vulnerability to a given hazard must consider how these four factors interact with exposure, sensitivity, and adaptive capacity. In a study of residential property in Florida and risk from climate change, the authors found that Florida is at risk of increased flooding and property devaluation related

to climate change 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 all along the Gulf Coast (Woetzel et al. 2020).

Research is ongoing on Asian-American communities in the Gulf Coast region. Schewe et al. (2019) analyzed participation of Vietnamese American fishers on the U.S. Gulf Coast in collaborative resource management of commercial fisheries. They found that mistrust, language barriers, and the use of digital technologies by management agencies limit opportunities for participation by community members but that citizen-science, when well designed, can facilitate community engagement. DeYoung et al. (2019) studied well-being and disaster preparedness among individuals in Cambodian and Laotian immigrant communities along the Alabama, Mississippi, Florida, and Louisiana coasts. They found that these communities have unique vulnerabilities tied to their histories and composition, with elders being particularly vulnerable; the sense of community was positively correlate with a sense of wellbeing; and confidence in preparedness, the ability to cope with a financial crisis, and trust in local government disaster response were all positively correlated with preparedness.

Research in Houston indicates that minorities and individuals with disabilities have disproportionately greater exposure to environmental hazards (Chakraborty et al. 2019) and lesser access to environmental benefits, although the latter has seen some improvement over time due to shifting residence patterns (Elliott et al. 2019b). Flooding from Hurricane Harvey disproportionately impacted minority and low socioeconomic-status households (Collins et al. 2019). During Hurricane Harvey, those who engaged in pre-storm mitigation at their homes experienced faster recovery and suffered fewer health and stress-related consequences (Grineski et al. 2019). The Houston-Galveston area, however, does not have sufficient shelter capacity to serve residents with housing and transportation needs (Karaye et al. 2019). Baer and her co-authors investigated attitudes towards hurricane evacuation in Galveston, Texas, reporting that people chose not to evacuate either because they did not believe the reports of the potential dangers or they understood the reports and deemed evacuation more hazardous (Baer et al. 2019). The Harvey Data Project (Civis Analytics et al. 2019), a data collection and analysis project, provides details on the location and scale of Hurricane Harvey damage in Houston and develops a new methodology for understanding storm damage that the city intends to use in recovery from future flood events. This report notes that 56 percent of households directly impacted by Hurricane Harvey flooding were not in a FEMA flood zone; that the impacts were very unevenly distributed, resulting in highly at-risk areas for recovery; and that official techniques significantly underestimate damage, particularly damage suffered by more vulnerable populations.

The Mississippi River experienced a historic high-water event during 2019. Due to the high water, in 2019, the U.S. Army, Corps of Engineers opened the Bonnet Carré spillway twice, for a total of 123 days for both historic events (USACE 2019). These openings released trillions of gallons of fresh water into Lake Pontchartrain and, from there, the Mississippi Sound, creating algae blooms, closing all the Mississippi beaches and some additional waters to swimming and fishing, and killing dolphins. This persisted throughout the summer, disrupting livelihoods and tourism, and raising fears of impacts similar to the *Deepwater Horizon* oil spill (Lee 2019; Sharp et al. 2019; Weatherly 2019b).

The waters were reopened in October 2019, and in December 2019, the Mississippi Secretary of State sued the U.S. Army Corps of Engineers and the Mississippi River Commission for their operation of the flood control structures on the Mississippi River (Amy 2019).

Ongoing research on the social impacts of the *Deepwater Horizon* oil 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 (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; Strelitz et al. 2018). New evidence indicates that exposure to dispersants increased the chance 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 GOM communities found that, more than half a decade later, the oil spill event persisted in having social impacts across the GOM 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 both helped to keep the spill fresh in the minds of local communities and politicians, but also the sheer amount of data surrounding heterogeneous efforts, methodologies, and impacts contributed to uncertain conclusions about the spill and distrust among locals regarding continued academic interests. Overall, uncertainty remained one of the greatest social impacts from the spill. As funding from the spill continues to be distributed, now especially to coastal protection and restoration efforts, the aftermath of the spill continues to affect the region in profound ways.

During winter 2019-2020, a novel coronavirus and associated disease, COVID-19, originated in Wuhan Province, China. It quickly spread around the globe, attaining pandemic proportions by March 11, 2020, and a national state of emergency in the U.S. was declared on March 13, 2020 (Taylor 2020). The five Gulf Coast States or jurisdictions within them declared stay-at-home orders and some declared mandatory quarantine periods for visitors. Information on this situation is shifting rapidly, as are the resources where the information is available. During the pandemic, information was available on the CDC website (CDC 2021a). Public health data indicate that non-Hispanic black persons, Hispanics and Latinos, and American Indians/Alaska Natives experience higher rates of infection, severe cases, and death than non-Hispanic whites (CDC 2020). Early research has demonstrated that exposure to fine particle air pollution is associated with increases of death rate from COVID-19 (Wu et al. 2020). As COVID-19 spread and travel and industry slowed, first in China and then around the globe, demand for oil fell and an oil war between Saudi Arabia and Russia kept production high, leading oil prices to fall precipitously over spring 2020 (Stickney 2020). The appearance of COVID-19

on oil platforms in the Gulf of Mexico by April 8, 2020, has led to increased questions about how the industry will face this coupled pandemic and oil price collapse (Sneath 2020). How this complex, multifaceted situation will continue to develop is unknown, but it will likely have diverse, long-lasting impacts on the five Gulf Coast States and has the potential to alter baseline conditions. BOEM will continue to monitor the situation and seek the best information available on the impacts of the COVID-19 pandemic.

#### **4.15.3.5 Conclusion**

BOEM has reexamined the analysis for social factors presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS based on the new information presented above. No new information was discovered that would alter the impact conclusion for social factors presented in those documents, and the analysis and potential impacts detailed in the 2017-2022 GOM Multisale EIS and summarized in the 2018 GOM Supplemental EIS still apply for GOM Lease Sales 259 and 261.

### **4.16 UNAVOIDABLE ADVERSE IMPACTS OF A PROPOSED ACTION**

Unavoidable adverse impacts associated with a Proposed Action are expected to be primarily short term and localized in nature and 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 or temporary use or “taking” of large areas of the OCS. Cumulatively, however, a multitude of individual projects results in a major use of OCS space. Where feasible, mitigation measures (**Chapter 2.3.3**) are applied to reduce the impacts of a Proposed Action. Unavoidable adverse impacts have been identified for many of the resources described in this chapter and are summarized below. For a more complete description of unavoidable adverse impacts, refer to the 2017-2022 GOM Multisale EIS.

*Air Quality:* Unavoidable short-term impacts on air quality could occur through offshore engine combustion, spill events (evaporation and volatilization of the lighter components of crude oil), and spill-response activities (combustion from surface burning and aerial spraying of dispersant chemicals). Additionally, adverse impacts could last the life of the project since hydrocarbon production is inherently a source of pollutants that can be mitigated but not 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 this Proposed Action will add to the global carbon budget and contribute to global climate change.

*Water Quality, Offshore:* Routine offshore operations would cause some unavoidable adverse impacts to varying degrees on the quality of the surrounding water. Drilling, construction, overboard discharges of drilling mud and cuttings, and pipelaying activities would cause an increase in the

turbidity of the affected waters. Accidental spills from platforms, spill-response activities, and the discharge of produced waters could result in increases of hydrocarbon, trace metal, and chemical concentrations in the water column in the vicinity of the platforms.

*Water Quality, Onshore:* Unavoidable impacts to onshore water quality would occur as a result of discharges such as runoff and effluent discharges from existing onshore infrastructure and vessel traffic (i.e., low-quantity oil leakage, treated sanitary and domestic waste, bilge water, and contaminants known to exist in ship paints).

*Coastal Habitats, Wetlands:* If an oil spill contacts coastal wetlands, adverse impacts could be high in localized areas. Some unavoidable impacts could occur during pipeline and other related coastal construction, but others could result from dredging, wake erosion, and other secondary impacts related to channel use and maintenance as a result of a Proposed Action.

*Coastal Habitats, Beaches and Barrier Islands:* Oil spills and response activities could result in adverse impacts 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, causing an aesthetic impact.

*Offshore Biological Habitats:* Unavoidable adverse impacts would take place if an oil spill occurred and contacted offshore biological habitats, such as *Sargassum* at the surface or benthic habitats on the bottom. There could 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, particularly in subsurface environments.

*Fish and Invertebrate Resources:* Unavoidable adverse impacts from routine operations would take place from discharges from vessels and platforms. If an oil spill occurs, the oil, dispersant chemicals, or emulsions of oil droplets and dispersant chemicals could temporarily displace mobile fish species on a population or local scale. There could also be impacts on prey and sublethal impacts on fish.

*Birds:* Unavoidable adverse impacts from routine operations on birds could result from noise, helicopter and OCS service-vessel traffic, coastal facility and platform lighting, and floating trash and debris. Oil spills and oil-spill cleanup activities could also affect birds and their prey species.

*Protected Species, Marine Mammals and Sea Turtles:* Unavoidable adverse impacts from routine operations 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.

*Protected Species, Beach Mice, Birds, and Corals:* Unavoidable loss of individuals that are ESA-listed species may occur after an 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.

*Commercial Fisheries and Recreational Fishing:* Unavoidable adverse impacts from routine operations are loss of open ocean or bottom areas desired for fishing, loss of gear from bottom obstructions, or fishery closures due to an oil spill.

*Recreational Resources:* Unavoidable adverse impacts from routine operations may result in the accidental loss overboard of some floatable debris that may eventually come ashore on frequented recreational beaches. An 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.

*Archaeological Resources:* Unavoidable adverse impacts from routine operations could lead to the loss of unique or significant archaeological information if unrecognized at the time an area is disturbed.

*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. An oil spill could cause temporary increases in economic activity associated with spill-response activity; however, this increased economic activity 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.

## **4.17 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. Examples are when a species becomes extinct or when wetlands are permanently converted to open water. In either case, the loss is permanent.

### **4.17.1 Coastal 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.

### **4.17.2 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.

### **4.17.3 Protected Species**

Irreversible loss of individuals that are protected species could occur from an unintended 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. 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.

#### **4.17.3.1 Fish and Invertebrate Resources, Deepwater Benthic Communities, Live Bottoms, Commercial Fisheries, and Recreational Fishing**

Irreversible loss of fish and invertebrate resources (including commercial and recreational species) deepwater benthic communities, live bottoms, commercial fisheries, and recreational fishing, may be caused by structure removals or from unintended large oil spills.

### **4.17.4 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.

### **4.17.5 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 nonrenewable oil and gas resources.

### **4.17.6 Loss of Human and Animal Life**

Any loss of human and animal life from unpredictable and unexpected acts of man and nature (i.e., 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.

## **4.18 RELATIONSHIP BETWEEN THE SHORT-TERM USE OF MAN'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 Proposed Action are related to long-term impacts and the maintenance and enhancement of long-term productivity.

### 4.18.1 Short-Term Use

Short term refers to the total duration of oil and gas exploration and production activities. Extraction and consumption of offshore oil and natural gas is a short-term benefit. Depleting a nonrenewable resource now removes these domestic resources from being available for future use.

The specific impacts of a Proposed Action 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 a Proposed Action but also result in short-term, localized impacts. Activities during the production life of a platform 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 a spill. Platform removal is also a short-term activity with localized impacts, including removal of the habitat for encrusting invertebrates and fish living among them. 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 2.3.3**.

The OCS development off Texas and Louisiana has enhanced some recreational and commercial activities. A Proposed Action could increase these incidental benefits by the presence of offshore development. As mineral resources become depleted, platform 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 Gulf of Mexico 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 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.

### 4.18.2 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 Gulf of Mexico, a gradual easing of the specific impacts caused by oil and gas exploration and production would occur as the productive reservoirs in the GOM have been discovered, produced, and become depleted.

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 GOM 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<sup>2</sup>/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<sup>2</sup>/yr. Production is much lower in the surface waters over the deep GOM basin. Therefore, primary production in the GOM is dominated by processes along the margins of the GOM (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 Gulf of Mexico is available in BOEM's *Biological Environmental Background Report for the Gulf of Mexico OCS Region* (BOEM 2021a).

Major ecosystem services (i.e., positive benefits provided by ecosystems to humans) managed within the context of the Gulf of Mexico large marine ecosystem include recreational and commercial fisheries, oil and gas production, tourism, and potentially future renewable energy development (BOEM 2021a). To help sustain the long-term productivity of the Gulf of Mexico ecosystem, the OCS Oil and Gas Program 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 fishermen and for sport divers and spear fishers.

## **CHAPTER 5**

### **CONSULTATION AND COORDINATION**



## **5 CONSULTATION AND COORDINATION**

### **5.1 INTRODUCTION**

BOEM conducts consultations and other activities to comply with the following laws, including but not limited to, the development of consistency determinations (CDs) under CZMA, consultation under the Endangered Species Act (ESA) for potential impacts to listed species or designated critical habitat, Essential Fish Habitat consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, and a request for comments and consultation with federally recognized Indian Tribes pursuant to the National Historic Preservation Act and Executive Order 13175. Pursuant to NEPA, BOEM has conducted public involvement activities during review of the Draft Supplemental 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 Supplemental EIS.

### **5.2 COASTAL ZONE MANAGEMENT ACT**

The Federal agency performs a consistency review pursuant to the Coastal Zone Management Act (CZMA), and CDs are prepared for each coastal State along the Gulf of Mexico with a federally approved Coastal Management Program (CMP) prior to each of the lease sales. To prepare the CDs, BOEM reviews each State's federally approved Coastal Management Plan and analyzes the potential impacts as outlined in the 2017-2022 GOM Multisale EIS, 2018 GOM Supplemental EIS, and this Supplemental 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 part 930 subpart C).

Based on these and other analyses, BOEM's New Orleans Office's Regional Supervisor for the Office of Environment makes an assessment of consistency, which is then sent to the States of Texas, Louisiana, Mississippi, Alabama, and Florida for Gulf of Mexico lease sales; Texas and Louisiana for WPA lease sales; or Louisiana, Mississippi, Alabama, and Florida for CPA and/or EPA lease sales. 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 review period to attempt to resolve their differences (15 CFR § 930.43(b)).

At the end of the 90-day review 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 J of the 2017-2022 GOM Multisale EIS.

On May 7, 2021, NOAA's Office for Coastal Management received a request for approval of changes to the federally approved Florida CMP pursuant to the CZMA regulations at 15 CFR part 923 subpart H. The NOAA Office for Coastal Management approved the request to incorporate changes, subject to a qualification, on June 21, 2021, which would apply to Federal actions proposed on or after this date of approval. The approved changes and relevant documentation can be found on NOAA's website at <https://coast.noaa.gov/czmprogramchange/#/public/change-view/1256>. As per 15 CFR § 923.81(f), approved program changes would not apply retroactively to State-Federal consistency reviews initiated prior to the date NOAA approved the changes, except as allowed by 15 CFR § 930.46. Therefore, NOAA's approved changes to the FCMP would apply to consistency reviews and CDs that are prepared for the State of Florida for each CPA and/or EPA lease sale that is proposed after June 21, 2021.

### **5.3 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 they authorize, fund, or carry 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 its 10-year BiOp for BOEM and BSEE's OCS oil- and gas-related activities in the GOM (including holding lease sales), which does not include any terms and conditions for the protection of endangered species that the Bureaus, lessees, or operators must implement. The FWS BiOp stated that any future consultations may be informal dependent upon the likelihood of take.

On March 13, 2020, NMFS issued a BiOp and related terms and conditions and reasonable and prudent measures for future approvals of OCS oil- and gas-related activities (including lease sales) in the Gulf of Mexico for the protection of species listed as endangered or threatened under the ESA and under NMFS' jurisdiction. The NMFS' programmatic BiOp addresses any future lease sales and any future approvals issued by BOEM and BSEE, under both existing and future OCS oil and gas leases in the GOM, over a 10-year period. Applicable terms and conditions and reasonable and prudent measures, and the reasonable and prudent alternative for the Rice's whale would be included in the Protected Species Stipulation (as described in **Chapter 2.3.3.1** and **Appendix A**); other specific Conditions of Approval (COA) including the BOEM and BSEE jointly developed Notification of Intention to Transit Rice's Whale Area COA, or others as created, would also be applied to post-lease approvals (e.g., permits and plans). Any future BiOp amendments or COAs shall be a requirement and binding on subsequent actions. The NMFS BiOp and supporting documents can be found online at <https://repository.library.noaa.gov/view/noaa/23738>.

The NMFS BiOp made a jeopardy determination concerning the GOM Bryde's<sup>7</sup> whales (now Rice's whale) due to the potential for vessel strikes for service vessels transiting the GOM Rice's whale area, which is largely in the area of the Gulf of Mexico and which was subject to Congressional moratorium and is now under Presidential withdrawal (86 FR 47022). BOEM reviewed this analysis and found that the activities and effects from a lease sale are not reasonably foreseeable as a result of a Proposed Action since service vessels expected to service leases issued as a result of a lease sale are likely to use ports closer to the WPA and CPA, and are unlikely to transit across greater distances through the withdrawal area to get to the leases. Nevertheless, BOEM notified NMFS in April 2021 that it was formally accepting the reasonable and prudent alternative for the GOM Rice's whale, and on May 7, 2021, NMFS accepted BOEM's approach and stated it would not need to further amend its BiOp to reflect that change. The NMFS had previously updated the 2020 BiOp and appendices in April 2021 to reflect other changes (the amended appendices can be found online at <https://repository.library.noaa.gov/view/noaa/29355>). In accordance with 50 CFR §§ 402.2 and 402.14(g)(8) and the 1998 consultation handbook, BOEM and BSEE are implementing the reasonable and prudent alternative to comply with Section 7(a) of the ESA. The impacts to ESA-listed species from an oil and gas lease sale are addressed in **Chapter 4.10** of this Supplemental EIS, as well as in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.

BOEM petitioned NMFS for rulemaking under the Marine Mammal Protection Act (MMPA, 16 U.S.C. §§ 1361 *et seq.*) to assist industry in obtaining incidental take coverage for marine mammals due to oil and gas deep-penetration seismic G&G surveys in the Gulf of Mexico. On January 19, 2021, NMFS published in the *Federal Register* (86 FR 5322) its final "Incidental Take Regulation on Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico" as a result of the petition; the rule took effect on April 19, 2021 (<https://www.fisheries.noaa.gov/action/incidental-take->

<sup>7</sup> On August 23, 2021, NMFS published a direct final rule in the *Federal Register* (84 FR 15446), "Endangered and Threatened Wildlife and Plants; Technical Corrections for the Bryde's Whale (Gulf of Mexico Subspecies)." The NMFS revises the common name to Rice's whale, the scientific name to *Balaenoptera ricei*, and the description of the listed entity to the entire species. The changes to the taxonomic classification and nomenclature do not affect the species' listing status under the ESA or any protections and requirements arising from its listing. This rule became effective on October 22, 2021.

[authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico](#)). In April 2021, NMFS amended the Incidental Take Statement associated with the 2020 BiOp (which also served as the intra-service consultation for the rule). The amendment updated Appendices A and C to align with the regulation and updated the COAs developed since the release of the programmatic 2020 BiOp. The Appendices and COAs may be imposed on lessees and operators through compliance reviews associated with the Programmatic BiOp when lessees or operators submit requests for plans or permits, or through Letters of Authorization issued under the rule. Any additional mitigations applied by industry through the rule would only be expected to further reduce impacts already addressed in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. As the final incidental take regulation took effect on April 19, 2021, survey operators are now able to apply for Letters of Authorization.

On October 25, 2022, BOEM and BSEE requested reinitiation of the consultation with NMFS in light of an upcoming oil-spill risk analysis and to incorporate certain previously developed and implemented mitigations for Rice's whales. The existing 2020 BiOp as amended will remain in effect until the reinitiated consultation is completed and a new or amended BiOp becomes available. During the reinitiation process, BOEM will continue to implement the Reasonable and Prudent Alternative, and to comply with all Reasonable and Prudent Measures and Terms and Conditions under the existing 2020 BiOp, as amended. This includes continuing to request step down reviews for the prescribed activities and implementing and adaptively managing the mitigation, monitoring, and reporting requirements (2020 BiOp Appendixes and/or COAs) imposed by the Bureaus on plans and permits, and as coordinated with NMFS and industry.

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. Refer to **Appendix B** for copies of the consultation letters.

#### **5.4 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT**

Pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act, Federal agencies are required to consult with NMFS on any action that may result in adverse effects to essential fish habitat (EFH). The NMFS published the final rule implementing the EFH provisions of the Magnuson-Stevens Fisheries Conservation and Management Act (50 CFR part 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 2022b). The EFH Assessment was sent to NMFS on May 25, 2022, with a letter requesting formal consultation. The 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 activities on the Gulf of Mexico 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 B** for the regional programmatic EFH consultation letters.

## 5.5 NATIONAL HISTORIC PRESERVATION ACT

In accordance with the National Historic Preservation Act (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 National Historic Preservation Act, issued by the Advisory Council on Historic Preservation (36 CFR part 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 National Historic Preservation Act in lieu of 36 CFR §§ 800.3-800.6. Because of the extensive geographic area analyzed in this Supplemental 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. Refer to Chapter 4.13 of the 2017-2022 GOM Multisale EIS for more information on this review process and **Appendix B** of this Supplemental EIS for copies of the State Historic Preservation Offices' concurrence letters.

BOEM initiated a request for comment on the NOI for the 2017-2022 GOM Multisale EIS via a formal letter to each of the affected Gulf Coast States on April 3, 2015. A 30-day comment period was provided. The State Historic Preservation Officers for Alabama, Florida, and Louisiana responded via formal letters, all concurring that no historic properties will be affected. The Florida State Historic Preservation Officer further requested to be notified and given the opportunity to comment should any cultural resources be identified off the Florida coast. No additional responses were received.

BOEM solicited Tribal comment and consultation on the *2017-2022 Outer Continental Shelf Oil and Gas Leasing: Draft Proposed Program* and NOI for the 2017-2022 OCS Oil and Gas Leasing Programmatic EIS via a formal letter on March 4, 2015, and on the Draft 2017-2022 GOM Multisale EIS via a formal letter on May 19, 2016. The Final 2017-2022 GOM Multisale EIS and Draft 2018 GOM Supplemental EIS were sent to each Tribe in April 2017, again requesting Tribal comment or additional consultation.

Those letters were addressed to each of the Gulf Coast State-affiliated federally recognized Indian Tribes, including the Alabama-Coushatta Tribe of Texas, Caddo Nation of Oklahoma, Chitimacha Tribe of Louisiana, Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of Choctaw Indians, 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, and Tunica-Biloxi Indian Tribe of Louisiana.

In response to these communications, the Choctaw Nation of Oklahoma indicated that the 2017-2022 GOM Multisale EIS activities will affect the Tribe's area of historic interest. The Tribe requested to be updated on archaeological surveys and that any work be stopped and their Historic Preservation Department be notified immediately in the event that Native American artifacts or human remains are encountered (Bilyeu 2017b, official communication). The Poarch Band of Creek Indians indicated that they do not have any specific concerns with BOEM's activities on the OCS, but they request continued notifications concerning BOEM's activities (Jones 2015a, official communication). Additionally, the Jena Band of Choctaw indicated a general concern over adverse effects to documented or undocumented precontact and historic sites in the CPA and requested notification should an undertaking be unable to avoid a potential resource or in the event of a post-review discovery, as well as to continue being notified concerning BOEM's activities (Jones 2015b, official communication).

In September 2017, BOEM received an email comment from the Alabama Historical Commission on the *Gulf of Mexico OCS Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas; Final Programmatic Environmental Impact Statement*. The State Archaeologist commented that their office had erroneously not submitted comments during the Draft Programmatic EIS review and that they felt Alternatives A-G have the potential to adversely affect cultural resources in Alabama waters (Hathorn 2017, official communication). They requested to be included in consultations involving any future activities in Alabama waters.

BOEM conducts Section 106 of the National Historic Preservation Act 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.

No additional responses have been received from the above-referenced outreach efforts; however, BOEM continues to regularly correspond with designated Tribal representatives to determine if any of the individual Tribes desire consultation on these or other agency activities.

## **5.6 GOVERNMENT-TO-GOVERNMENT TRIBAL CONSULTATION**

In accordance with Executive Order 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 Indian Tribes and to

reduce the imposition of unfunded mandates upon Indian Tribes. On March 4, 2015, BOEM sent a formal letter to federally recognized Indian Tribes notifying them of the development of the *2017-2022 Outer Continental Shelf Oil and Gas Leasing: Draft Proposed Program* and accompanying Programmatic EIS, as well as the *Gulf of Mexico Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas—Programmatic EIS*. That letter was addressed to each of the Gulf Coast State-affiliated Indian Tribes, including the Alabama-Coushatta Tribe of Texas, Caddo Nation of Oklahoma, Chitimacha Tribe of Louisiana, Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of Choctaw Indians, Miccosukee Tribe of Indians of Florida, Mississippi Band of Choctaw Indians, Poarch Band of Creek Indians, Seminole Tribe of Florida, Seminole Nation of Oklahoma, and Tunica-Biloxi Indian Tribe of Louisiana. 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 Draft Proposed Program, as well as ongoing activities. On May 19, 2016, another formal letter was sent announcing and soliciting consultation on the releases of the 2017-2022 Proposed Program, Draft 2017-2022 National OCS Program EIS, and Draft 2017-2022 GOM Multisale EIS. That letter was sent to each of the above-listed Tribes, as well as to the Muscogee (Creek) Nation. The Final 2017-2022 GOM Multisale EIS and Draft 2018 GOM Supplemental EIS were sent to each Tribe in April 2017, again requesting Tribal comment or additional consultation.

In response to these communications, the Choctaw Nation of Oklahoma indicated that the 2017-2022 GOM Multisale EIS activities will affect the Tribe's area of historic interest. The Tribe requested to be updated on archaeological surveys and that any work be stopped and their Historic Preservation Department be notified immediately in the event that Native American artifacts or human remains are encountered (Bilyeu 2017b, official communication). The Poarch Band of Creek Indians indicated that they do not have any specific concerns with BOEM's activities on the OCS, but they request continued notifications concerning BOEM's activities (McCullers 2015, official communication). Additionally, the Jena Band of Choctaw indicated a general concern over adverse effects to documented or undocumented precontact and historic sites in the CPA and requested notification should an undertaking be unable to avoid a potential resource or in the event of a post-review discovery, as well as to continue being notified concerning BOEM's activities (Jones 2015b, official communication).

In August 2017, BOEM sent a letter to Gulf of Mexico-affiliated Tribes regarding the Request for Information to support development of the 2019-2024 National Outer Continental Shelf Oil and Gas Leasing Program (Program) (Celata 2017, official communication). Responses were received from The Choctaw Nation of Oklahoma (Bilyeu 2017a, official communication) and Muscogee (Creek) Nation (Wendt 2017, official communication). Both Tribes indicated that the proposed activities are within their historic area of interest, that they wanted to continue to receive information on the development of the Program, and that they were potentially interested in future consultations. The Choctaw Nation of Oklahoma's Historic Preservation Department clarified during later discussions that their interest was primarily in State waters and that they did not wish to consult at that time but requested notification if any precontact archaeological resources are discovered in Federal waters (Jones 2017, official communication).

Following the Secretary of the Interior's announcement of the Draft Proposed Program in January 2018, phone calls were made to each of the Gulf of Mexico-affiliated Tribes, and additional emails were sent to the Poarch Band of Creek Indians, Seminole Nation of Oklahoma, and Chitimacha Tribe of Louisiana to provide additional information on the Program at those Tribes' request (Jones 2018, official communication; Phaneuf 2018, official communication). No additional responses were received and no Tribes requested consultations at that time.

In January 2019, BOEM notified Tribes of the intent to prepare a Supplemental EIS evaluating the remaining oil and gas lease sales for 2020-2022. Tribes were invited to provide input and consult on the development of the Supplemental EIS, including becoming a cooperating agency (Jones 2019, official communication). No responses were received.

BOEM continues to consult with Tribes on oil and gas activities and other BOEM-authorized activities proposed on the Gulf of Mexico OCS and will update this summary as additional efforts are conducted.

BOEM has also analyzed environmental justice issues for minority and low-income populations, which is broadly applicable to federally recognized Indian Tribes. Further information on that analysis can be found in **Chapter 4.15.3** of this Supplemental EIS, Chapter 4.14.3.3 of the 2017-2022 GOM Multisale EIS, and Chapter 4.14.3.1 of the 2018 GOM Supplemental EIS.

## **5.7 LEASE SALE PROCESS AND THE NATIONAL ENVIRONMENTAL POLICY ACT**

### **5.7.1 Development of the Proposed Action**

This Final Supplemental EIS updates the analysis for a proposed Federal action, i.e., a Gulf of Mexico OCS oil and gas lease sale. This document is expected to be used to inform the lease sale processes for GOM Lease Sales 259 and 261. BOEM conducted early coordination with appropriate Federal and State agencies and other concerned parties to discuss and coordinate the prelease process for the lease sales and this Supplemental EIS.

#### **5.7.1.1 Call for Information and Area ID Memorandum**

Pursuant to the Outer Continental Shelf Lands Act of 1953, as amended (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* on December 26, 2018 (83 FR 66300). The comment period for the Call closed on January 25, 2019. BOEM received three comments in response to the Call; these comments are summarized below.

#### **Private Citizen (California)**

- suggests exploring clean energy solutions instead of fossil fuels

**Private Citizen (California)**

- suggests focusing on renewable energy to limit the worst effects of climate change

**Center for Biological Diversity (co-signed by 25 additional organizations)**

- suggests halting all GOM oil and gas lease sales included in the Draft Proposed Program
- states that BOEM violated the Antideficiency Act by putting staff back to work during the government shutdown
- states that the proposed lease sales are inconsistent with our Nation's energy needs

Using information provided in response to the Call and from scoping comments received for the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, BOEM developed an 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 2017-2022 GOM Multisale EIS, 2018 GOM Supplemental EIS, and this Supplemental EIS. On November 20, 2015, the Area ID decision was prepared for all proposed lease sales from 2017-2022. The Area ID memo recommended keeping the area of the GOM comprised of unleased blocks in the WPA, CPA, and EPA not subject to Congressional moratorium, pursuant to the Gulf of Mexico Energy Security Act of 2006 (which is now under Presidential withdrawal), which will be included for GOM Lease Sales 259 and 261.

**5.7.2 Development of the Draft Supplemental EIS****5.7.2.1 Scoping**

Under 40 CFR § 1502.9(c)(4), scoping is not required for a Supplemental EIS. Multiple opportunities for public input on the relevant issues, alternatives and resources to be evaluated with a GOM lease sale, including scoping and the Draft EIS comment periods for the 2017-2022 GOM Multisale EIS (BOEM 2017b) and 2018 GOM Supplemental EIS (BOEM 2017a). A summary of the scoping comments from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS is provided below.

**2017-2022 GOM Multisale EIS**

- BOEM received a total of 10 comments during the public scoping period from April 29 to June 1, 2015.
- Many of the comments cited broad environmental concerns or specific concern about impacts on marine wildlife in general or on protected species such as marine mammals and sea turtles. Others cited concerns about impacts to critical habitats, fish and fisheries, sensitive benthic communities, and pelagic resources. Several

of the comments had concerns about the effects of oil spills and the safety of offshore operations. Within the broad category of socioeconomics, comments focused on impacts on fisheries, recreation, tourism, and local jobs.

- Some of the comments provided recommendations for the inclusion of particular alternatives or mitigation in this Supplemental EIS analysis. Some comments recommended the implementation of specific analysis methodologies, while others recommended that recent industry technology and safety advances be taken into consideration.

### **2018 GOM Supplemental EIS**

- BOEM received a total of 441 comments during the public scoping period from August 19 to September 19, 2016; 433 comments in response to the NOI; and 8 comments at the scoping meetings.
- Almost 380 individual comments were received in support of the proposed lease sales, 356 of which were form letters. Commenters stated that future leases are vital to the national economy and security, and are integral to the State of Louisiana and local economies and jobs. Several noted that oil and gas companies and employees must be good stewards of the environment and continue to provide more emphasis on safety. Several commenters stated that the recent downturn in oil and gas prices is hurting small towns and southern states in general.
- Twenty-three individual comments were received that opposed future lease sales. Commenters stated that renewable energy should be pursued instead of oil and gas, fossil fuels should be left in the ground, and new lease sales are not compatible with the Paris Treaty. Issues of concern included the impacts of oil and gas on greenhouse gas emission and global climate change, the impacts of climate change on the GOM's environmental resources, warmer oceans, increased storms and flooding events, and land loss. Several commenters also expressed concern about continuing oil and chemical spill risks, continuing effects of past oil and chemical spills, leaking wells and pipelines, and a lack of reasonable alternatives. Environmental resources of concern included protected species (i.e., marine mammals, sea turtles, beach mice, protected birds, and corals), wetlands, fish nurseries, coral reefs, seafood safety, and environmental justice. Comments were received expressing concerns for environmental justice related to those living nearby petrochemical processing facilities.

#### **5.7.2.2 Cooperating Agencies**

According to Part 516 of the DOI Departmental Manual, BOEM must invite eligible government entities to participate as cooperating agencies when developing an EIS in accordance with the requirements of NEPA and CEQ regulations. 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.

The 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. BSEE has been working as a Cooperating Agency through the MOA and formally requested to serve as a Cooperating Agency for this Supplemental EIS, via email, on October 20, 2022.

### 5.7.2.3 Distribution of the Draft Supplemental EIS for Review and Comment

BOEM announced the publication of the Draft Supplemental EIS via Press Release on October 6, 2022, and published the Draft Supplemental EIS on BOEM's website at <https://www.boem.gov/GoM-Sales-259-and-261-SEIS>. In addition, a Notice to Stakeholders announcing the Draft Supplemental EIS and the virtual public meetings was sent out on October 7, 2022.

## 5.7.3 Development of the Final Supplemental EIS

### 5.7.3.1 Major Differences Between the Draft and Final Supplemental EISs

Several changes were made between the Draft and Final Supplemental EISs. These changes were the result of new information becoming available, editorial suggestions, and comments received on the Draft Supplemental EIS. Most notably, BOEM added information in **Chapter 2.3.4**, Issues Identified, addressing potential space-use conflicts between the OCS Oil and Gas Program, Marine Minerals Program, and Renewable Energy Program in overlapping OCS blocks in the GOM. That chapter also describes the NTLs and ITLs that can be used to help mitigate those potential space-use conflicts. In **Chapter 2.3.4**, BOEM describes how cancelling a single lease sale could eliminate some of those space-use conflicts. BOEM also addresses the need for the use of sediment resources for storm damage mitigation and coastal resiliency under the Marine Minerals Program and renewable energy infrastructure under the Renewable Energy Program in **Chapter 4.0.2.1**. In addition, BOEM has added additional description to the purpose of and need for this Supplemental EIS in **Chapter 1.2**. The additional information relates to the connections between the Biden Administration's goals, Inflation Reduction Act of 2022, and BOEM's 2022 Gulf of Mexico GHG Analysis Addendum.

Comments on the Draft Supplemental EIS were received via verbal testimony and electronic submission via [regulations.gov](https://www.regulations.gov). As a result of these comments, as well as the publication of new information, changes and updates have been made between the Draft and Final Supplemental EISs. Where appropriate, the text in this Final Supplemental 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 Supplemental EISs, however, did not change the impact conclusion for the any of the resources analyzed. For more information, refer to **Chapter 4.1** for clarification on the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c); **Chapter 4.3** for updated information on the USEPA's National Pollution Discharge Elimination System permits, dead zone in the GOM, and oil spills; **Chapter 4.4.2** for new information on the impacts of oil spills on beaches; **Chapter 4.5** for new information on the long-term impacts of the *Deepwater Horizon* oil spill on deepwater benthic communities; **Chapter 4.6** for new information on the impacts of oil spills on *Sargassum* and associated communities; **Chapter 4.7.1** for new information on stony coral tissue loss disease in the Flower Garden Banks National Marine Sanctuary; **Chapter 4.8** for expanded information on fish and invertebrate communities near floating structures, an updated impact conclusion for fish and invertebrates as a result of a oil spill, a revised analysis for the impacts of Alternative C on fish and invertebrate communities, and additional information on the impacts of climate change and oil spills on fish and invertebrates; **Chapter 4.9** for new information on the impacts of oil spills on birds; **Chapter 4.10.1** for new information on the impacts of oil spills on marine mammals, expanded information on the impacts of vessel strikes on Rice's whale, and new information on the impacts of sound on marine mammals; **Chapter 4.10.2** for new information on the impacts of an oil spill on sea turtles; **Chapter 4.10.4** for a clarification on the impacts of oil spills on protected birds; **Chapter 4.10.5** for new information on listed corals, the impacts of oil spills on protected corals, and new information on stony coral tissue loss disease in the Flower Garden Banks National Marine Sanctuary; and **Chapter 4.15.3** for new information on the social impacts of the *Deepwater Horizon* oil spill.

### 5.7.3.2 Virtual Public Meetings

In accordance with 30 CFR § 556.26, BOEM scheduled two virtual public meetings soliciting comments on the Draft Supplemental EIS. The meetings were conducted to solicit information from interested parties in order to provide the Secretary of the Interior with information to help in the evaluation of the potential effects of Lease Sales 259 and 261. An announcement of the dates and times of the virtual public meetings was included in the Notice to Stakeholders. A copy of the Notice to Stakeholders was posted on BOEM's website at <https://www.boem.gov/GoM-Sales-259-and-261-SEIS>.

Virtual public meetings were held on the dates and at the times indicated below:

- October 24, 2022, at 4:00 p.m. CST and
- October 26, 2022, at 1:00 p.m. CST.

### 5.7.3.3 Comments Received on the Draft Supplemental EIS and BOEM's Responses

The Notice to Stakeholders and the announcement of public meetings were distributed and published on BOEM's website on October 7, 2022. The comment period ended on November 21, 2022. BOEM received 75,904 comments in response to the Draft Supplemental EIS via written and verbal comments at public meetings and the [regulations.gov](https://www.regulations.gov) website. Of the 75,904 submissions, 324 were identified as unique and containing substantive content. BOEM also received 5 form letters

with 28,741 signatures; 9 signatures; 7,039 signatures; and 20,047 signatures, respectively. 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 the Comment ID Number from [regulations.gov](http://regulations.gov). Within these 11 categories, responses are provided for each issue. When similar issues were raised by several commenters, a single response has been provided for multiple comments. The comments and responses are presented in a matrix in **Appendix C** and are organized by the 11 topics below.

Topic 1 – “NEPA Process and Public Involvement” contains those issues related to the process of preparing this Supplemental 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 Supplemental EIS. A majority of these comments included a statement of the commenter’s preference for a particular alternative, with some including a reason why. A “Stated Preference” subtopic was included to group those comments.

Topic 4 – “Environmental Issues and Concerns” contains the 20 subcategories listed below.

- Climate Change
- Greenhouse Gasses
- Well Stimulation
- Renewable Energy and Alternative Uses of the OCS
- Air Quality
- Water Quality
- Estuarine Systems (Wetlands and Seagrasses/Submerged Vegetation)
- Deepwater Benthic Communities
- *Sargassum* and Associated Communities
- Topographic Features
- Fish and Invertebrate Resources
- Birds
- Marine Mammals
- Sea Turtles
- Beach Mice
- Commercial Fisheries
- Archaeological Resources
- Land Use and Coastal Infrastructure

- Economic Factors
- Social Factors (Including Environmental Justice)

Topic 5 – “Cumulative Analysis” includes the comments that BOEM received regarding the analysis of past, present, and reasonably foreseeable activities in this Supplemental EIS.

Topic 6 – “Oil Spills” includes comments related to concerns over oil spills and their impact on the environment.

Topic 7 – “Mitigation” includes all of the comments that relate to how BOEM plans to minimize environmental impacts.

Topic 8 – “Regulations and Safety” includes comments on how BOEM and BSEE regulate offshore energy production and safety.

Topic 9 – “Scenario” includes comments on the OCS oil and gas scenario that BOEM used in its analysis.

Topic 10 – “Inflation Reduction Act of 2022” includes comments concerning the Inflation Reduction Act of 2022 and the requirement to hold Lease Sales 259 and 261.

Topic 11 – “Out of Scope” comments include those comments that are not covered within the analysis of this Supplemental EIS. They include a wide range of comments that did not fall into one of the above categories.

**CHAPTER 6**  
**REFERENCES CITED**



## 6 REFERENCES CITED

- Abramson D, Redlener I, Stehling-Ariza T, Sury J, Banister A, Park YS. 2010. Impact on children and families of the Deepwater Horizon oil spill: preliminary findings of the coastal population impact study. New York (NY): National Center for Disaster Preparedness, Columbia University, Mailman School of Public Health. 19 p. Report No.: NCDP Research Brief 2010:08. [accessed 2021 Oct 25]. <https://academiccommons.columbia.edu/doi/10.7916/D8988GQT>.
- ABS Consulting Inc. 2016. 2016 update of occurrence rates for offshore oil spills. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Bureau of Safety and Environmental Enforcement. 95 p. [accessed 2020 Nov 29]. <https://www.bsee.gov/sites/bsee.gov/files/osrr-oil-spill-response-research/1086aa.pdf>.
- Ahmad F, Morris K, Law GTW, Taylor KG, Shaw S. 2021. Fate of radium on the discharge of oil and gas produced water to the marine environment. *Chemosphere*. 273:129550. doi:10.1016/j.chemosphere.2021.129550.
- Ainsworth CH, Paris CB, Perlin N, Dornberger LN, Patterson III WF, Chancellor E, Murawski S, Hollander D, Daly K, Romero IC, et al. 2018. Impacts of the Deepwater Horizon oil spill evaluated using an end-to-end ecosystem model. *PLoS ONE*. 13(1):e0190840. doi:10.1371/journal.pone.0190840.
- Ajemian MJ, Wetz JJ, Shipley-Lozano B, Shively JD, Stunz GW. 2015. An analysis of artificial reef fish community structure along the Northwestern Gulf of Mexico shelf: potential impacts of "Rigs-to-Reefs" programs. *PLoS ONE*. 10(5):e0126354. doi:10.1371/journal.pone.0126354.
- Al-Dahash LM, Mahmoud HM. 2013. Harboring oil-degrading bacteria: a potential mechanism of adaptation and survival in corals inhabiting oil-contaminated reefs. *Marine Pollution Bulletin*. 72:364-374. doi:10.1016/j.marpolbul.2012.08.029.
- Alabama Oil and Gas Board. 2018. State of Alabama calendar year offshore production. Tuscaloosa (AL): State of Alabama, Geological Survey of Alabama, Alabama State Oil and Gas Board. [accessed 2021 Oct 12]. <https://www.gsa.state.al.us/img/ogb/summaries/AnnOSCalPrd.pdf>.
- Alexander CR, Hooper MJ, Cacula D, Smelker KD, Calvin CS, Dean KM, Bursian SJ, Cunningham FL, Hanson-Dorr KC, Horak KE, et al. 2017. Reprint of: CYP1A protein expression and catalytic activity in double-crested cormorants experimentally exposed to Deepwater Horizon Mississippi Canyon 252 oil. *Ecotoxicology and Environmental Safety*. 146. doi:10.1016/j.ecoenv.2017.05.015.
- Amy J. 2019. Mississippi sues federal government over river flooding. *Clarion Ledger*. 2019 Feb 11. [accessed 2021 Oct 20]. <https://www.clarionledger.com/story/news/local/2019/02/11/mississippi-sues-federal-government-over-river-flooding/2842558002/>
- Anderson C, LaBelle R. 2000. Update of comparative occurrence rates for offshore oil spills. *Spill Science & Technology Bulletin*. 6(5/6):302-321.

- Anderson CM, Mayes M, Labelle R. 2012. Update of occurrence rates for offshore oil spills. Herndon (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Bureau of Safety and Environmental Enforcement. 87 p. Report No.: OCS Study BOEM 2012-069, BSEE 2012-069. [accessed 2020 Nov 29]. [https://www.boem.gov/sites/default/files/uploadedFiles/BOEM/Environmental\\_Stewardship/Environmental\\_Assessment/Oil\\_Spill\\_Modeling/AndersonMayesLabelle2012.pdf](https://www.boem.gov/sites/default/files/uploadedFiles/BOEM/Environmental_Stewardship/Environmental_Assessment/Oil_Spill_Modeling/AndersonMayesLabelle2012.pdf).
- Apriesnig JL, Thompson JM. 2021. Recreational marine fishing in the time of Covid-19. In: 2021 Agricultural & Applied Economics Association Annual Meeting; 2021 Aug 1-3; Austin (TX). Agricultural & Applied Economics Association. p. 23. <https://ageconsearch.umn.edu/record/313369/>.
- Austin D, Dosemagen S, Marks B, McGuire T, Prakash P, Rogers B. 2014a. Offshore oil and *Deepwater Horizon*: social effects on Gulf Coast communities. Volume II: key economic sectors, NGOs, and ethnic groups. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 207 p. Report No.: OCS Study BOEM 2014-618. [accessed 2020 Oct 7]. <https://espis.boem.gov/final%20reports/5385.pdf>.
- Austin D, Luchetta J, Phaneuf V, Simms J. 2022. Social impacts of the *Deepwater Horizon* oil spill on coastal communities along the US Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 143 p. Report No.: OCS Study BOEM 2022-021. [accessed 2022 Dec 6]. [https://espis.boem.gov/final%20reports/BOEM\\_2022-021.pdf](https://espis.boem.gov/final%20reports/BOEM_2022-021.pdf).
- Austin D, Marks B, McClain K, McGuire T, McMahan B, Phaneuf V, Prakash P, Rogers B, Ware C, Whalen J. 2014b. Offshore oil and *Deepwater Horizon*: social effects on Gulf Coast communities. Volume I: methodology, timeline, context, and communities. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 268 p. Report No.: OCS Study BOEM 2014-617. [accessed 2020 Oct 7]. <https://espis.boem.gov/final%20reports/5384.pdf>.
- Austin D, Phaneuf V. 2020. Place matters. Tracking coastal restoration after *Deepwater Horizon*. In: Park TK, Greenberg JB, editors. Terrestrial transformations: a political ecology approach to society and nature. Lanham (MD): Lexington Books. Chapter 12; p. 193-209.
- Bae H-S, Huang L, White JR, Wang J, DeLaune RD, Ogram A. 2018. Response of microbial populations regulating nutrient biogeochemical cycles to oiling of coastal saltmarshes from the Deepwater Horizon oil spill. *Environmental Pollution*. 241:136-147. doi:10.1016/j.envpol.2018.05.033.
- Baer RD, Weller SC, Roberts C. 2019. The role of regional cultural values in decisions about hurricane evacuation. *Human Organization*. 78(2):133-146. doi:10.17730/0018-7259.78.2.133.
- Baldwin CC, Tornabene L, Robertson DR. 2018. Below the mesophotic. *Scientific Reports*. 8:4920. doi:10.1038/s41598-018-23067-1.

- Barkaszi MJ, Kelly CJ. 2019. Seismic survey mitigation measures and protected species observer reports: synthesis report - corrected version. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 222 p. Report No.: OCS Study BOEM 2019-012. [accessed 2021 Oct 28]. [https://espis.boem.gov/final%20reports/BOEM\\_2019-012.pdf](https://espis.boem.gov/final%20reports/BOEM_2019-012.pdf).
- Baurick T. 2018. Building barriers: inside the race to save Louisiana's first line of storm defense. The Times-Picayune. 2018 Jul 15. [accessed 2018 Sep 7]. [https://www.nola.com/news/environment/article\\_df61c669-14cc-5ba7-821d-2ee7c57becd9.html](https://www.nola.com/news/environment/article_df61c669-14cc-5ba7-821d-2ee7c57becd9.html).
- BEA. 2020a. Gross domestic product, 2nd quarter 2020 (advance estimate) and annual update. Suitland (MD): U.S. Department of Commerce, Bureau of Economic Analysis. [accessed 2020 Nov 6]. <https://www.bea.gov/news/2020/gross-domestic-product-2nd-quarter-2020-advance-estimate-and-annual-update>.
- BEA. 2020b. Gross domestic product, 2nd quarter 2020 (second estimate); corporate profits, 2nd quarter 2020 (preliminary estimate). Suitland (MD): U.S. Department of Commerce, Bureau of Economic Analysis. [accessed 2020 Sep 28]. <https://www.bea.gov/news/2020/gross-domestic-product-2nd-quarter-2020-second-estimate-corporate-profits-2nd-quarter>.
- Bennett NJ, Finkbeiner EM, Ban NC, Belhabib D, Jupiter SD, Kittinger JN, Mangubhai S, Scholtens J, Gill D, Christie P. 2020. The COVID-19 pandemic, small-scale fisheries and coastal fishing communities. *Coastal Management*. 48(4):336-347. doi:10.1080/08920753.2020.1766937.
- Bento MIFC, Campos JC. 2020. Evaluation of the acute effects of chemical additives on the toxicity of a synthetic oilfield produced water. *Journal of Environmental Science and Health, Part A*. 56(1):89-96. doi:10.1080/10934529.2020.1840228.
- Bevan EM, Wibbels T, Shaver D, Walker JS, Illescas F, Montano J, Ortiz J, Peña JJ, Sarti L, Najera BMZ, 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. *Endangered Species Research*. 40:31-40. doi:10.3354/esr00977.
- Billiot S, Kwon S, Burnette CE. 2019. Repeated disasters and chronic environmental changes impede generational transmission of indigenous knowledge. *Journal of Family Strengths*. 19(1):31.
- Bilyeu L. 2017a. RE: BOEM 2019-2024 National OCS Oil and Gas Leasing Program [official communication; email from the Choctaw Nation of Oklahoma on 2017 Oct 10].
- Bilyeu L. 2017b. RE: Gulf of Mexico OCS oil and gas lease sales: 2017-2022; Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261; final multisale environmental impact statement [official communication; email from Choctaw Nation of Oklahoma on 2017 May 18].
- BLS. 2020. Effects of COVID-19 pandemic on employment and unemployment statistics. Washington (DC): U.S. Department of Labor, Bureau of Labor Statistics; [updated 2020 Jul 29; accessed 2020 Jul 31]. <https://www.bls.gov/covid19/effects-of-covid-19-pandemic-on-employment-and-unemployment-statistics.htm>.

- Blunden J, Boyer T. 2021. State of the climate in 2020. *Bulletin of the American Meteorological Society*. 102(8):Si-S475. doi:10.1175/2021BAMSStateoftheClimate.1.
- Bociu I, Shin B, Wells WB, Kostka JE, Konstantinidis KT, Huettel M. 2019. Decomposition of sediment-oil-agglomerates in a Gulf of Mexico sandy beach. *Scientific Reports*. 9(1):10071. doi:10.1038/s41598-019-46301-w.
- BOEM. 2016a. 2017-2022 outer continental shelf oil and gas leasing: proposed final program. Herndon (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 269 p. [accessed 2020 Aug 3]. <https://www.boem.gov/sites/default/files/oil-and-gas-energy-program/Leasing/Five-Year-Program/2017-2022/2017-2022-OCS-Oil-and-Gas-Leasing-PFP.pdf>.
- BOEM. 2016b. Outer continental shelf oil and gas leasing program: 2017-2022. Final programmatic environmental impact statement, volumes I-II. Washington (DC): U.S. Department of the Interior, Bureau of Ocean Energy Management. 938 p. Report No.: OCS EIS/EA BOEM 2016-060. [accessed 2018 Jun 1].
- BOEM. 2016c. Outer continental shelf oil and gas leasing program: 2017-2022. Final programmatic environmental impact statement. Volume II: appendices A-J. Herndon (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 578 p. Report No.: OCS EIS/EA BOEM 2016-060. <https://www.boem.gov/sites/default/files/documents/oil-gas-energy/national-program/Outer%20Continental%20Shelf%20Oil%20and%20Gas%20Leasing%20Program%2C%202017-2022%20Final%20Programmatic%20EIS%20Volume%20II%20Appendices.pdf>.
- BOEM. 2016d. Outer continental shelf oil and gas leasing program: 2017-2022. Final programmatic environmental impact statement: Volume I: chapters 1-6. Washington (DC): U.S. Department of the Interior, Bureau of Ocean Energy Management. 360 p. Report No.: OCS EIS/EA BOEM 2016-060. [accessed 2020 Nov 12]. [https://www.boem.gov/sites/default/files/oil-and-gas-energy-program/Leasing/Five-Year-Program/2012-2017/BOEMOceanInfo/fpeis\\_volume1.pdf](https://www.boem.gov/sites/default/files/oil-and-gas-energy-program/Leasing/Five-Year-Program/2012-2017/BOEMOceanInfo/fpeis_volume1.pdf).
- BOEM. 2017a. Gulf of Mexico OCS lease sale, final supplemental environmental impact statement 2018. Volumes I & II. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 895 p. Report No.: OCS EIS/EA BOEM 2017-074. [https://permanent.fdlp.gov/gpo88797/https://www.boem.gov/BOEM-EIS-2017-074-v1\\_.pdf](https://permanent.fdlp.gov/gpo88797/https://www.boem.gov/BOEM-EIS-2017-074-v1_.pdf).
- BOEM. 2017b. Gulf of Mexico OCS oil and gas lease sales: 2017-2022. Gulf of Mexico lease sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261: final multisale environmental impact statement. Volumes I-III. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 1858 p. Report No.: OCS EIS/EA BOEM 2017-009. <https://www.boem.gov/environment/environmental-assessment/nepa-activities-gulf-mexico>.

- BOEM. 2017c. Gulf of Mexico OCS proposed geological and geophysical activities: Western, Central, and Eastern planning areas. Final programmatic environmental impact statement. Volumes I-IV. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 2592 p. Report No.: OCS EIS/EA BOEM 2017-051. [accessed 2020 Sep 21]. <https://www.boem.gov/regions/gulf-mexico-ocs-region/resource-evaluation/gulf-mexico-geological-and-geophysical-gg>.
- BOEM. 2017d. Record of decision and approval of the 2017-2022 outer continental shelf oil and gas leasing program. Washington (DC): U.S. Department of the Interior, Bureau of Ocean Energy Management. 3 p. <https://www.boem.gov/sites/default/files/oil-and-gas-energy-program/Leasing/Five-Year-Program/2017-2022/2017-2022-Record-of-Decision.pdf>.
- BOEM. 2020a. Gulf of Mexico OCS regulatory framework. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, New Orleans Office. 68 p. Report No.: OCS Report BOEM 2020-059. [accessed 2021 Nov 15]. <https://www.boem.gov/sites/default/files/documents/about-boem/GOM-OCS-Regulatory-Framework.pdf>.
- BOEM. 2020b. HPHT production in the Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, New Orleans Office. Report No.: OCS Report BOEM 2020-060. [accessed 2022 Dec 1]. <https://www.boem.gov/sites/default/files/documents/about-boem/HPHT-Production-in-the-GOM.pdf>.
- BOEM. 2020c. Record of decision for Gulf of Mexico Outer Continental Shelf proposed geological and geophysical activities; western, central, and eastern planning areas; final programmatic environmental impact statement. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 12 p. [accessed 2021 Sep 29]. <https://www.boem.gov/gom-g-g-rod>.
- BOEM. 2020d. Royalty relief information. Washington (DC): U.S. Department of the Interior, Bureau of Ocean Energy Management; [accessed 2020 Jul 28]. <https://www.boem.gov/oil-gas-energy/energy-economics/royalty-relief/royalty-relief-information>.
- BOEM. 2021a. Biological environmental background report for the Gulf of Mexico OCS region. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico Regional Office. 298 p. Report No.: OCS Report BOEM 2021-015. [accessed 2021 Jul 29]. <https://www.boem.gov/sites/default/files/documents/environment/Biological%20Environmental%20Background%20Report%20for%20the%20GOM.pdf>.
- BOEM. 2021b. Lease sales and fair market value. Washington (DC): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Public Affairs; [accessed 2021 Sep 24]. <https://www.boem.gov/oil-gas-energy/energy-economics/fair-market-value>.
- BOEM. 2021c. National assessment of undiscovered oil and gas resources of the U.S. outer continental shelf. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 112 p. Report No.: OCS Report BOEM 2021-071.

- BOEM. 2021d. Outer continental shelf 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. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 364 p. Report No.: OCS Report BOEM 2021-007. [accessed 2021 Oct 26]. <https://www.boem.gov/sites/default/files/documents/environment/GOM%20Catastrophic%20Spill%20Event%20Analysis%202021.pdf>.
- BOEM. 2021e. Wakes across the Gulf: historic sea lanes and shipwrecks in the Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Environment, Gulf of Mexico Regional Office. 66 p. Report No.: Technical Report BOEM 2021-057. [accessed 2021 Oct 15]. <https://www.boem.gov/sites/default/files/documents/regions/gulf-mexico-ocs-region/office-environment/TR-BOEM-2021-057.pdf>.
- BOEM. 2022a. 2023-2028 national outer continental shelf oil and gas leasing proposed program. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. Report No.: BOEM OCS EIS/EA 2022-033. [accessed 2022 Dec 12]. [https://www.boem.gov/sites/default/files/documents/oil-gas-energy/national-program/2023-2028\\_Proposed%20Program\\_July2022.pdf](https://www.boem.gov/sites/default/files/documents/oil-gas-energy/national-program/2023-2028_Proposed%20Program_July2022.pdf).
- BOEM. 2022b. Essential fish habitat assessment for oil and gas activities in the Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico Regional Office. 107 p. Report No.: BOEM 2022-032.
- BOEM. 2022c. Gulf of Mexico OCS oil and gas leasing greenhouse gas emissions and social cost analysis: Addendum to the Gulf of Mexico Lease Sales 259 and 261 draft supplemental EIS and technical report. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management. Report No.: Technical Report BOEM 2022-056.
- BOEM. 2022d. Oil and gas operations reports - Part A (OGOR-A), well production. [accessed 2020 Dec 1]. <https://www.data.bsee.gov/Main/HtmlPage.aspx?page=ogorAPDF>.
- Bolser DG, Egerton JP, Grüss A, Loughran T, Beyea T, McCain K, Erisman BE. 2020. Environmental and structural drivers of fish distributions among petroleum platforms across the U.S. Gulf of Mexico. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science*. 12:142-163. doi:10.1002/mcf2.10116.
- Bourque JR, Demopoulos AWJ. 2018. The influence of different deep-sea coral habitats on sediment macrofaunal community structure and function. *PeerJ*. 6(7):e5276. doi:10.7717/peerj.5276.
- Bourque JR, Demopoulos AWJ. 2019. Quantifying changes to infaunal communities associated with several deep-sea coral habitats in the Gulf of Mexico and their potential recovery from the *Deepwater Horizon* oil spill. New Orleans, LA: U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 43 p. Report No.: OCS Study BOEM 2019-033. [https://espis.boem.gov/final%20reports/BOEM\\_2019-033.pdf](https://espis.boem.gov/final%20reports/BOEM_2019-033.pdf).

- Bracco A, Liu G, Galaska MP, Quattrini AM, Herrera S. 2019. Integrating physical circulation models and genetic approaches to investigate population connectivity in deep-sea corals. *Journal of Marine Systems*. 198:103189. doi:10.1016/j.jmarsys.2019.103189.
- Brooks MT, Coles VJ, Hood RR, Gower JFR. 2018. Factors controlling the seasonal distribution of pelagic *Sargassum*. *Marine Ecology Progress Series*. 599:1-18. doi:10.3354/meps12646.
- Bruce B, Bradford R, Foster S, Lee K, Lansdell M, Cooper S, Przeslawski R. 2018. Quantifying fish behaviour and commercial catch rates in relation to a marine seismic survey. *Marine Environmental Research*. 140:18-30. doi:10.1016/j.marenvres.2018.05.005.
- BSEE. 2015. Bureau of Safety and Environmental Enforcement: annual report 2015. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement. 55 p. [accessed 2021 Oct 12]. [https://www.bsee.gov/sites/bsee.gov/files/bsee\\_final\\_annual\\_report\\_2015rev.pdf](https://www.bsee.gov/sites/bsee.gov/files/bsee_final_annual_report_2015rev.pdf).
- BSEE. 2016. Bureau of Safety and Environmental Enforcement: annual report 2016. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement. 46 p. [accessed 2021 Jul 28]. [https://www.bsee.gov/sites/bsee.gov/files/bsee\\_2016\\_annual\\_report\\_v6b.pdf](https://www.bsee.gov/sites/bsee.gov/files/bsee_2016_annual_report_v6b.pdf).
- BSEE. 2017a. BSEE Tropical Storm Cindy activity statistics: June 22, 2017. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2017 Jun 22; accessed 2021 Sep 19]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-tropical-storm-cindy-activity-0>.
- BSEE. 2017b. BSEE Tropical Storm Harvey activity statistics final update: Sept. 4, 2017. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2017 Sep 4; accessed 2021 Sep 19]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/see-tropical-storm-harvey-activity>.
- BSEE. 2017c. BSEE Tropical Storm Nate activity final report: October 14, 2017. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2017 Oct 14; accessed 2021 Sep 19]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-tropical-storm-nate-activity-final>.
- BSEE. 2018a. BSEE reports final Tropical Storm Michael statistics: Oct. 16, 2018. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2018 Oct 16; accessed 2020 Oct 22]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-reports-final-tropical-storm>.
- BSEE. 2018b. BSEE Tropical Storm Gordon activity final report: Sept. 6, 2018. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2018 Sep 6; accessed 2021 Sep 19]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-tropical-storm-gordon-activity>.
- BSEE. 2018c. Final environmental assessment. Final rulemaking: oil and gas and sulphur operations on the outer continental shelf—oil and gas production safety systems—revisions. Washington

- (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement. p. 52. [accessed 2021 Oct 25]. <https://www.regulations.gov/document/BSEE-2017-0008-0748>.
- BSEE. 2018d. Finding of no significant impact. Final oil and gas production safety systems rule. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement. p. 2. <https://www.regulations.gov/document/BSEE-2017-0008-0748>.
- BSEE. 2019a. BSEE Tropical Storm Barry activity final report: July 20, 2019. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2019 Jul 20; accessed 2020 Jul 31]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-tropical-storm-barry-activity-final>.
- BSEE. 2019b. Final environmental assessment. Rulemaking: oil and gas and sulfur operations in the outer continental shelf — blowout preventer systems and well control revisions. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement. p. 19. [accessed 2021 Oct 25]. <https://www.regulations.gov/document/BSEE-2018-0002-46820>.
- BSEE. 2019c. Finding of no significant impact. Rulemaking: oil and gas and sulfur operations in the outer continental shelf — blowout preventer systems and well control revisions. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement. p. 2. [accessed 2021 Oct 25]. <https://www.regulations.gov/document/BSEE-2018-0002-46819>.
- BSEE. 2019d. Investigation of October 11, 2017 flowline jumper failure. Lease OCS-G 24055 Mississippi Canyon block 209, Gulf of Mexico region, New Orleans district. December 30, 2019. New Orleans (LA): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement. 20 p. Report No.: BSEE Panel Report 2019-002.
- BSEE. 2020a. BSEE Hurricane Delta activity final report: October 16, 2020. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2020 Oct 16; accessed 2021 Oct 12]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-hurricane-delta-activity-final>.
- BSEE. 2020b. BSEE Hurricane Laura activity final report: September 5, 2020. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2020 Sep 5; accessed 2021 Oct 12]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-hurricane-laura-activity-final>.
- BSEE. 2020c. BSEE Hurricane Sally activity final report: September 22, 2020. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2020 Sep 22; accessed 2021 Oct 12]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-hurricane-sally-activity-final>.

- BSEE. 2020d. BSEE Hurricane Zeta activity final report: November 4, 2020. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2020 Nov 4; accessed 2021 Oct 12]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-hurricane-zeta-activity-final>.
- BSEE. 2020e. BSEE Tropical Storm Cristobal activity final report: June 12, 2020. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2020 Jun 12; accessed 2020 Jul 31]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-tropical-storm-cristobal-activity>.
- BSEE. 2020f. Statistics for decommissioned platforms on the OCS. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [accessed 2020 Jul 31]. <https://www.bsee.gov/what-we-do/environmental-focuses/decommissioning/decommissioning-statistics>.
- BSEE. 2021. BSEE Hurricane Ida activity final report: September 23, 2021. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [updated 2021 Sep 23; accessed 2021 Oct 12]. <https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-hurricane-ida-activity-final-report>.
- BSEE. 2022. Offshore incident statistics. Washington (DC): U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement; [accessed 2022 Jan 12]. <https://www.bsee.gov/stats-facts/offshore-incident-statistics>.
- Burgess MG, Ritchie J, Shapland J, Pielke Jr. R. 2020. IPCC baseline scenarios have over-projected CO<sub>2</sub> emissions and economic growth. *Environmental Research Letters*. 16(1):014016. doi:10.1088/1748-9326/abcdd2.
- Busby G. 2020 May 8. Alabama beach businesses work to recover visitor dollars lost to COVID-19. Alabama Public Radio. [accessed 2020 Jul 27]. <https://www.apr.org/post/alabama-beach-businesses-work-recover-visitor-dollars-lost-covid-19>.
- Byrd J. 2019. Fishery disaster due to the opening of the Bonnet Carré Spillway. *Water Log*. 39(4):10-12.
- Byrnes MR, Davis Jr. RA, Kennicutt II MC, Kneib RT, Mendelssohn IA, Rowe GT, Tunnell Jr. JW, Vittor BA, Ward CH. 2017. Habitats and biota of the Gulf of Mexico: before the Deepwater Horizon oil spill. Volume 1: water quality, sediments, sediment contaminants, oil and gas seeps, coastal habitats, offshore plankton and benthos, and shellfish. New York (NY): Springer. 917 p. [accessed 2021 Oct 8]. <https://link.springer.com/content/pdf/10.1007%2F978-1-4939-3447-8.pdf>.
- Bytingsvik J, Parkerton TF, Guyomarch J, Tassara L, LeFloch S, Arnold WR, Brander SM, Volety A, Camus L. 2020. The sensitivity of the deepsea species northern shrimp (*Pandalus borealis*) and the cold-water coral (*Lophelia pertusa*) to oil-associated aromatic compounds, dispersant, and Alaskan North Slope crude oil. *Marine Pollution Bulletin*. 156:111202. doi:10.1016/j.marpolbul.2020.111202.

- Camp EV, Ahrens RNM, Crandall C, Lorenzen K. 2018. Angler travel distances: implications for spatial approaches to marine recreational fisheries governance. *Marine Policy*. 87:263-274. doi:10.1016/j.marpol.2017.10.003.
- Carroll M, Gentner B, Larkin S, Quigley K, Perlot N, Dehner L, Kroetz A. 2016. An analysis of the impacts of the *Deepwater Horizon* oil spill on the Gulf of Mexico seafood industry. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 196 p. Report No.: OCS Study BOEM 2016-020. [accessed 2020 Oct 5]. <https://espis.boem.gov/final%20reports/5518.pdf>.
- Caudle TL, Paine JG, Andrews JR, Saylam K. 2019. Beach, dune, and nearshore analysis of Southern Texas Gulf Coast using Chiroptera LIDAR and imaging system. *Journal of Coastal Research*. 35(2):251-268. doi:10.2112/JCOASTRES-D-18-00069.1.
- CDC. 2020. CDC data show disproportionate COVID-19 impact in American Indian/Alaska Native populations. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. [accessed 2021 Oct 26]. <https://www.cdc.gov/media/releases/2020/p0819-covid-19-impact-american-indian-alaska-native.html>.
- CDC. 2021a. COVID data tracker. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; [accessed 2021 Oct 4]. <https://covid.cdc.gov/covid-data-tracker/#datatracker-home>.
- CDC. 2021b. Illness and symptoms: marine (saltwater) algal blooms. Atlanta (GA): U.S. Department of Health & Human Services, Centers for Disease Control and Prevention; [updated 2021 Apr 19; accessed 2022 Jan 31]. <https://www.cdc.gov/habs/illness-symptoms-marine.html>.
- Celata MA. 2017. Official letter announcing the development of a 2019-2024 National Outer Continental Shelf Oil and Gas Leasing Program. Washington (DC): U.S. Department of the Interior, Bureau of Ocean Energy Management.
- CEQ. 1981. Memorandum for general counsels, NEPA liaisons and participants in scoping. April 30, 1981. Washington (DC): Executive Office of the President of the United States, Council on Environmental Quality. 17 p. [accessed 2021 Oct 7]. <https://ceq.doe.gov/dtSearch/dtisapi6.dll?cmd=getdoc&DocId=88&Index=%2a%7baa6ef58232bb83cd704a3f43820d33a0%7d%20CEQ&HitCount=3&hits=17+18+19+&mc=0&SearchForm=%2fCEQSearch%5fform%2html>.
- CEQ. 2010. Report regarding the Minerals Management Service's National Environmental Policy Act policies, practices, and procedures as they relate to outer continental shelf oil and gas exploration and development. Washington (DC): Executive Office of the President of the United States, Council on Environmental Quality. 41 p. [accessed 2022 Jan 24]. <https://obamawhitehouse.archives.gov/sites/default/files/microsites/ceq/20100816-ceq-mms-ocs-nepa.pdf>.

- Chakraborty J, Grineski SE, Collins TW. 2019. Hurricane Harvey and people with disabilities: disproportionate exposure to flooding in Houston, Texas. *Social Science & Medicine*. 226:176-181. doi:10.1016/j.socscimed.2019.02.039.
- Chin C, Church J. 2010. Field report: Fort Livingston, Grand Terre Island, Jefferson Parish, Louisiana. Site visit: June 16, 2010. Natchitoches (LA): U.S. Department of the Interior, National Park Service. 7 p. [accessed 2021 Aug 12]. <https://www.ncptt.nps.gov/wp-content/uploads/2010-03.pdf>.
- Civis Analytics, Dewberry Engineers, Knudson LP. 2019. The Harvey data project: city of Houston housing and community development department. Houston (TX): City of Houston Housing and Community Development Department. 17 p. [accessed 2020 Oct 16]. [https://www.civisanalytics.com/wp-content/uploads/2019/03/CityOfHouston\\_Report\\_Website-1.pdf](https://www.civisanalytics.com/wp-content/uploads/2019/03/CityOfHouston_Report_Website-1.pdf).
- Collins TW, Grineski SE, Chakraborty J, Flores AB. 2019. Environmental injustice and Hurricane Harvey: a household-level study of socially disparate flood exposures in Greater Houston, Texas, USA. *Environmental Research*. 179(A):108772. doi:10.1016/j.envres.2019.108772.
- Colten CE. 2019. Adaptive transitions: the long-term perspective on humans in changing coastal settings. *Geographical Review*. 109(3):416-435. doi:10.1111/gere.12345.
- Colten CE, Grismore AM. 2018. Can public policy perpetuate the memory of disasters? In: Lakhani V, de Smalen E, editors. *RCC perspectives: transformations in environment and society Sites of remembering: landscapes, lessons, policies*. Munich (DE): Environment & Society Portal, Rachel Carson Center for Environment and Society. p. 43-51. [accessed 2020 Oct 20]. [http://www.environmentandsociety.org/sites/default/files/05\\_colten\\_and\\_grismore.pdf](http://www.environmentandsociety.org/sites/default/files/05_colten_and_grismore.pdf).
- Colten CE, Simms JRZ, Grismore AA, Hemmerling SA. 2018. Social justice and mobility in coastal Louisiana, USA. *Regional Environmental Change*. 18:371-383. doi:10.1007/s10113-017-1115-7.
- Continental Shelf Associates Inc., Texas A&M University Geochemical and Environmental Research Group. 2001. Mississippi/Alabama pinnacle trend ecosystem monitoring, final synthesis report. New Orleans (LA): U.S. Department of the Interior, Geological Survey, Biological Resources Division, Minerals Management Service, Gulf of Mexico OCS Region. 481 p. Report No.: USGS/BRD/BSR 2001-0007, OCS Study MMS-2001-080. [accessed 2020 Dec 23]. <http://purl.access.gpo.gov/GPO/LPS90176>.
- Cordes EE, Jones DOB, Schlacher TA, Amon DJ, Bernardino AF, Brooke S, Carney R, DeLeo DM, Dunlop KM, Escobar-Briones EG, et al. 2016. Environmental impacts of the deep-water oil and gas industry: a review to guide management strategies. *Frontiers in Environmental Science*. 4:58. doi:10.3389/fenvs.2016.00058.
- Croissant SA, Lin Y-I, Shearer JJ, Prochaska J, Phillips-Savoy A, Gee J, Jackson D, Panettieri Jr. RA, Howarth M, Sullivan J, et al. 2017. The Gulf Coast Health Alliance: health risks related to the Macondo spill (GC-HARMS) study: self reported health effects. *International Journal of Environmental Research and Public Health*. 14(11):1328. doi:10.3390/ijerph14111328.

- Cronin JP, Tirpak BE, Dale LL, Robenski VL, Tirpak JM, Marcot BG. 2021. Strategic habitat conservation for beach mice: estimating management scenario efficiencies. *The Journal of Wildlife Management*. 85(2):324-339. doi:10.1002/jwmg.21983.
- Crossett K, Ache B, Pacheco P, Haber K. 2013. National coastal population report, population trends from 1970 to 2020. Washington (DC): U.S. Department of Commerce, National Oceanic and Atmospheric Administration; Census Bureau. 22 p. [accessed 2020 Dec 3]. <http://oceanservice.noaa.gov/facts/coastal-population-report.pdf>.
- Cruz Y. 2020. SBA offering assistance to businesses affected by harmful algae bloom. WLOX. 2020 Jan 17. [accessed 2020 Feb 5]. <https://www.wlox.com/2020/01/17/sba-offering-assistance-businesses-affected-by-harmful-algae-bloom/>.
- CSA Ocean Sciences Inc., LGL Ecological Research Associates Inc. 2014. Gulf of Mexico cooling water intake structure entrainment monitoring study, final report. Houston (TX): Cooling Water Intake Structure Steering Group, ExxonMobil Upstream Research Company. 228 p.
- Cullinane Thomas C, Koontz L. 2021. 2020 national park visitor spending effects: economic contributions to local communities, states, and the nation. Fort Collins (CO): U.S. Department of the Interior, National Park Service, Natural Resource Stewardship and Science. 70 p. Report No.: NPS/NRSS/EQD/NRR-2021/2259. [https://www.nps.gov/nature/customcf/nps\\_data\\_visualization/docs/nps\\_2020\\_visitor\\_spending\\_effects.pdf](https://www.nps.gov/nature/customcf/nps_data_visualization/docs/nps_2020_visitor_spending_effects.pdf).
- Cullinane Thomas C, Koontz L, Cornachione E. 2019. 2018 national park visitor spending effects: economic contributions to local communities, states, and the nation. Fort Collins (CO): U.S. Department of the Interior, National Park Service, Natural Resource Stewardship and Science. 64 p. Report No.: NPS/NRSS/EQD/NRR--2019/1922. [accessed 2020 Oct 7]. [https://www.nps.gov/nature/customcf/NPS\\_Data\\_Visualization/docs/NPS\\_2018\\_Visitor\\_Spending\\_Effects.pdf](https://www.nps.gov/nature/customcf/NPS_Data_Visualization/docs/NPS_2018_Visitor_Spending_Effects.pdf).
- Dahl KA, Patterson III WF. 2014. Habitat-specific density and diet of rapidly expanding invasive red lionfish, *Pterois volitans*, populations in the Northern Gulf of Mexico. *PLoS ONE*. 9(8):e105852. doi:10.1371/journal.pone.0105852.
- Dahl KA, Spanger-Siegfried E, Caldas A, Udvardy S. 2017. Effective inundation of continental United States communities with 21st century sea level rise. *Elementa Science of the Anthropocene*. 5:37. doi:10.1525/elementa.234.
- Davis RW, Evans WE, Würsig B. 2000. Cetaceans, sea turtles, and seabirds in the Northern Gulf of Mexico: distribution, abundance and habitat associations. Volume II: technical report. New Orleans (LA): U.S. Department of the Interior, U.S. Geological Survey, Biological Resources Division, Minerals Management Service, Gulf of Mexico OCS Region. 346 p. Report No.: USGS/BRD/CR-1999-0006, OCS Study MMS 2000-003.

- Dean KM, Bursian SJ, Cacela D, Carney MW, Cunningham FL, Dorr B, Hanson-Dorr KC, Healy KA, Horak KE, Link JE, et al. 2017. Changes in white cell estimates and plasma chemistry measurements following oral or external dosing of double-crested cormorants, *Phalacrocorax auritus*, with artificially weathered MC252 oil. *Ecotoxicology and Environmental Safety*. 146:40-51. doi:10.1016/j.ecoenv.2017.08.007.
- Deepwater Horizon Natural Resource Damage Assessment Trustees. 2016. *Deepwater Horizon* oil spill: final programmatic damage assessment and restoration plan and final programmatic environmental impact statement. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Response and Restoration. 1659 p. [accessed 2020 Sep]. <http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan/>.
- DeLeo DM, Glazier A, Herrera S, Barkman A, Cordes EE. 2021. Transcriptomic responses of deep-sea corals experimentally exposed to crude oil and dispersant. *Frontiers in Marine Science*. 8:649909. doi:10.3389/fmars.2021.649909.
- Derouen ZC, Peterson MR, Wang H-H, Grant WE. 2020. Determinants of *Tubastraea coccinea* invasion and likelihood of further expansion in the northern Gulf of Mexico. *Marine Biodiversity*. 50:101. doi:10.1007/s12526-020-01126-z.
- DeYoung SE, Lewis DC, Seponski DM, Augustine DA, Phal M. 2019. Disaster preparedness and well-being among Cambodian- and Laotian-Americans. *Disaster Prevention and Management*. 29(4):425-443. doi:10.1108/DPM-01-2019-0034.
- Díaz MC, Pomponi SA. 2018. New Poecilosclerida from mesophotic coral reefs and the deep-sea escarpment in the Pulley Ridge region, Eastern Gulf of Mexico: *Discorhabdella ruetzleri* n.sp. (Crambeidae) and *Hymedesmia (Hymedesmia) vaceleti* n.sp. (Hymedesmiidae). *Zootaxa*. 4466(1):229-237. doi:10.11646/zootaxa.4466.1.17.
- Dismukes DE. 2020. Irreparable changes are coming to the American oil and gas industry. 10/12 Industry Report. Baton Rouge (LA): Louisiana Business Inc. p. 55. [accessed 2020 Jul 30]. [https://issuu.com/batonrougebusinessreport/docs/10\\_12\\_industry\\_report\\_spring\\_2020\\_fr=sMTQ2NTExNTM4OTg](https://issuu.com/batonrougebusinessreport/docs/10_12_industry_report_spring_2020_fr=sMTQ2NTExNTM4OTg).
- Dismukes DE, Upton Jr. GB. 2020. 2021 Gulf Coast energy outlook. Baton Rouge (LA): Louisiana State University, Center for Energy Studies. 68 p. [accessed 2021 Sep 24]. [https://www.lsu.edu/ces/publications/2020/gulf-coast-energy-outlook-2021-df\\_finaldigital2.pdf](https://www.lsu.edu/ces/publications/2020/gulf-coast-energy-outlook-2021-df_finaldigital2.pdf).
- DOC. 2019. Secretary of Commerce approves disaster declarations for American fishing communities. Washington (DC): U.S. Department of Commerce, Office of Public Affairs; [updated 2019 Sep 25; accessed 2022 Jan 25]. <https://2017-2021.commerce.gov/news/press-releases/2019/09/secretary-commerce-approves-disaster-declarations-american-fishing.html>.

- DOE. 2022a. The Inflation Reduction Act drives significant emissions reductions and positions America to reach our climate goals. Washington (DC): U.S. Department of Energy, Office of Policy. 6 p. Report No.: DOE/OP-0018. [accessed 2022 Dec 22]. [https://www.energy.gov/sites/default/files/2022-08/8.18%20InflationReductionAct\\_Factsheet\\_Final.pdf](https://www.energy.gov/sites/default/files/2022-08/8.18%20InflationReductionAct_Factsheet_Final.pdf).
- DOE. 2022b. Methodological appendix. Washington (DC): U.S. Department of Energy, Office of Policy; [accessed 2022 Dec 12]. <https://www.energy.gov/policy/methodological-appendix>.
- DOI. 2021. Economic contributions report, fiscal year 2019. Washington (DC): U.S. Department of the Interior, Office of Policy Analysis. 44 p. [https://doi.sciencebase.gov/doivv/files/2019/pdf/Econ%20Report%202019\\_FINAL.pdf](https://doi.sciencebase.gov/doivv/files/2019/pdf/Econ%20Report%202019_FINAL.pdf).
- Dorr BS, Hanson-Dorr KC, Assadi-Porter FM, Selen ES, Healy KA, Horak KE. 2019. Effects of repeated sublethal external exposure to Deepwater Horizon oil on the avian metabolome. *Scientific Reports*. 9:371. doi:10.1038/s41598-018-36688-3.
- Doyle H. 2018. US Gulf oil terminal projects signal major export growth. Reuters. 2018 Sep 7. <http://analysis.petchem-update.com/supply-chain-logistics/us-gulf-oil-terminal-projects-signal-major-export-growth>.
- Druzin R. 2018a. Offshore crude oil terminal could cost Corpus Christi port millions. *Houston Chronicle*. 2018 Sep 10. [accessed 2021 Oct 15]. <https://web.archive.org/web/20180910174644/https://www.chron.com/business/energy/article/Offshore-crude-oil-terminal-could-cost-Corpus-13217825.php>.
- Druzin R. 2018b. With pipelines full, oil and gas companies turning to trucks, rail. *Houston Chronicle*. 2018 Sep 4. [accessed 2021 Oct 15]. <https://www.houstonchronicle.com/business/energy/article/With-pipelines-full-oil-and-gas-companies-13197758.php>.
- Duarte CM, Chapuis L, Collin SP, Costa DP, Devassy RP, Eguiluz VM, Erbe C, Gordon TAC, Halpern BS, Harding HR, et al. 2021. The soundscape of the Anthropocene ocean. *Science*. 371(6529):eaba4658. doi:10.1126/science.aba4658.
- Duncombe J. 2021. What five graphs from the U.N. climate report reveal about our path to halting climate change. *Eos Science News by AGU*. 2021 Aug 9. <https://eos.org/articles/what-five-graphs-from-the-u-n-climate-report-reveal-about-our-path-to-halting-climate-change>.
- Eckle P, Burgherr P, Michaux E. 2012. Risk of large oil spills: a statistical analysis in the aftermath of Deepwater Horizon. *Environmental Science and Technology*. 46:13002-13008.
- Elliott BW, Read AJ, Godley BJ, Nelms SE, Nowacek DP. 2019a. Critical information gaps remain in understanding impacts of industrial seismic surveys on marine vertebrates. *Endangered Species Research*. 39:247-254. doi:10.3354/esr00968.
- Elliott JR, Korver-Glenn E, Bolger D. 2019b. The successive nature of city parks: making and remaking unequal access over time. *City & Community*. 18(1):109-127. doi:10.1111/cico.12366.

- Elliott RJR, Schumacher I, Withagen C. 2020. Suggestions for a Covid-19 post-pandemic research agenda in environmental economics. *Environmental and Resource Economics*. 76(4):1187-1213. doi:10.1007/s10640-020-00478-1.
- Energy Information Administration. 2018a. EIA now publishes petroleum export data by U.S. region of origin and destination country. Washington (DC): U.S. Department of Energy, U.S. Energy Information Administration; [updated 2018 Jun 26; accessed 2021 Oct 15]. <https://www.eia.gov/todayinenergy/detail.php?id=36552>.
- Energy Information Administration. 2018b. Frequently asked questions: when was the last refinery built in the United States? Washington (DC): U.S. Department of Energy, U.S. Energy Information Administration; [updated 2018 Jun 29; accessed 2018 Sep 11]. <https://www.eia.gov/tools/faqs/faq.php?id=29&t=6>.
- Energy Information Administration. 2020. COVID-19 mitigation efforts result in the lowest U.S. petroleum consumption in decades. Washington (DC): U.S. Department of Energy, U.S. Energy Information Administration; [updated 2020 Dec 30; accessed 2021 Oct 19]. <https://www.eia.gov/todayinenergy/detail.php?id=46141>.
- Energy Information Administration. 2021a. Annual energy outlook 2021 with projections to 2050: narrative. Washington (DC): U.S. Department of Energy, Energy Information Administration. 33 p. Report No.: AEO2021 Narrative. [accessed 2021 Oct 25]. [https://www.eia.gov/outlooks/aeo/pdf/AEO\\_Narrative\\_2021.pdf](https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf).
- Energy Information Administration. 2021b. Hurricane Ida disrupted crude oil production and refining activity. Washington (DC): U.S. Department of Energy, U.S. Energy Information Administration; [updated 2021 Sep 16; accessed 2021 Oct 19]. <https://www.eia.gov/todayinenergy/detail.php?id=49576>.
- Energy Information Administration. 2021c. Short-term energy outlook: September 2021. Washington (DC): U.S. Department of Energy, U.S. Energy Information Administration. 52 p. <https://www.eia.gov/outlooks/steo/archives/Sep21.pdf>.
- Energy Information Administration. 2021d. U.S. LNG exports in EIA's AEO2021 side cases vary with crude oil, natural gas prices. Washington (DC): U.S. Department of Energy, U.S. Energy Information Administration; [updated 2021 Mar 22; accessed 2021 Oct 15]. <https://www.eia.gov/todayinenergy/detail.php?id=47236>.
- Ertfemeijer PLA, Lewis III RRR. 2006. Environmental impacts of dredging on seagrasses: a review. *Marine Pollution Bulletin*. 52(12):1553-1572. doi:10.1016/j.marpolbul.2006.09.006.
- Evans AM. 2016. Examining and testing potential prehistoric archaeological features on the Gulf of Mexico outer continental shelf. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 376 p. Report No.: OCS Study BOEM 2016-015. [accessed 2020 Dec 22]. <https://espis.boem.gov/final%20reports/5557.pdf>.
- Evans MJ, Malcom JW. 2020. Supporting habitat conservation with automated change detection in Google Earth engine. *Conservation Biology*. 35(4):1151-1161. doi:10.1111/cobi.13680.

- Farkas J, Altin D, Hansen BH, Øverjordet IB, Nordtug T. 2020. Acute and long-term effects of anionic polyacrylamide (APAM) on different developmental stages of two marine copepod species. *Chemosphere*. 257:127259. doi:10.1016/j.chemosphere.2020.127259.
- Farmer NA, Froeschke JT, Records DL. 2020. Forecasting for recreational fisheries management: a derby fishery case study with Gulf of Mexico red snapper. *ICES Journal of Marine Science*. 77(6):2265-2284. doi:10.1093/icesjms/fsz238.
- FERC. 2018a. North American LNG export terminals - proposed as of July 13, 2018. Washington (DC): U.S. Department of Energy, Federal Energy Regulatory Commission; [accessed 2018 Oct 12]. <https://www.ferc.gov/industries/gas/indus-act/lng/lng-proposed-export.pdf?csrt=9625520368890159575>.
- FERC. 2018b. North American LNG import/export terminals - approved as of July 2, 2018. Washington (DC): U.S. Department of Energy, Federal Energy Regulatory Commission; [accessed 2019 Oct 12]. <https://www.ferc.gov/industries/gas/indus-act/lng/lng-approved.pdf?csrt=9625520368890159575>.
- Fernández A, Sierra E, Díaz-Delgado J, Sacchini S, Sánchez-Paz Y, Suárez-Santana C, Arregui M, Arbelo M, Bernaldo de Quirós Y. 2017. Deadly acute decompression sickness in Risso's dolphins. *Scientific Reports*. 7:13621. doi:10.1038/s41598-017-14038-z.
- Fitzhugh J. 2019. Algae water advisories lead to layoffs by beach vendor. WLOX. [accessed 2019 Sep 13]. 2019 Jul 9. <https://www.wlox.com/2019/07/10/algae-water-advisories-lead-layoffs-by-beach-vendor/>.
- Frasier KE, Solsona-Berga A, Stokes L, Hildebrand JA. 2020. Impacts of the *Deepwater Horizon* oil spill on marine mammals and sea turtles. In: Murawski SA, Ainsworth CH, Gilbert S, Hollander DJ, Paris CB, Schlüter M, Wetzel DL, editors. *Deep oil spills: facts, fate, and effects*. Cham (CH): Springer. Chapter 26; p. 431-462.
- Friedman L. 2021. Biden administration makes first major move to regulate greenhouse gases. *The New York Times*. 2021 Sep 23. [accessed 2021 Sep 25]. <https://www.nytimes.com/2021/09/23/climate/hydrofluorocarbons-hfc-climate-change.html>.
- Fugro-McClelland Marine Geosciences Inc. 2007. Geotechnical investigation: excavation project, Block 20, Mississippi Canyon Area Gulf of Mexico; geology and engineering analyses. Field and standard laboratory data report. FMMG report to Taylor Energy Company. Houston (TX): Fugro-McClelland Marine Geosciences, Inc. Report no. 0201-6235; [accessed 2020 Nov 29]. <https://mc20response.com/wp-content/uploads/2019/01/2007-07.25-Fugro-0201-6235-Geo-Invest-of-MC20.pdf>.
- Fujiwara M, Martinez-Andrade F, Wells RJD, Fisher M, Pawluk M, Livernois MC. 2019. Climate-related factors cause changes in the diversity of fish and invertebrates in subtropical coast of the Gulf of Mexico. *Communications Biology*. 2:403. doi:10.1038/s42003-019-0650-9.

- FWS. 2018. Biological opinion on the effects of BOEM and BSEE's proposed oil and gas leasing, exploration, development, production, decommissioning, and all related activities in the GOM OCS. New Orleans (LA): U.S. Department of the Interior, Fish and Wildlife Service. 181 p.
- FWS. 2019a. Alabama beach mouse (*Peromyscus polionotus ammobates*) 5-year review: summary and evaluation. Daphne (AL): U.S. Department of the Interior, U.S. Fish and Wildlife Service. 36 p. [accessed 2021 Sep 24]. [https://ecos.fws.gov/docs/tess/species\\_nonpublish/2690.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/2690.pdf).
- FWS. 2019b. Alabama beach mouse (*Peromyscus polionotus ammobates*) recover plan amendment. Atlanta (GA): U.S. Department of the Interior, Fish and Wildlife Service. 5 p. [accessed 2021 Sep 24]. [https://ecos.fws.gov/docs/recovery\\_plan/Alabama%20Beach%20Mouse%20Recovery%20Plan%20Amendment\\_1.pdf](https://ecos.fws.gov/docs/recovery_plan/Alabama%20Beach%20Mouse%20Recovery%20Plan%20Amendment_1.pdf).
- FWS. 2019c. Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*) 5-year review: summary and evaluation. Panama City (FL): U.S. Department of the Interior, Fish and Wildlife Service. 26 p. [accessed 2020 Nov 5]. [https://ecos.fws.gov/docs/five\\_year\\_review/doc6290.pdf](https://ecos.fws.gov/docs/five_year_review/doc6290.pdf).
- FWS. 2019d. Perdido Key beach mouse recovery plan amendment. Atlanta (GA): U.S. Department of the Interior, Fish and Wildlife Service. 12 p. [accessed 2021 Jan 15]. [https://ecos.fws.gov/docs/recovery\\_plan/Perdido%20Key%20Beach%20Mouse\\_Final\\_12-6-2019.pdf](https://ecos.fws.gov/docs/recovery_plan/Perdido%20Key%20Beach%20Mouse_Final_12-6-2019.pdf).
- FWS. 2019e. St. Andrew mouse (*Peromyscus polionotus peninsularis*) 5-year review: summary and evaluation. Panama City (FL): U.S. Department of the Interior, Fish and Wildlife Service. 29 p. [accessed 2021 Jan 15]. [https://ecos.fws.gov/docs/five\\_year\\_review/doc6315.pdf](https://ecos.fws.gov/docs/five_year_review/doc6315.pdf).
- FWS. 2021. Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*) 5-year review: summary and evaluation. Panama City (FL): U.S. Department of the Interior, Fish and Wildlife Service. 35 p. [accessed 2021 Aug 26]. [https://ecos.fws.gov/docs/tess/species\\_nonpublish/997.pdf](https://ecos.fws.gov/docs/tess/species_nonpublish/997.pdf).
- Galloway BJ, Raborn S, McCain K, Beyea T, Dufault S, Heyman W, Kim K, Conrad A. 2020. Explosive removal of structures: fisheries impact assessment. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 151 p. Report No.: OCS Study BOEM 2020-038. [accessed 2020 Nov 16]. [https://espis.boem.gov/final%20reports/BOEM\\_2020-038.pdf](https://espis.boem.gov/final%20reports/BOEM_2020-038.pdf).
- Gam KB, Kwok RK, Engel LS, Curry MD, Stewart PA, Stenzel MR, McGrath JA, Jackson WB, II, Jensen RL, Keil AP, et al. 2018. Lung function in oil spill response workers 1–3 years after the Deepwater Horizon disaster. *Epidemiology*. 29(3):315-322. doi:10.1097/EDE.0000000000000808.
- GAO. 2016. Oil and gas management: Interior's Bureau of Safety and Environmental Enforcement restructuring has not addressed long-standing oversight deficiencies. Washington (DC): U.S. Government Accountability Office. 45 p. Report No.: GAO-16-245. [accessed 2022 Jan 19]. <https://www.gao.gov/assets/gao-16-245.pdf>.

- GAO. 2019. Report to Congressional Requesters. Offshore oil and gas. Opportunities exist to better ensure a fair return on federal resources. U.S. Government Accountability Office. 63 p. Report No.: GAO-19-531.
- GAO. 2022. Oil and gas management: Interior's Bureau of Safety and Environmental Enforcement restructuring has not addressed long-standing oversight deficiencies. Full report published February 10, 2016. GAO-16-245. U.S. Government Accountability Office; [accessed 2022 Dec 12]. <https://www.gao.gov/products/gao-16-245>.
- Garnham JP. 2020 Apr 7. The Texas real estate market is headed for a slowdown. The question is for how long. The Texas Tribune. [accessed 2020 Jul 30]. <https://www.texastribune.org/2020/04/07/coronavirus-texas-cools-real-estate-market-experts-dont-know-how-long/>.
- Garrison LP, Glenn III DW, Karrigan H. 2018. Sperm whale acoustic prey study in the Northern Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 95 p. Report No.: OCS Study BOEM 2018-035. [accessed 2020 Nov 16]. [https://espis.boem.gov/final%20reports/BOEM\\_2018-035.pdf](https://espis.boem.gov/final%20reports/BOEM_2018-035.pdf).
- Garrison LP, Glenn III DW, Karrigan H. 2020. The movement and habitat associations of sea turtles in the Northern Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 69 p. Report No.: OCS Study BOEM 2020-010.
- Getter CD, Cintron G, Kicks B, Lewis III RR, Seneca ED. 1984. The recovery and restoration of salt marshes and mangroves following an oil spill. In: Cairns Jr. J, Buikema Jr. AL, editors. Restoration of habitats impacted by oil spills. Boston (MA): Butterworth Publishers, Ann Arbor Science Book. Chapter 3; p. 65-104.
- Girard F, Fu B, Fisher CR. 2016. Mutualistic symbiosis with ophiuroids limited the impact of the *Deepwater Horizon* oil spill on deep-sea octocorals. *Marine Ecology Progress Series*. 549:89-98. doi:10.3354/meps11697.
- Girard F, Shea K, Fisher CR. 2018. Projecting the recovery of a long-lived deep-sea coral species after the Deepwater Horizon oil spill using state-structured models. *Journal of Applied Ecology*. 55(4):1812-1822. doi:10.1111/1365-2664.13141.
- Gittings SR. 1998. Reef community stability on the Flower Garden Banks, Northwest Gulf of Mexico. *Gulf of Mexico Science*. 16(2):161-169. doi:10.18785/goms.1602.05.
- Goffman J. 2021. Memorandum: status of affordable clean energy rule and clean power plan. Washington (DC): U.S. Environmental Protection Agency, Office of Air and Radiation. 1 p. [accessed 2021 Oct 7]. [https://www.epa.gov/sites/default/files/2021-02/documents/ace\\_letter\\_021121.doc\\_signed.pdf](https://www.epa.gov/sites/default/files/2021-02/documents/ace_letter_021121.doc_signed.pdf).
- Goode SL, Rowden AA, Clark MR. 2020. Resilience of seamount benthic communities to trawling disturbance. *Marine Environmental Research*. 161:105086. doi:10.1016/j.marenvres.2020.105086.

- Gorchov Negron AM, Kort EA, Conley SA, Smith ML. 2020. Airborne assessment of methane emissions from offshore platforms in the U.S. Gulf of Mexico. *Environmental Science & Technology*. 54(8):5112-5120. doi:10.1021/acs.est.0c00179.
- Gössling S, Scott D, Hall CM. 2020. Pandemics, tourism and global change: a rapid assessment of COVID-19. *Journal of Sustainable Tourism*. [accessed 2021 Oct 19];29(1):1-20. doi:10.1080/09669582.2020.1758708.
- Greene DU, Gore JA, Austin JD. 2017. Reintroduction of captive-born beach mice: the importance of demographic and genetic monitoring. *Journal of Mammalogy*. 98(2):513-522. doi:10.1093/jmammal/gyw229.
- Griggs T. 2017. Low oil prices claim Sasol's proposed \$15 billion gas-to-liquids plant near Lake Charles. *The Advocate*. 2017 Nov 23. [accessed 2018 Sep 11]. [http://www.theadvocate.com/baton\\_rouge/news/business/article\\_3c940178-d051-11e7-8493-07a7ef24d003.html](http://www.theadvocate.com/baton_rouge/news/business/article_3c940178-d051-11e7-8493-07a7ef24d003.html).
- Grineski SE, Flores AB, Collins TW, Chakraborty J. 2019. Hurricane Harvey and Greater Houston households: comparing pre-event preparedness with post-event health effects, event exposures, and recovery. *Disasters*. 44(2):408-432. doi:10.1111/disa.12368.
- Guiry EJ, Kennedy JR, O'Connell MT, Gray DR, Grant C, Szpak P. 2021. Early evidence for historical overfishing in the Gulf of Mexico. *Science Advances*. 7(32):eabh2525. doi:10.1126/sciadv.abh2525.
- Gulf of Mexico Fishery Management Council. 2021. Fishing regulations. Tampa (FL): Gulf of Mexico Fishery Management Council; [accessed 2021 Oct 12]. <https://gulfcouncil.org/fishing-regulations/>.
- Gulf States Marine Fisheries Commission. 2020. CARES Act. Ocean Springs (MS): Gulf States Marine Fisheries Commission; [updated 2020 May 13; accessed 2020 Aug 4]. <https://www.gsmfc.org/cares-act.php>.
- Gulf States Marine Fisheries Commission. 2021. CARES Act (2020). Ocean Springs (MS): Gulf States Marine Fisheries Commission; [updated 2021 Aug 9; accessed 2021 Oct 13]. <https://www.gsmfc.org/cares-act.php>.
- Guzman HM, Kaiser S, Weil E. 2020. Assessing the long-term effects of a catastrophic oil spill on subtidal coral reef communities off the Caribbean coast of Panama (1985-2017). *Marine Diversity*. 50:28. doi:10.1007/s12526-020-01057-9.
- Halmo DB, Griffith D, Stoffle BW. 2019. "Out of sight, out of mind": rapid ethnographic assessment of commercial fishermen's perspectives on corporate/state response to the Deepwater Horizon disaster. *Human Organization*. 78(1):1-11. doi:10.17730/0018-7259.78.1.1.
- Hamdan LJ, Salerno JL, Reed A, Joye SB, Damour M. 2018. The impact of the *Deepwater Horizon* blowout on historic shipwreck-associated sediment microbiomes in the Northern Gulf of Mexico. *Scientific Reports*. 8:9057. doi:10.1038/s41598-018-27350-z.

- Hardy D, Lazrus H, Mendez M, Orlove B, Rivera-Collazo I, Roberts JT, Rockman M, Thomas K, Warner BP, Winthrop R. 2018. Social vulnerability: social science perspectives on climate change, part 1. Washington (DC): U.S. Global Change Research Program, Social Science Coordinating Committee. 38 p. [accessed 2020 Oct 19]. <https://www.globalchange.gov/sites/globalchange/files/Vulnerability%20-%20SSCC%20workshop%20Part%201%204-9-2018.pdf>.
- Harr KE, Cunningham FL, Pritsos CA, Pritsos KL, Muthumalage T, Dorr BS, Horak KE, Hanson-Dorr KC, Dean KM, Cacela D, et al. 2017a. Weathered MC252 crude oil-induced anemia and abnormal erythroid morphology in double-crested cormorants (*Phalacrocorax auritus*) with light microscopic and ultrastructural description of Heinz bodies. *Ecotoxicology and Environmental Safety*. 146:29-39. doi:10.1016/j.ecoenv.2017.07.030.
- Harr KE, Reavill DR, Bursian SJ, Cacela D, Cunningham FL, Dean KM, Dorr BS, Hanson-Dorr KC, Healy K, Horak K, et al. 2017b. Organ weights and histopathology of double-crested cormorants (*Phalacrocorax auritus*) dosed orally or dermally with artificially weathered Mississippi Canyon 252 crude oil. *Ecotoxicology and Environmental Safety*. 146:52-61. doi:10.1016/j.ecoenv.2017.07.011.
- Harr KE, Rishniw M, Rupp TL, Cacela D, Dean KM, Dorr BS, Hanson-Dorr KC, Healy K, Horak K, Link JE, et al. 2017c. Dermal exposure to weathered MC252 crude oil results in echocardiographically identifiable systolic myocardial dysfunction in double-crested cormorants (*Phalacrocorax auritus*). *Ecotoxicology and Environmental Safety*. 146:76-82. doi:10.1016/j.ecoenv.2017.04.010.
- Harress C. 2020. Ban on Florida vacation rentals lifted in some Gulf Coast counties; New Yorkers remain banned. *Advance Local*. 2020 May 20. [accessed 2020 Jul 27]. <https://www.al.com/news/2020/05/ban-on-florida-vacation-rentals-lifted-in-some-gulf-coast-counties-new-yorkers-remain-banned.html>.
- Harris HE, Fogg AQ, Allen MS, Ahrens RNM, Patterson III WF. 2020. Precipitous declines in Northern Gulf of Mexico invasive lionfish populations following the emergence of an ulcerative skin disease. *Scientific Reports*. 10:1934. doi:10.1038/s41598-020-58886-8.
- Hart KM, Lamont MM, Iverson AR, Smith BJ. 2020. The importance of the Northeastern Gulf of Mexico to foraging loggerhead sea turtles. *Frontiers in Marine Science*. 7:330. doi:10.3389/fmars.2020.00330.
- Hathorn S. 2017. Final Gulf of Mexico G&G programmatic EIS [official communication; email from Alabama Historical Commission on 2017 Sep 13]. 1 p.
- Hauer ME. 2017. Migration induced by sea-level rise could reshape the US population landscape. *Nature Climate Change*. 7(5):321-325. doi:10.1038/nclimate3271.
- Hauser C. 2019. Mississippi closes beaches because of toxic algae blooms. *The New York Times*. 2019 Jul 8. [accessed 2019 Sep 13]. <https://www.nytimes.com/2019/07/08/us/toxic-algae-bloom-mississippi.html>.

- Hausfather Z. 2013 Oct 23. IPCC's new estimates for increased sea-level rise. Yale Climate Connections. [accessed 2021 Oct 8]. <https://yaleclimateconnections.org/2013/10/ipccs-new-estimates-for-increased-sea-level-rise/>.
- Hayes SA, Josephson E, Maze-Foley K, Rosel PE. 2018. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments - 2017: (second edition). Woods Hole (MA): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center. 378 p. Report No.: NOAA Technical Memorandum NMFS-NE-245. [accessed 2020 Nov 16]. <https://repository.library.noaa.gov/view/noaa/22730>.
- Hayes SA, Josephson E, Maze-Foley K, Rosel PE. 2019. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments - 2018. Woods Hole (MA): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center. 306 p. Report No.: NOAA Technical Memorandum NMFS-NE-258. [accessed 2020 Nov 16]. <https://repository.library.noaa.gov/view/noaa/20611>.
- Hayes SA, Josephson E, Maze-Foley K, Rosel PE. 2020. US Atlantic and Gulf of Mexico marine mammal stock assessments - 2019. Woods Hole (MA): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center. 479 p. Report No.: NOAA Technical Memorandum NMFS-NE-264. [accessed 2020 Dec 15]. [https://media.fisheries.noaa.gov/dam-migration/2019\\_sars\\_atlantic\\_508.pdf](https://media.fisheries.noaa.gov/dam-migration/2019_sars_atlantic_508.pdf).
- Heinrich PV, Miner M, Paulsell R, McCulloh RP. 2020. Response of Later Quaternary Valley systems to Holocene sea level rise on continental shelf offshore Louisiana: preservation potential of paleolandscapes. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 109 p. Report No.: OCS Study BOEM 2020-004. [https://espis.boem.gov/final%20reports/BOEM\\_2020-004.pdf](https://espis.boem.gov/final%20reports/BOEM_2020-004.pdf).
- Helicopter Safety Advisory Conference. 2019. 2018 Gulf of Mexico offshore helicopter operations and safety review. Houston (TX): Helicopter Safety Advisory Conference. 3 p. [accessed 2020 Nov 29]. <http://hsac.org/siteDocs/Library/Statistics/HSAC%202018%20Statistics.pdf>.
- Hemmerling SA, Barra M, Blenn HC, Baustian MM, Jung H, Meselhe E, Wang Y, White E. 2019. Elevating local knowledge through participatory modeling: active community engagement in restoration planning in coastal Louisiana. *Journal of Geographical Systems*. 22:241-266. doi:10.1007/s10109-019-00313-2.
- Hemmerling SA, Carruthers TJB, Hijuelos AC, Bienn HC. 2020a. Double exposure and dynamic vulnerability: assessing economic well-being, ecological change and the development of the oil and gas industry in coastal Louisiana. *Shore & Beach*. 88(1):72-82. doi:10.34237/1008819.
- Hemmerling SA, Colten CE. 2017. Environmental justice: a comparative study in Louisiana. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 197 p. Report No.: OCS Study BOEM 2017-068. [accessed 2020 Oct 7]. <https://espis.boem.gov/final%20reports/5650.pdf>.

- Hemmerling SA, DeMeyers CA, Parfait J. 2021. Tracing the flow of oil and gas: a spatial and temporal analysis of environmental justice in coastal Louisiana from 1980 to 2010. *Environmental Justice*. 14(2):134-145. doi:10.1089/env.2020.0052.
- Hemmerling SA, McHugh CM, DeMeyers CA, Bienn HC, DeJong A, Parfait J, Kiskaddon E. 2020b. A community-informed framework for quantifying risk and resilience in Southeast Louisiana. Baton Rouge (LA): The Water Institute of the Gulf. 88 p. <https://thewaterinstitute.org/assets/docs/reports/A-Community-Informed-Framework-for-Quantifying-Risk-and-Resilience-in-Southeast-Louisiana.pdf>.
- Heyward A, Colquhoun J, Cripps E, McCorry D, Stowar M, Radford B, Miller K, Miller I, Battershill C. 2018. No evidence of damage to the soft tissue or skeletal integrity of mesophotic corals exposed to a 3D marine seismic survey. *Marine Pollution Bulletin*. 129(1):8-13. doi:10.1016/j.marpolbul.2018.01.057.
- Hiatt RL, Milon JW. 2002. Economic impact of recreational fishing and diving associated with offshore oil and gas structures in the Gulf of Mexico: final report. New Orleans (LA): U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. 288 p. Report No.: OCS Study MMS 2002-010. [accessed 2020 Oct 6]. <https://espis.boem.gov/final%20reports/3058.pdf>.
- Horak KE, Bursian SJ, Ellis CK, Dean KM, Link JE, Hanson-Dorr KC, Cunningham FL, Harr KE, Pritsos CA, Pritsos KL, et al. 2017. Toxic effects of orally ingested oil from the Deepwater Horizon spill on laughing gulls. *Ecotoxicology and Environmental Safety*. 146:83-90. doi:10.1016/j.ecoenv.2017.07.018.
- Huang W, Chen M, Song B, Deng J, Shen M, Chen Q, Zeng G, Liang J. 2021. Microplastics in the coral reefs and their potential impacts on corals: a mini-review. *Science of Total Environment*. 762:143112. doi:10.1016/j.scitotenv.2020.143112.
- Huettel M, Overholt WA, Kostka JE, Hagan C, Kaba J, Wells WB, Dudley S. 2018. Degradation of Deepwater Horizon oil buried in a Florida beach influenced by tidal pumping. *Marine Pollution Bulletin*. 126:488-500. doi:10.1016/j.marpolbul.2017.10.061.
- Industrial Economics Inc. 2018. Forecasting environmental and social externalities associated with outer continental shelf (OCS) oil and gas development, volume 1: 2018 revised offshore environmental cost model (OECM). Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 360 p. Report No.: OCS Study BOEM 2018-066. [accessed 2021 Oct 25]. [https://espis.boem.gov/final%20reports/BOEM\\_2018-066.pdf](https://espis.boem.gov/final%20reports/BOEM_2018-066.pdf).
- Intergovernmental Panel on Climate Change. 2021a. Climate change 2021: the physical science basis. Contribution of working group I to the sixth assessment report of the Intergovernmental Panel on Climate Change. Annexes I-X. Cambridge (UK) and New York (NY): Cambridge University Press. [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_FullReport.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf).
- Intergovernmental Panel on Climate Change. 2021b. Summary for policymakers. In: Masson-Delmotte V, Zhai P, Pirani A, Connors SL, Péan C, Berger S, Caud N, Chen Y, Goldfarb L,

- Gomis MI et al., editors. Climate change 2021: the physical science basis Contribution of working group I to the sixth assessment report of the Intergovernmental Panel on Climate Change. Cambridge (UK): Cambridge University Press. [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM\\_final.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf).
- Iverson AR, Benscoter AM, Fujisaki I, Lamont MM, Hart KM. 2020. Migration corridors and threats in the Gulf of Mexico and Florida Straits for loggerhead sea turtles. *Frontiers in Marine Science*. 7:208. doi:10.3389/fmars.2020.00208.
- Jantarasami L, Novak R, Delgado R, Marino E, McNeeley S, Narducci C, Raymond-Yakoubian J, Singletary L, Powys Whyte K. 2018. Tribes and indigenous peoples. In: Reidmiller DR, Avery CW, Easterling DR, Kunkel KE, Lewis KLM, Maycock TK, Stewart BC, editors. Impacts, risks, and adaptation in the United States: fourth national climate assessment, volume II. Washington (DC): U.S. Global Change Research Program. Chapter 15; p. 572-603. [accessed 2020 Oct 16]. <https://nca2018.globalchange.gov/chapter/15/>.
- Jefferson TA, Leatherwood S, Shoda LKM, Pitman RL. 1992. Marine mammals of the Gulf of Mexico: a field guide for aerial and shipboard observers. College Station (TX): Texas A&M University Printing Center. 92 p.
- Jenkins JD, Farbes J, Jones R, Patankar N, Schivley G. 2022. Electricity transmission is key to unlock the full potential of the inflation reduction act. REPEAT Project, Princeton (NJ). September 2022. doi:10.5281/zenodo.7106176.
- Ji Z-G, Johnson W, Wikel G. 2014. Statistics of extremes in oil spill risk analysis. *Environmental Scientific Technology*. 48(17):10505-10510. doi:10.1021/es501515j.
- Ji Z-G, Johnson WR, DuFore CM. 2017. Oil-spill risk analysis: Gulf of Mexico outer continental shelf (OCS) lease sales, Eastern planning area, Central planning area, and Western planning area, 2017-2022, and gulf-wide OCS program, 2017-2086. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Division of Environmental Sciences. 64 p. Report No.: OCS Report BOEM 2017-010. [accessed 2021 Oct 12]. <https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Assessment/Oil-Spill-Modeling/OCS-Report-BOEM-2017-010-Oil-Spill-Risk-Analysis.pdf>.
- Jodice PGR, Lamb JS, Satgé YG, Florello C. 2022. Blood biochemistry and hematology of adult and chick brown pelicans in the northern Gulf of Mexico: baseline health values and ecological relationships. *Conservation Physiology*. 10(1):coac064. doi:10.1093/conphys/coac064.
- Johnston MA. 2021. Strategy for stony coral tissue loss disease prevention and response at Flower Garden Banks National Marine Sanctuary (version 1). Galveston (TX): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries. 37 p.
- Johnston MA. 2022. RE: FGBNMS Long-term monitoring 3rd quarterly report 2022 - interagency agreement M19PG0001. Recipient: Caporaso, A. 2022 Oct 25. Galveston (TX): U.S. Department

of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuaries. p. 3.

Johnston MA, Blakeway RD, O'Connell K, MacMillan J, Nuttall MF, Hu X, Embesi JA, Hickerson EL, Schmahl GP. 2020. Long-term monitoring at East and West Flower Garden Banks: 2018 annual report. Galveston (TX): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, Flower Garden Banks National Marine Sanctuary. 138 p. Report No.: ONMS-20-09. [accessed 2020 Oct 27]. <https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/2018-east-and-west-fgb-monitoringPublication.pdf>.

Johnston MA, Hickerson EL, Nuttall MF, Blakeway RD, Sterne TK, Eckert RJ, Schmahl GP. 2019a. Coral bleaching and recovery from 2016 to 2017 at East and West Flower Garden Banks, Gulf of Mexico. *Coral Reefs*. 38(4):787-799. doi:10.1007/s00338-019-01788-7.

Johnston MA, Nuttall MF, Eckert RJ, Blakeway RD, Sterne TK, Hickerson EL, Schmahl GP, Lee MT, MacMillan J, Embesi JA. 2019b. Localized coral reef mortality event at East Flower Garden Bank, Gulf of Mexico. *Bulletin of Marine Science*. 95(2):239-250. doi:10.5343/bms.2018.0057.

Johnston MA, Nuttall MF, Eckert RJ, Embesi JA, Slowey NC, Hickerson EL, Schmahl GP. 2013. Long-term monitoring at the East and West Flower Garden Banks National Marine Sanctuary, 2009-2010. Volume 1: technical report. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 218 p. Report No.: OCS Study BOEM 2013-214, FGB NMS 2013-002. [accessed 2020 Dec 23]. <https://espis.boem.gov/final%20reports/5345.pdf>.

Johnston MA, Nuttall MF, Eckert RJ, Embesi JA, Slowey NC, Hickerson EL, Schmahl GP. 2015. Long-term monitoring at East and West Flower Garden Banks National Marine Sanctuary, 2011-2012. Volume 1: technical report. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 205 p. Report No.: OCS Study BOEM 2015-027, FGB NMS 2015-001. [accessed 2020 Oct 23]. <https://espis.boem.gov/final%20reports/5476.pdf>.

Johnston MA, O'Connell K, Blakeway RD, MacMillan J, Nuttall MF, Hu X, Embesi JA, Hickerson EL, Schmahl GP. 2021. Long-term monitoring at East and West Flower Garden Banks: 2019 annual report. Galveston (TX): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Flower Garden Banks National Marine Sanctuary. 101 p. Report No.: ONMS-21-02. [accessed 2021 Oct 5]. <https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/2019-fgbnms-long-term-monitoring.pdf>.

- Johnston MA, Sterne TK, Blakeway R, MacMillan J, Nuttall MF, Hu X, Embesi JA, Hickerson EL, Schmahl GP. 2018. Long-term monitoring at East and West Flower Garden Banks: 2017 annual report. Galveston (TX): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Flower Garden Banks National Marine Sanctuary. 139 p. Report No.: ONMS-18-02. [accessed 2020 Dec 22]. <https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/2017-annual-report-long-term-monitoring-east-west-flower-garden-banks.pdf>.
- Jones D. 2015a. BOEM activities [official communication; email from BOEM on 2015 Jun 4]. 1 p.
- Jones D. 2015b. BOEM activities [official communication; emails exchanged to and from Jena Band of Choctaw Indians and the Bureau of Ocean Energy Management from 2015 May 8 through 2015 Jun 9].
- Jones D. 2017. BOEM conference call follow-up [official communication; email from BOEM on 2017 Nov 3]. 2 p.
- Jones D. 2018. Gulf region tribal outreach for the DPP [official communication; email from BOEM on 2018 Jan 18]. 1 p.
- Jones D. 2019. BOEM announces development of 2020 Gulf of Mexico lease sale supplemental EIS [official communication; email from BOEM on 2019 Jan 31]. 26 p.
- Kaiser MJ, Narra S. 2018. Gulf of Mexico decommissioning trends and operating cost estimation. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Strategic Resources. 547 p. Report No.: OCS Study BOEM 2019-023. [accessed 2020 Oct 20]. <https://www.boem.gov/sites/default/files/oil-and-gas-energy-program/Energy-Economics/External-Studies/BOEM-2019-023.pdf>.
- Karaye IM, Thompson C, Horney JA. 2019. Evacuation shelter deficits for socially vulnerable Texas residents during Hurricane Harvey. *Health Services Research and Managerial Epidemiology*. 6:1-7. doi:10.1177/2333392819848885.
- Kaushik A, Graham J, Dorheim K, Kramer R, Wang J, Byrne B. 2020. The future of the carbon cycle in a changing climate. *Eos*. 101. doi:10.1029/2020EO140276
- Kellogg CA. 2019. Microbiomes of stony and soft deep-sea corals share rare core bacteria. *Microbiome*. 7:90. doi:10.1186/s40168-019-0697-3.
- Kellogg CA, Goldsmith DB, Gray MA. 2017. Biogeographic comparison of *Lophelia*-associated bacterial communities in the Western Atlantic reveals conserved core microbiome. *Frontiers in Microbiology*. 8:796. doi:10.3389/fmicb.2017.00796.
- Kennicutt II MC. 2017. Water quality of the Gulf of Mexico. In: Ward CH, editor. *Habitats and biota of the Gulf of Mexico: before the Deepwater Horizon oil spill*. New York (NY): Springer. Chapter 2; p. 55-164. [accessed 2020 Sep 11]. <https://link.springer.com/book/10.1007/978-1-4939-3447-8>.

- Kenworthy WJ, Fonseca MS. 1996. Light requirements of seagrasses *Halodule wrightii* and *Syringodium filiforme* derived from the relationship between diffuse light attenuation and maximum depth distribution. *Estuaries*. 19(3):740-750. doi:10.2307/1352533.
- Kocmoud AR, Wang H-H, Grant WE, Gallaway BJ. 2019. Population dynamics of the endangered Kemp's ridley sea turtle following the 2010 oil spill in the Gulf of Mexico: simulation of potential cause-effect relationships. *Ecological Modelling*. 392:159-178. doi:10.1016/j.ecolmodel.2018.11.014.
- Krishnamurthy J, Engel LS, Wang L, Schwartz EG, Christenbury K, Kondrup B, Barrett J, Rusiecki JA. 2019. Neurological symptoms associated with oil spill response exposures: results from the Deepwater Horizon Oil Spill Coast Guard Cohort Study. *Environment International*. 131:104963. doi:10.1016/j.envint.2019.104963.
- Kwok RK, McGrath JA, Lowe SR, Engel LS, Jackson 2nd WB, Curry MD, Payne J, Galea S, Sandler DP. 2017. Mental health indicators associated with oil spill response and clean-up: cross-sectional analysis of the GuLF STUDY cohort. *The Lancet Public Health*. 2(12):e560-e567. doi:10.1016/S2468-2667(17)30194-9.
- LA 1 Coalition. 2018. Coalition celebrates ground breaking for next phase of LA 1 improvement project. Thibodaux (LA): LA 1 Coalition; [updated 2018 Apr 26; accessed 2019 Feb 6]. <http://la1coalition.org/coalition-celebrates-ground-breaking-for-next-phase-of-la-1-improvement-project/>.
- Lamb JS. 2016. Ecological drivers of brown pelican movement patterns and reproductive success in the Gulf of Mexico [dissertation]. [Clemson (SC)]: Clemson University. [accessed 2020 Oct 30]. [https://tigerprints.clemson.edu/cgi/viewcontent.cgi?article=2646&context=all\\_dissertations](https://tigerprints.clemson.edu/cgi/viewcontent.cgi?article=2646&context=all_dissertations).
- Lamb JS, Satgé YG, Jodice PGR. 2019. Seasonal variation in environmental and behavioural drivers of annual-cycle habitat selection in a nearshore seabird. *Biodiversity Research*. 26(2):254-266. doi:10.1111/ddi.13015.
- Lamb JS, Satgé YG, Streker RA, Jodice PGR. 2020. Ecological drivers of brown pelican movement patterns, health, and reproductive success in the Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 236 p. Report No.: OCS Study BOEM 2020-036. [accessed 2021 Oct 8]. [https://espis.boem.gov/final%20reports/BOEM\\_2020-036.pdf](https://espis.boem.gov/final%20reports/BOEM_2020-036.pdf).
- Larsen J, King B, Kolus H, Dasari N, Hiltbrand G, Herndon W. 2022. A turning point for US climate progress: assessing the climate and clean energy provisions in the Inflation Reduction Act. New York (NY): Rhodium Group. 11 p.
- Larson E, Greig C, Jenkins J, Mayfield E, Pascale A, Zhang C, Drossman J, Williams R, Pacala S, Socolow R, et al. 2021. Net-zero America: potential pathways, infrastructure, and impacts. Final report summary. Princeton (NJ): Princeton University. 77 p. [accessed 2022 Mar 3]. [https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20\(29Oct2021\).pdf](https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20(29Oct2021).pdf).

- Lauritsen AM, Dixon PM, Cacela D, Brost B, Hardy R, MacPherson SL, Meylan A, Wallace BP, Witherington B. 2017. Impact of the *Deepwater Horizon* oil spill on loggerhead turtle *Caretta caretta* nest densities in Northwest Florida. *Endangered Species Research*. 33:83-93. doi:10.3354/esr00794.
- Lee A. 2019. Miss. coast will pay steep price in new plan to save Louisiana wetlands, fishermen warn. *Sun Herald*. 2019 Aug 23. <https://www.sunherald.com/news/local/counties/harrison-county/article234222617.html>.
- Leighton FA. 1993. The toxicity of petroleum oils to birds. *Environmental Reviews*. 1(2):92-103. doi:10.1139/a93-008.
- Levas S, Schoepf V, Warner ME, Aschaffenburg M, Baumann J, Grottoli AG. 2018. Long-term recovery of Caribbean corals from bleaching. *Journal of Experimental Marine Biology and Ecology*. 506:124-134. doi:10.1016/j.jembe.2018.06.003.
- LGL Ecological Research Associates Inc. 2009. Gulf of Mexico cooling water intake structure: source water biological baseline characterization study. Houston (TX): ExxonMobil Upstream Research Co. 200 p.
- Limer BD, Bloomberg J, Holstein DM. 2020. The influence of eddies on coral larval retention in the Flower Garden Banks. *Frontiers in Marine Science*. 7:372. doi:10.3389/fmars.2020.00372.
- Lindo-Atichati D, Bringas F, Goni G, Muhling B, Muller-Karger FE, Habtes S. 2012. Varying mesoscale structures influence larval fish distribution in the Northern Gulf of Mexico. *Marine Ecology Progress Series*. 463:245-257. doi:10.3354/meps09860.
- Liu Z, Liu J, Gardner WS, Shank GC, Ostrom NE. 2014. The impact of *Deepwater Horizon* oil spill on petroleum hydrocarbons in surface waters of the Northern Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography*. 129:292–300. doi:10.1016/j.dsr2.2014.01.013.
- Lohrenz SE, Fahnensteil GL, Redalje DG, Lang GA, Dagg MJ, Whittedge TE, Dortch Q. 1999. Nutrients, irradiance, and mixing as factors regulating primary production in coastal waters impacted by the Mississippi River plume. *Continental Shelf Research*. 19(9):1113-1141. doi:10.1016/S0278-4343(99)00012-6.
- Long BF, Vandermeulen JH. 1983. Geomorphological impact of cleanup of an oiled salt marsh (Ile Grande, France). In: *International Oil Spill Conference; 1983 Feb 28-Mar 3; San Antonio (TX)*. p. 501-505. [accessed 2020 Nov 8]. <https://meridian.allenpress.com/iosc/article-pdf/1983/1/501/1740125/2169-3358-1983-1-501.pdf>.
- Longcore T, Rich C. 2004. Ecological light pollution. *Frontiers in Ecology and the Environment*. 2(4):191-198. doi:10.1890/1540-9295(2004)002[0191:ELP]2.0.CO;2.

- Louisiana's Strategic Adaptations for Future Environments. 2019. Our land and water: a regional approach to adaptation. Baton Rouge (LA): U.S. Department of Housing and Urban Development. 204 p.  
<https://s3.amazonaws.com/lasafe/Final+Adaptation+Strategies/Regional+Adaptation+Strategy.pdf>.
- Louisiana Department of Natural Resources. 2020a. Louisiana state crude oil and condensate production, excluding OCS. Baton Rouge (LA): State of Louisiana, Department of Natural Resources. [accessed 2021 Oct 12].  
<http://www.dnr.louisiana.gov/assets/TAD/OGTables/Table03.pdf>.
- Louisiana Department of Natural Resources. 2020b. Louisiana state gas production, wet after lease separation, natural gas and casinghead gas, excluding OCS. Baton Rouge (LA): State of Louisiana, Department of Natural Resources. [accessed 2021 Oct 12].  
<http://www.dnr.louisiana.gov/assets/TAD/OGTables/Table11.pdf>.
- Louisiana Department of Wildlife and Fisheries. 2020. LA Creel. Baton Rouge (LA): Louisiana Department of Wildlife and Fisheries; [accessed 2020 July 28].  
<https://www.wlf.louisiana.gov/page/lacreel>.
- Louisiana State University, Louisiana Universities Marine Consortium. 2022. Report from 2022 shelf-wide hypoxia cruise. Baton Rouge (LA): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Centers for Coastal Ocean Science. [accessed 2022 Nov 9]. [https://gulfhypoxia.net/research/shelfwide-cruise/?y=2022&p=press\\_release](https://gulfhypoxia.net/research/shelfwide-cruise/?y=2022&p=press_release).
- Maggini I, Kennedy LV, Elliott KH, Dean KM, MacCurdy R, Macmillan A, Pritsos CA, Guglielmo CG. 2017a. Reprint of: trouble on takeoff: crude oil on feathers reduces escape performance of shorebirds. *Ecotoxicology and Environmental Safety*. 146:111-117. doi:10.1016/j.ecoenv.2017.05.018.
- Maggini I, Kennedy LV, Macmillan A, Elliott KH, Dean K, Guglielmo CG. 2017b. Light oiling of feathers increases flight energy expenditure in a migratory shorebird. *Journal of Experimental Biology*. 220(13):2372-2379. doi:10.1242/jeb.158220.
- Magill K. 2017. Company plans \$800 million LNG plant at Port Fourchon. *Houma Today*. 2017 Jan 31. [accessed 2022 Jan 25]. <https://www.houmatoday.com/story/business/2017/01/31/company-plans-800-million-lng-plant-at-port-fourchon/22570190007/>.
- MARAD. 2015. 2015 vessel calls in U.S. ports, selected terminals and lightering areas. Washington (DC): U.S. Department of Transportation, Maritime Administration. [accessed 2020 Jul 31].  
<https://www.maritime.dot.gov/data-reports/data-statistics/data-statistics>.

- Mason AL, Taylor JC, MacDonald IR. 2019. An integrated assessment of oil and gas release into the marine environment at the former Taylor Energy MC20 site. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, National Centers for Coastal Ocean Science. 168 p. Report No.: NOAA Technical Memorandum NOS NCCOS 260. [accessed 2020 Nov 29]. <https://repository.library.noaa.gov/view/noaa/20612>.
- Matkin CO, Saulitis EL, Ellis GM, Olesiuk P, Rice SD. 2008. Ongoing population-level impacts on killer whales *Orcinus orca* following the Exxon Valdez oil spill in Prince William Sound, Alaska. *Marine Ecology Progress Series*. 356:269-281. doi:10.3354/meps07273.
- McCullers R. 2015. Official communication. Email communication with the Environmental Director of the Poarch Band of Creek Indians regarding OCS activities. June 3, 2015.
- McGowan C, J., Kwok RK, Engel LS, Stenzel MR, Stewart PA, Sandler DP. 2017. Respiratory, dermal, and eye irritation symptoms associated with Corexit™ EC9527A/EC9500A following the *Deepwater Horizon* oil spill: findings from the GuLF STUDY. *Environmental Health Perspectives*. 125(9):097015. doi:10.1289/EHP1677.
- McNichol E, Leachman M. 2020. States continue to face large shortfalls due to COVID-19 effects. Washington (DC): Center on Budget and Policy Priorities; [updated 2020 Jul 7; accessed 2020 Jul 31]. <https://www.cbpp.org/sites/default/files/atoms/files/6-15-20sfp.pdf>.
- Meekan MG, Speed CW, McCauley RD, Fisher R, Birt MJ, Currey-Randall LM, Semmens JM, Newman SJ, Cure K, Stowar M, et al. 2021. A large-scale experiment finds no evidence that a seismic survey impacts a demersal fish fauna. *PNAS*. 118(30):e2100869118. doi:10.1073/pnas.2100869118.
- Mendelssohn IA, Hester MW, Hill JM. 1993. Effects of oil spills on coastal wetlands and their recovery: year 4, final report. New Orleans (LA): U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. 53 p. Report No.: OCS Study MMS 93-0045. [accessed 2020 Nov 8]. <https://espis.boem.gov/final%20reports/1038.pdf>.
- Merrill MD, Sleeter BM, Freeman PA, Liu J, Warwick PD, Reed BC. 2018. Federal lands greenhouse gas emissions and sequestration in the United States: estimates for 2005-14. Reston (VA): U.S. Department of the Interior, U.S. Geological Survey. 44 p. Report No.: 2018-5131. [accessed 2020 Oct 22]. <https://pubs.usgs.gov/sir/2018/5131/sir20185131.pdf>.
- Metz TL, Gordon M, Mokrech M, Guillen G. 2020. Movements of juvenile green turtles (*Chelonia mydas*) in the nearshore waters of the Northwestern Gulf of Mexico. *Frontiers in Marine Science*. 7:647. doi:10.3389/fmars.2020.00647.
- Michael PE, Hixson KM, Haney JC, Satgé YG, Gleason JS, Jodice PGR. 2022. Seabird vulnerability to oil: exposure potential, sensitivity, and uncertainty in the northern Gulf of Mexico. *Frontiers in Marine Science*. 9:880750. doi:10.3389/fmars.2022.880750.

- Michel J. 2021. Oil spill effects literature study of spills of greater than 20,000 barrels of crude oil, condensate, or diesel. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. Report No.: BOEM 2020-058. [https://espis.boem.gov/final%20reports/BOEM\\_2020-058.pdf](https://espis.boem.gov/final%20reports/BOEM_2020-058.pdf).
- Michel J, Owens EH, Zengel S, Graham A, Nixon Z, Allard T, Holton W, Reimer PD, Lamarche A, White M, et al. 2013. Extent and degree of shoreline oiling: *Deepwater Horizon* oil spill, Gulf of Mexico, USA. PLoS ONE. 8(6):e65087. doi:10.1371/journal.pone.0065087.
- Midway SR, Lynch AJ, Peoples BK, Dance M, Caffey R. 2021. COVID-19 influences on US recreational angler behavior. PLoS ONE. 16(8):e0254652. doi:10.1371/journal.pone.0254652.
- Miller MW, Bright AJ, Pausch RE, Williams DE. 2020. Larval longevity and competency patterns of Caribbean reef-building coral. PeerJ. 8:e9705. doi:10.7717/peerj.9705.
- Mitchelmore CL, Bishop CA, Collier TK. 2017. Toxicological estimation of mortality of oceanic sea turtles oiled during the *Deepwater Horizon* oil spill. Endangered Species Research. 33:39-50. doi:10.3354/esr00758.
- Moore C, Morley JW, Morrison B, Kolian M, Horsch E, Frölicher T, Pinsky ML, Griffis R. 2021. Estimating the economic impacts of climate change on 16 major US fisheries. Climate Change Economics. 12(1):2150002. doi:10.1142/s2010007821500020.
- Morano JL, Tielens JT, Muirhead CA, Eastabrook BJ, Sullivan PJ, Dugan PJ, Clark CW, Rice AN. 2020. Seasonal movements of Gulf of Mexico sperm whales following the *Deepwater Horizon* oil spill and the limitations of impact assessments. Marine Pollution Bulletin. 161(A):111627. doi:10.1016/j.marpolbul.2020.111627.
- Morris CJ, Cote D, Martin SB, Mallowney D. 2020. Effects of 3D seismic surveying on snow crab fishery. Fisheries Research. 232:105719. doi:10.1016/j.fishres.2020.105719.
- Morton RA, Miller TL, Moore LJ. 2004. National assessment of shoreline change: part 1, historical shoreline changes and associated coastal land loss along the U.S. Gulf of Mexico. St. Petersburg (FL): U.S. Department of the Interior, U.S. Geological Survey. 44 p. Report No.: Open-File Report 2004-1043. [accessed 2021 Dec 21]. <https://pubs.usgs.gov/of/2004/1043/ofr-2004-1043.pdf>.
- Mosbrucker K. 2020. Yearslong lull looms for Louisiana's energy sectors hit by economic slowdown, energy slump. The Advocate. 2020 Jun 7. [accessed 2020 Jul 31]. [https://www.theadvocate.com/baton\\_rouge/news/coronavirus/article\\_4bcb2edc-a5c4-11ea-aecb-377953c8028e.html](https://www.theadvocate.com/baton_rouge/news/coronavirus/article_4bcb2edc-a5c4-11ea-aecb-377953c8028e.html).
- Mugge RL, Brock ML, Salerno JL, Damour M, Church RA, Lee JS, Hamdan LJ. 2019. Deep-sea biofilms, historic shipwreck preservation and the *Deepwater Horizon* spill. Frontiers in Marine Science. 6:48. doi:10.3389/fmars.2019.00048.
- Nagarin M. 2017. Sur de Texas-Tuxpan pipeline key to Mexico's power supply. Pipeline & Gas Journal. [accessed 2018 Sep 12];244(10):69-70. <https://pgjonline.com/magazine/2017/october-2017-vol-244-no-10/features/sur-de-texas-tuxpan-pipeline-key-to-mexico-s-power-supply>.

- Nash HL, Furiness SJ, Tunnell Jr. JW. 2013. What is known about species richness and distribution on the outer-shelf South Texas Banks? *Gulf and Caribbean Research*. 25(1):9-18. doi:10.18785/gcr.2501.02.
- National Academies of Sciences, Engineering, and Medicine. 2018. Understanding the long-term evolution of the coupled natural-human coastal system: the future of the U.S. Gulf Coast. Washington (DC): The National Academies Press. 156 p. [accessed 2020 Aug 23]. <https://www.nap.edu/catalog/25108/understanding-the-long-term-evolution-of-the-coupled-natural-human-coastal-system>.
- National Academies of Sciences, Engineering, and Medicine. 2019. Review of the Bureau of Ocean Energy Management "air quality modeling in the Gulf of Mexico region" study. Washington (DC): The National Academies Press. 72 p. [accessed 2020 Nov 22]. <https://www.nap.edu/catalog/25600/review-of-the-bureau-of-ocean-energy-management-air-quality-modeling-in-the-gulf-of-mexico-region-study>.
- National Research Council. 1983. Drilling discharges in the marine environment. Panel on Assessment of fates and effects of drilling fluids, and cuttings in the marine environment. Washington (DC): The National Academies Press. 189 p. <https://www.govinfo.gov/content/pkg/CZIC-td195-p4-n36-1983/pdf/CZIC-td195-p4-n36-1983.pdf>.
- Nelms SE, Piniak WED, Weir CR, Godley BJ. 2016. Seismic surveys and marine turtles: an underestimated global threat? *Biological Conservation*. 193:49-65. doi:10.1016/j.biocon.2015.10.020.
- Ngai C, Sims B. 2017. U.S. oil exports boom, putting infrastructure to the test. *Reuters*. 2017 Oct 30. [accessed 2021 Oct 15]. <https://www.reuters.com/article/us-usa-oil-exports/u-s-oil-exports-boom-putting-infrastructure-to-the-test-idUSKBN1CZ0CI>.
- NIEHS. 2014. GuLF STUDY gears up for second round of health exams. Research Triangle Park (NC): U.S. Department of Health and Human Services, National Institutes of Health, National Institute of Environmental Health Sciences. [accessed 2015 Sep 13]. <https://www.niehs.nih.gov/news/newsroom/releases/2014/april11/index.cfm>.
- Nienhuis JH, Törnqvist TE, Jankowski KL, Fernandes AM, Keogh ME. 2017. A new subsidence map for coastal Louisiana. *GSA Today*. 27(9):58-59. doi:10.1130/GSATG337GW.
- NMFS. 2016. Fisheries economics of the United States 2014. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 246 p. Report No.: NOAA Technical Memorandum NMFS-F/SPO-163. [accessed 2020 Oct 5]. <https://repository.library.noaa.gov/view/noaa/11988>.

- NMFS. 2017. Fisheries economics of the United States 2015. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 257 p. Report No.: NOAA Technical Memorandum NMFS-F/SPO-170. [accessed 2020 Mar 24]. <https://repository.library.noaa.gov/view/noaa/16121>.
- NMFS. 2018. Fisheries economics of the United States 2016. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 264 p. Report No.: NOAA Technical Memorandum NMFS-F/SPO-187A. [accessed 2020 Oct 5]. <https://media.fisheries.noaa.gov/dam-migration/feus2016-report-webready4.pdf>.
- NMFS. 2019. 2010-2014 cetacean unusual mortality event in northern Gulf of Mexico (closed). Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service; [updated 2019 Sep 12; accessed 2021 Oct 25]. <https://www.fisheries.noaa.gov/national/marine-life-distress/2010-2014-cetacean-unusual-mortality-event-northern-gulf-mexico>.
- NMFS. 2020. Commerce Secretary announces allocation of \$300 million in CARES Act funding. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service; [updated 2021 Jul 6; accessed 2021 Sep 20]. <https://www.fisheries.noaa.gov/feature-story/commerce-secretary-announces-allocation-300-million-cares-act-funding>.
- NMFS. 2021a. Fisheries economics of the United States 2017. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 259 p. Report No.: NOAA Technical Memorandum NMFS-F/SPO-2019. <https://media.fisheries.noaa.gov/2021-09/FEUS2017-final-v1.3.pdf>.
- NMFS. 2021b. Fisheries of the United States 2019. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Services. 167 p. Report No.: Current Fishery Statistics 2019. [accessed 2021 Oct 12]. <https://media.fisheries.noaa.gov/2021-05/FUS2019-FINAL-webready-2.3.pdf?null=>.
- NMFS. 2021c. National snapshot, January-July 2020: NOAA Fisheries updated impact assessment of the COVID-19 crisis on the U.S. commercial seafood and recreational for-hire/charter industries. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 6 p. [accessed 2021 Oct 13]. <https://media.fisheries.noaa.gov/2021-01/Updated-COVID-19-Impact-Assessment.pdf>.
- NMFS. 2021d. Recreational fisheries statistics queries. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service; [updated 2021 Sep 30; accessed 2021 Sep 30]. <https://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/queries/index>.

- NMFS. 2021e. Secretary of Commerce announces allocation of an additional \$255 million in CARES Act funding to states and territories. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service; [updated 2021 May 11; accessed 2021 Oct 13]. <https://www.fisheries.noaa.gov/feature-story/secretary-commerce-announces-allocation-additional-255-million-cares-act-funding>.
- NMFS. 2021f. Southeast snapshot, January-June 2020: southeast fisheries impacts from COVID-19, commercial fisheries landings trends and impacts through June 2020. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 10 p. [accessed 2021 Oct 14]. <https://media.fisheries.noaa.gov/2021-01/Southeast-COVID-19-Impact-Snapshot.pdf>.
- NMFS. 2022. Staghorn coral (*Acropora cervicornis*), elkhorn coral (*Acropora palmata*), lobed star coral (*Orbicella annularis*), mountainous star coral (*Orbicella faveolata*), boulder star coral (*Orbicella franksi*), rough cactus coral (*Mycetophyllia ferox*), pillar coral (*Dendrogyra cylindrus*). 5-year review: summary and evaluation. Saint Petersburg (FL): U.S. Department of Commerce, National Ocean and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office. 108 p.
- NOAA. 2008. The Gulf of Mexico at a glance, a tool for the Gulf of Mexico alliance and the American public. Washington (DC): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service. 34 p. [accessed 2021 Oct 8]. [https://gulfofmexicoalliance.org/wp-content/uploads/2008/12/gulf\\_glance\\_1008-1.pdf](https://gulfofmexicoalliance.org/wp-content/uploads/2008/12/gulf_glance_1008-1.pdf).
- NOAA. 2016. Flower Garden Banks National Marine Sanctuary draft environmental impact statement: sanctuary expansion. Volume 1: chapters 1-6. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries. 153 p.
- NOAA. 2021. Gulf of Mexico/Florida: harmful algal blooms. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service; [updated 2021 Jul 29; accessed 2021 Sep 25]. <https://oceanservice.noaa.gov/hazards/hab/gulf-mexico.html>.
- NOAA. 2022. Shell Green Canyon 248. Oil spill-Green Canyon, Gulf of Mexico-2016. U.S. Department of Commerce, National Oceanic and Atmospheric Administration; [updated 2022 Mar 3; accessed 2022 Nov 3]. <https://darrp.noaa.gov/oil-spills/shell-green-canyon-248>.
- NOAA, Office for Coastal Management. 2019. NOAA report on the U.S. ocean and Great Lakes economy. Charleston (SC): U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 27 p. <https://coast.noaa.gov/digitalcoast/training/econreport.html>.
- NOAA, Office for Coastal Management. 2021. NOAA report on the U.S. marine economy: regional and state profiles. Charleston (SC): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office for Coastal Management. 82 p. <https://coast.noaa.gov/data/digitalcoast/pdf/econ-report-regional-state.pdf>.

- Nugent N, Gaston SA, Perry J, Rung AL, Trapido EJ, Peters ES. 2019. PTSD symptom profiles among Louisiana women affected by the 2010 Deepwater Horizon oil spill: a latent profile analysis. *Journal of Affective Disorders*. 250:289-297. doi:10.1016/j.jad.2019.03.018.
- Offshore. 2021. Offshore international edition July/August 2021. Houston (TX): Endeavor Business Media. <https://www.offshore-mag.com/magazine>.
- Offshore Technology. 2017. South Texas-Tuxpan gas pipeline, Gulf of Mexico. New York (NY): Offshore Technology; [updated 2017 May 26; accessed 2018 Sep 11]. <https://www.offshore-technology.com/projects/south-texas-tuxpan-gas-pipeline-gulf-of-mexico/>.
- Onuf CP. 1996. Biomass patterns in seagrass meadows of the Laguna Madre, Texas. *Bulletin of Marine Science*. 58(2):404-420.
- Oviatt CA, Huizenga K, Rogers CS, Miller JW. 2019. What nutrient sources support anomalous growth and the recent sargassum mass stranding on Caribbean beaches? A review. *Marine Pollution Bulletin*. 145:517-525. doi:10.1016/j.marpolbul.2019.06.049.
- Oxford Economics. 2020. The impact of COVID-19 on the United States travel economy: 2020 analysis. New York (NY): Oxford Economics. 14 p. [https://www.ustravel.org/sites/default/files/media\\_root/document/Coronavirus2020\\_Impacts\\_April\\_15.pdf](https://www.ustravel.org/sites/default/files/media_root/document/Coronavirus2020_Impacts_April_15.pdf).
- Pagano MA, McFarland CK. 2020. When will your city feel the fiscal impact of COVID-19? *The Avenue*. [accessed 2020 Oct 2]. <https://www.brookings.edu/blog/the-avenue/2020/03/31/when-will-your-city-feel-the-fiscal-impact-of-covid-19/>.
- Passut C. 2017. FERC authorizes valley crossing pipeline to Mexico via presidential permit. *Natural Gas Intelligence*. 2017 Oct 25. [accessed 2018 Sep 11]. <http://www.naturalgasintel.com/articles/112208-ferc-authorizes-valley-crossing-pipeline-to-mexico-via-presidential-permit>.
- Pequegnat WE, Gallaway BJ, Pequegnat LH. 1990. Aspects of the ecology of the deep-water fauna of the Gulf of Mexico. *American Zoologist*. 30(1):45-64. doi:10.1093/icb/30.1.45.
- Perez CR, Moye JK, Cacela D, Dean KM, Pritsos CA. 2017a. Homing pigeons externally exposed to *Deepwater Horizon* crude oil change flight performance and behavior. *Environmental Pollution*. 230:530-539. doi:10.1016/j.envpol.2017.07.008.
- Perez CR, Moye JK, Cacela D, Dean KM, Pritsos CA. 2017b. Low level exposure to crude oil impacts avian flight performance: the Deepwater Horizon oil spill effect on migratory birds. *Ecotoxicology and Environmental Safety*. 146:98-103. doi:10.1016/j.ecoenv.2017.05.028.
- Peters ES, Rung AL, Bronson MH, Brashear MM, Peres LC, Gaston S, Sullivan SM, Peak K, Abranson DM, Fontham ETH, et al. 2017. The women and their children's health (WaTCH) study: methods and design of a prospective cohort study in Louisiana to examine the health effects from the BP oil spill. *BMJ Open*. 7(7):e014887. doi:10.1136/bmjopen-2016-014887.

- Peters X. 2020. In the COVID-19 economy, Texas' commercial fishermen are barely treading water. The Texas Observer. 2020 May 15. [accessed 2020 Aug 4]. <https://www.texasobserver.org/in-the-covid-19-economy-texas-commercial-fishermen-are-barely-treading-water/>.
- Phaneuf V. 2018. Gulf region tribal outreach for the DPP [official communication; email from BOEM on 2018 Jan 25]. 1 p.
- Piniak WED, Mann DA, Harms CA, Jones TT, Eckert SA. 2016. Hearing in the juvenile green sea turtle (*Chelonia mydas*): a comparison of underwater and aerial hearing using auditory evoked potentials. PLoS ONE. 11(10):e0159711. doi:10.1371/journal.pone.0159711.
- Posadas BC, Posadas Jr. BKA. 2017. Economic impacts of the opening of the Bonnet Carré Spillway to the Mississippi oyster fishery. Journal of Food Distribution Research. 48(1):42-45. doi:10.22004/ag.econ.274566.
- Potter C. 2021. Remote sensing of wetland area loss and gain in the Western Barataria Basin (Louisiana, U.S.A.) since Hurricane Katrina. Journal of Coastal Research. 37(5):953-963. doi:10.2112/jcoastres-d-20-00119.1.
- Powell TB. 2021. U.S. Coast Guard investigating nearly 350 reported oil spills after Hurricane Ida. CBS News. 2021 Sep 8. [accessed 2021 Oct 12]. <https://www.cbsnews.com/news/oil-spills-coast-guard-investigation-hurricane-ida/>.
- Powers SP, Drymon JM, Hightower CL, Spearman T, Bosarge GS, Jefferson A. 2018. Distribution and age composition of red snapper across the continental shelf of the north-central Gulf of Mexico. Transactions of the American Fisheries Society. 147(5):791-805. doi:10.1002/tafs.10081.
- Price JC, Ewen M, Isom H, Ebersole J, Lehr J. 2020. Cumulative impacts model and lifecycle impacts model for assessing economic and fiscal impacts of offshore oil and gas activities. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, New Orleans Office. 110 p. Report No.: OCS Study BOEM 2020-032. [https://espis.boem.gov/final%20reports/BOEM\\_2020-032.pdf](https://espis.boem.gov/final%20reports/BOEM_2020-032.pdf).
- Pritsos KL, Perez CR, Muthumalage T, Dean KM, Cacela D, Hanson-Dorr K, Cunningham F, Bursian SJ, Link JE, Shriner S, et al. 2017. Dietary intake of Deepwater Horizon oil-injected live food fish by doublecrested cormorants resulted in oxidative stress. Ecotoxicology and Environmental Safety. 146. doi:10.1016/j.ecoenv.2017.06.067.
- Pulster E, Gracia A, Armenteros M, Carr BE, Mrowicki J, Murawski SA. 2020a. Chronic PAH exposures and associated declines in fish health indices observed for ten grouper species in the Gulf of Mexico. Science of the Total Environment. 703:135551. doi:10.1016/j.scitotenv.2019.135551.
- Pulster E, Gracia A, Armenteros M, Toro-Farmer G, Snyder SM, Carr BE, Schwaab MR, Nicholson TJ, Mrowicki J, Murawski SA. 2020b. A first comprehensive baseline of hydrocarbon pollution in Gulf of Mexico fishes. Scientific Reports. 10(1):6437. doi:10.1038/s41598-020-62944-6.

- Purtlebaugh CH, Martin CW, Allen MS. 2020. Poleward expansion of common snook *Centropomus undecimalis* in the northeastern Gulf of Mexico and future research needs. PLoS ONE. 15(6):e0234083. doi:10.1371/journal.pone.0234083.
- Putman NF, Seney EE, Verley P, Shaver DJ, López-Castro MC, Cook M, Guzmán V, Brost B, Ceriani SA, Mirón R, et al. 2019. Predicted distributions and abundances of the sea turtle 'lost years' in the western North Atlantic Ocean. *Ecography*. 43(4):506-517. doi:10.1111/ecog.04929.
- Railroad Commission of Texas. 2020a. State offshore crude oil and casinghead gas production for May 2020. Austin (TX): State of Texas, Railroad Commission of Texas. [accessed 2020 Oct 10]. <https://www.rrc.texas.gov/media/hk1htaks/2020-12-offshore-oil.pdf>.
- Railroad Commission of Texas. 2020b. State offshore gas well gas and condensate production for May 2020. Austin (TX): State of Texas, Railroad Commission of Texas. [accessed 2021 Oct 10]. <https://www.rrc.texas.gov/media/zg2fvhct/2020-12-offshore-gas.pdf>.
- Redden J. 2020. Deepwater development is holding steady. Portland (ME): Workboat; [updated 2020 Jun 16; accessed 2020 Jun 17]. <https://www.workboat.com/blogs/energy-level/deepwater-development-is-holdingsteady/>.
- Rees MA, Huey SM, Sorset S. 2019. An assessment of the effects of an oil spill on coastal archaeological sites in Louisiana. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 315 p. Report No.: OCS Study BOEM 2019-025. [https://espis.boem.gov/final%20reports/BOEM\\_2019-025.pdf](https://espis.boem.gov/final%20reports/BOEM_2019-025.pdf).
- Remsen JV, Wallace BP, Seymour MA, O'Malley DA, Johnson EI. 2019. The regional, national, and international importance of Louisiana's coastal avifauna. *The Wilson Journal of Ornithology*. 131(2):221-434. doi:10.1676/18-111.
- Rennert K, Roy N, Burtraw D. 2022. Modeled effects of Inflation Reduction Act of 2022. Slides from: RFF Live: Inflation Reduction Act of 2022: modeling major climate and energy provisions.
- Reuscher MG, Baguley JG, Montagna PA. 2020. The expanded footprint of the Deepwater Horizon oil spill in the Gulf of Mexico deep-sea benthos. PLoS ONE. 15(6):e0235167. doi:10.1371/journal.pone.0235167.
- Reuters. 2018. Crude exports hit record highs; Shell PA cracker bypasses steel hurdle; Enterprise begins NGL construction in Texas. London (UK): Reuters; [updated 2018 Sep 7; accessed 2021 Nov 25]. <http://analysis.petchem-update.com/operations-maintenance/crude-exports-hit-record-highs-shell-pa-cracker-bypasses-steel-hurdle>.
- Reynolds EM, Cowan Jr. JH, Lewis KA, Simonsen KA. 2018. Method for estimating relative abundance and species composition around oil and gas platforms in the northern Gulf of Mexico, U.S.A. *Fisheries Research*. 201:44-55. doi:10.1016/j.fishres.2018.01.002.
- Rezak R, Bright TJ. 1981. Northern Gulf of Mexico topographic features study: final report, volumes 1-5. New Orleans (LA): U.S. Department of the Interior, Bureau of Land Management,

- Outer Continental Shelf Office. 929 p. Report No.: TR 81-2-T. <https://marinecadastre.gov/espis/#/search/study/15145>.
- Riches TJ. 2020. 2017-2022 E&D activity scenario response to COVID & 800-1600m lease term change [official communication; email from BOEM on 2020 Jul 21]. 3 p.
- Richman BT. 2015. Historic climate agreement reached in Paris. *Eos*. 96. doi:10.1029/2015EO041471.
- Robertson DR, Soimoes N, Gutiérrez Rodríguez C, Piñeros VJ, Perez-España H. 2016. An Indo-Pacific damselfish well established in the southern Gulf of Mexico: prospects for a wider, adverse invasion. *Journal of the Ocean Science Foundation*. 19:1-17. doi:10.5281/zenodo.44898.
- Romero IC, Judkins H, Vecchione M. 2020. Temporal variability of polycyclic aromatic hydrocarbons in deep-sea cephalopods of the northern Gulf of Mexico. *Frontiers in Marine Science*. 7:54. doi:10.3389/fmars.2020.00054.
- Rosel PE, Corkeron P, Engleby L, Epperson D, Mullin KD, Soldevilla MS, Taylor BL. 2016. Status review of Bryde's whales (*Balaenoptera edeni*) in the Gulf of Mexico under the Endangered Species Act. Miami (FL): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. 149 p. Report No.: NOAA Technical Memorandum NMFS-SEFSC-692. <https://repository.library.noaa.gov/view/noaa/14180>.
- Rosel PE, Garrison LP. 2022. Rice's whale core distribution map. Version: 7 June 2019. Key Biscayne (FL): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. 4 p. Report No.: Southeast Fisheries Science Center Reference Document MMTD-2022-01.
- Rosel PE, Wilcox LA, Yamada TK, Mullin KD. 2021. A new species of baleen whale (*Balaenoptera*) from the Gulf of Mexico, with a review of its geographic distribution. *Marine Mammal Science*. 37(2):577-610. doi:10.1111/mms.12776.
- Rung AL, Gaston S, Oral E, Robinson WT, Fonham E, Harrington DJ, Trapido E, Peters ES. 2016. Depression, mental distress, and domestic conflict among Louisiana women exposed to the Deepwater Horizon oil spill in the WaTCH study. *Environmental Health Perspectives*. 124(9):1429-1435. doi:10.1289/EHP167.
- Rung AL, Gaston S, Robinson WT, Trapido EJ, Peters ES. 2017. Untangling the disaster-depression knot: the role of social ties after Deepwater Horizon. *Social Science & Medicine*. 177:19-26. doi:10.1016/j.socscimed.2017.01.041.
- Rung AL, Oral E, Fonham E, Harrington DJ, Trapido EJ, Peters ES. 2019. The long-term effects of the Deepwater Horizon oil spill on women's depression and mental distress. *Disaster Medicine and Public Health Preparedness*. 13(2):183-190. doi:10.1017/dmp.2018.14.

- Ruppel CD, Weber TC, Staaterman ER, Labak SJ, Hart PE. 2022. Categorizing active marine acoustic sources based on their potential to affect marine animals. *Journal of Marine Science and Engineering*. 10(9):1278. doi:10.3390/jmse10091278.
- Russell RW. 2005. Interactions between migrating birds and offshore oil and gas platforms in the northern Gulf of Mexico: final report. New Orleans (LA): U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. 330 p. Report No.: OCS Study MMS 2005-009. <https://espis.boem.gov/final%20reports/2955.pdf>.
- Salerno JL, Little B, Lee J, Hamdan LJ. 2018. Exposure to crude oil and chemical dispersant may impact marine microbial biofilm composition and steel corrosion. *Frontiers in Marine Science*. 5:196. doi:10.3389/fmars.2018.00196.
- SBA. 2020. Economic injury disaster loans. Washington (DC): U.S. Small Business Administration; [accessed 2021 Oct 15]. <https://www.sba.gov/funding-programs/disaster-assistance/economic-injury-disaster-loans>.
- Schawlm CR, Glendon S, Duffy PB. 2020. RCP8.5 tracks cumulative CO<sub>2</sub> emissions. *PNAS*. 117(33):19656-19657. doi:10.1073/pnas.2007117117.
- Schewe RL, Hoffman D, Witt J, Shoup B, Freeman M. 2019. Citizen-science and participatory research as a means to improve stakeholder engagement in resource management: a case study of Vietnamese American fishers on the US Gulf Coast. *Environmental Management*. 65:74-87. doi:10.1007/s00267-019-01223-1.
- Schleifstein M. 2018a. Proposed oil export terminal may conflict with mid-Barataria sediment diversion. *The Times-Picayune*. 2018 Sep 6. [accessed 2021 Oct 15]. <https://www.nola.com/expo/news/erry-2018/09/ee9b94614c5492/proposed-oil-export-terminal-m.html>.
- Schleifstein M. 2018b. What's the Gulf Coast's future in confronting rapid environmental changes? *The Times-Picayune*. 2018 Jun 27. [accessed 2021 Sep 9]. [https://www.nola.com/news/environment/article\\_6c3b94f1-d5e1-5df5-979a-e269c1edd4c6.html](https://www.nola.com/news/environment/article_6c3b94f1-d5e1-5df5-979a-e269c1edd4c6.html).
- Schleifstein M. 2019a. Louisiana's DEQ saw among largest cuts to state environmental agencies over past 10 years. *The Times-Picayune*. 2019 Dec 5. [accessed 2019 Dec 27]. [https://www.nola.com/news/environment/article\\_b9edcfcc-16fa-11ea-9a1f-e37486f9b033.html](https://www.nola.com/news/environment/article_b9edcfcc-16fa-11ea-9a1f-e37486f9b033.html).
- Schleifstein M. 2019b. Mark Schleifstein: Louisiana is backsliding after making environmental progress. It's troubling. *The Times-Picayune*. 2019 Oct 30. [accessed 2019 Nov 19]. [https://www.nola.com/news/environment/article\\_8bcba3be-f74a-11e9-a7d3-4391c648b565.html](https://www.nola.com/news/environment/article_8bcba3be-f74a-11e9-a7d3-4391c648b565.html).
- Schleifstein M. 2020. Number of 'orphaned' wells increased by 50 percent, could cost state millions: audit. *The Times-Picayune*. 2020 Apr 19. [accessed 2020 Apr 22]. [https://www.nola.com/news/business/article\\_313d8dd2-7a9d-11ea-b4a4-e7675d1484f7.html](https://www.nola.com/news/business/article_313d8dd2-7a9d-11ea-b4a4-e7675d1484f7.html).

- Schlenker LS, Stieglitz JD, Greer JB, Faillettaz R, Lam CH, Hoenig RH, Heuer RM, McGuigan CJ, Pasparakis C, Esch EB, et al. 2022. Brief oil exposure reduces fitness in wild Gulf of Mexico mahi-mahi (*Coryphaena hippurus*). *Environmental Science & Technology*. 56:13019-13028. doi:10.1021/acs.est.2c01783.
- Schneider M. 2021. Team selected to estimate abundance of Greater Amberjack in South Atlantic, Gulf of Mexico. Ocean Springs (MS): Mississippi-Alabama Sea Grant Consortium; [updated 2021 Aug 25; accessed 2021 Sep 30]. <https://masgc.org/news/article/team-selected-to-estimate-abundance-of-greater-amberjack-in-south-atlantic>.
- Schwacke LH, Smith CR, Townsend FI, Wells RS, Hart LB, Balmer BC, Collier TK, de Guise S, Fry MM, Guillette Jr. LJ, et al. 2014. Health of common bottlenose dolphins (*Tursiops truncatus*) in Barataria Bay, Louisiana, following the Deepwater Horizon oil spill. *Environmental Science & Technology*. 48(1):93-103. doi:10.1021/es403610f.
- Schwacke LH, Thomas L, Wells RS, McFee WE, Hohn AA, Mullin KD, Zolman ES, Quigley BM, Rowles TK, Schwacke JH. 2017. Quantifying injury to common bottlenose dolphins from the *Deepwater Horizon* oil spill using an age-, sex- and class-structured population model. *Endangered Species Research*. 33:265-279. doi:10.3354/esr00777.
- Schwing PT, Montagna PA, Joye SB, Paris CB, Cordes EE, McClain CR, Kilborn JP, Murawski SA. 2020. A synthesis of deep benthic faunal impacts and resilience following the Deepwater Horizon oil spill. *Frontier in Marine Science*. 7:560012. doi:10.3389/fmars.2020.560012.
- Scott M. 2019. Prepare for more downpours: heavy rain has increased across most of the United States, and is likely to increase further. Washington (DC): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate; [updated 2019 Jul 10; accessed 2020 Sep 9]. <https://www.climate.gov/news-features/featured-images/prepare-more-downpours-heavy-rain-has-increased-across-most-united-0>.
- Senzaki M, Kadoya T, Francis C. 2020. Direct and indirect effects of noise pollution alter biological communities in and near noise-exposed environments. *Proceedings of the Royal Society B*. 287:20200176. doi:10.1098/rspb.2020.0176.
- Shantharam AK, Baco AR. 2020. Biogeographic and bathymetric patterns of benthic molluscs in the Gulf of Mexico. *Deep Sea Research Part I: Oceanographic Research Papers*. 155:103167. doi:10.1016/j.dsr.2019.103167.
- Sharp J. 2019. 'All bets are off': toxic algae bloom shuts Mississippi beaches, causes worry in Alabama. *Mobile Press-Register*. 2019 Jul 12. [accessed 2020 Oct 7]. <https://www.al.com/news/mobile/2019/07/all-bets-are-off-toxic-algae-bloom-shutters-mississippi-beaches-causes-worry-in-alabama.html>.
- Sharp J. 2020. From bust to boom: Alabama beach rentals fill up, but will the good times last? *Mobile Press Register*. 2020 May 22. [accessed 2020 Jul 27]. <https://www.al.com/business/2020/05/from-bust-to-boomalabama-beach-rentals-fill-up-but-will-the-good-times-last.html>.

- Sharp SM, McLellan WA, Rotstein DS, Costidis AM, Barco SG, Durham K, Pitchford TD, Jackson KA, Daoust P-Y, Wimmer T, et al. 2019. Gross and histopathologic diagnoses from North Atlantic right whale *Eubalaena glacialis* mortalities between 2003 and 2018. *Diseases of Aquatic Organisms*. 135:1-31. doi:10.3354/dao03376.
- Shaver DJ, Hart KM, Fujisaki I, Bucklin D, Iverson AR, Rubio C, Backof TF, Burchfield PM, Mirón R, Dutton PH, et al. 2017. Inter-nesting movements and habitat-use of adult female Kemp's ridley turtles in the Gulf of Mexico. *PLoS ONE*. 12(3):e0174248. doi:10.1371/journal.pone.0174248.
- Simms JRZ. 2017. "Why would I live anyplace else?": resilience, sense of place, and possibilities of migration in coastal Louisiana. *Journal of Coastal Research*. 33(2):408-420. doi:10.2112/JCOASTRES-D-15-00193.1.
- Small J. 2021 Sep 14. New Orleans seeks sustainability as it rebuilds from hurricane once again. *Newsweek*. [accessed 2021 Oct 25]. <https://www.newsweek.com/new-orleans-seeks-sustainability-it-rebuilds-hurricane-once-again-1628653>.
- Smith CR, Rowles TK, Hart LB, Townsend FI, Wells RS, Zolman ES, Balmer BC, Quigley B, Ivančić M, McKercher W, et al. 2017. Slow recovery of Barataria Bay dolphin health following the *Deepwater Horizon* oil spill (2013-2014), with evidence of persistent lung disease and impaired stress response. *Endangered Species Research*. 33:127-142. doi:10.3354/esr00778.
- Sneath S. 2020. The novel coronavirus has made its way onto oil platforms in the Gulf of Mexico. *The Times-Picayune*. 2020 Apr 15. [accessed 2020 Apr 16]. [https://www.nola.com/news/coronavirus/article\\_05436a90-7e61-11ea-90f2-abe500e39278.html](https://www.nola.com/news/coronavirus/article_05436a90-7e61-11ea-90f2-abe500e39278.html).
- Snyder SM, Pulster EL, Murawski SA. 2019. Associations between chronic exposure to polycyclic aromatic hydrocarbons and health indices in Gulf of Mexico tilefish (*Lopholatilus chamaeleonticeps*) post Deepwater Horizon. *Environmental Toxicology and Chemistry*. 38(12):2659-2671. doi:10.1002/etc.4583.
- Soldevilla MS, Debich AJ, Garrison LP, Hildebrand JA, Wiggins SM. 2022. Rice's whales in the northwestern Gulf of Mexico: call variation and occurrence beyond the known core habitat. *Endangered Species Research*. 48:155-174. doi:10.3354/esr01196.
- Southall BL, Finneran JJ, Reichmuth C, Nachtigall PE, Ketten DR, Bowles AE, Ellison WT, Nowacek DP, Tyack PL. 2019. Marine mammal noise exposure criteria: updated scientific recommendations for residual hearing effects. *Aquatic Mammals*. 45(2):125-232. doi:10.1578/AM.45.2.2019.125.
- Spanger-Siegfried E, Dahl K, Caldas A, Udvardy S, Cleetus R, Worth P, Hammer NH. 2017. When rising seas hit home: hard choices ahead for hundreds of US coastal communities. Cambridge (MA): Union of Concerned Scientists. 64 p. <https://ucsusa.org/resources/when-rising-seas-hit-home>.
- Stacy NI, Field CL, Staggs L, MacLean RA, Stacy BA, Keene J, Cacula D, Pelton C, Cray C, Kelley M, et al. 2017. Clinicopathological findings in sea turtles assessed during the *Deepwater Horizon* oil spill response. *Endangered Species Research*. 33:25-37. doi:10.3354/esr00769.

- Stewart JD, Nuttall M, Hickerson EL, Johnston MA. 2018. Important juvenile manta ray habitat at Flower Garden Banks National Marine Sanctuary in the northwestern Gulf of Mexico. *Marine Biology*. 165:151. doi:10.1007/s00227-018-3364-5.
- Stickney K. 2020. Oil and gas is 'done' for 2020, energy economist says; gas as low as \$1.29 per gallon in Louisiana. *The Advocate*. 2020 Mar 25. [accessed 2020 Mar 27]. [https://www.theadvocate.com/acadiana/news/coronavirus/article\\_e309e14e-6ed3-11ea-95ce-8f6f4cc9fb22.html](https://www.theadvocate.com/acadiana/news/coronavirus/article_e309e14e-6ed3-11ea-95ce-8f6f4cc9fb22.html).
- Strelitz J, Engel LS, Kwok RK, Miller AK, Blair A, Sandler DP. 2018. Deepwater Horizon oil spill exposures and nonfatal myocardial infarction in the GULF STUDY. *Environmental Health*. 17(1):69. doi:10.1186/s12940-018-0408-8.
- Stuntz GW, Patterson III WF, Powers SP, Cowan Jr J, Rooker JR, Ahrens RA, Boswell K, Carleton L, Catalano M, Drymon JM, et al. 2021. Estimating the absolute abundance of age-2+ red snapper (*Lutjanus campechanus*) in the U.S. Gulf of Mexico. Ocean Springs (MS): Mississippi-Alabama Sea Grant Consortium, NOAA Sea Grant. 408 p. [accessed 2021 Oct 25]. [https://www.harte.org/sites/default/files/inline-files/Great%20Red%20Snapper%20Count\\_Final%20Report.pdf](https://www.harte.org/sites/default/files/inline-files/Great%20Red%20Snapper%20Count_Final%20Report.pdf).
- Substance Abuse and Mental Health Services Administration, CDC. 2013. Behavioral health in the gulf coast region following the *Deepwater Horizon* oil spill. Rockville (MD) and Atlanta (GA): Substance Abuse and Mental Health Services Administration, Centers for Disease Control and Prevention. 70 p. Report No.: (SMA) 13-4737. [accessed 2021 Oct 4]. <https://www.samhsa.gov/data/sites/default/files/NSDUH-GSPS-GulfCoast-Apps-2012/NSDUH-GSPS-GulfCoast-2012.pdf>.
- Suter JR, Berryhill Jr. HL. 1985. Late quaternary shelf-margin deltas, northwest Gulf of Mexico. *American Association of Petroleum Geologists Bulletin*. 69(1):77-91. doi:10.1306/AD461B92-16F7-11D7-8645000102C1865D.
- Sweet WV, Hamlington BD, Kopp RE, Weaver CP, Barnard PL, Bekaert D, Brooks W, Craghan M, Dusek G, Frederikse T, et al. 2022. Global and regional sea level rise scenarios for the United States: updated mean projections and extreme water level probabilities along U.S. coastlines. Silver Spring (MD): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service. 111 p. Report No.: NOAA Technical Report NOS 01. <https://oceanservice.noaa.gov/hazards/sealevelrise/noaa-nos-techrpt01-global-regional-SLR-scenarios-US.pdf>.
- Takeshita R, Sullivan L, Smith C, Collier T, Hall A, Brosnan T, Rowles T, Schwacke L. 2017. The *Deepwater Horizon* oil spill marine mammal injury assessment. *Endangered Species Research*. 33:95-106. doi:10.3354/esr00808.
- Tatarw C, Flournoy N, Kleinhuizen AA, Tulette D, Overton EB, Sobecky PA, Mortazavi B. 2018. Salt marsh denitrification is impacted by oiling intensity six years after the *Deepwater Horizon* oil spill. *Environmental Pollution*. 243(Part B):1606-1614. doi:10.1016/j.envpol.2018.09.034.

- Taylor DB. 2020. A timeline of the coronavirus pandemic. The New York Times. 2020 Apr 14. [accessed 2020 Apr 17]. <https://www.nytimes.com/article/coronavirus-timeline.html>.
- The White House. 2020. Memorandum on withdrawal of certain areas of the United States Outer Continental Shelf from leasing disposition. Washington (DC): U.S. National Archives and Records Administration, Office of the Federal Register. 1 p. Report No.: DCPD-202000659. [accessed 2022 Apr 20]. <https://www.govinfo.gov/app/details/DCPD-202000659/>.
- The White House. 2021. Fact sheet: President Biden sets 2030 greenhouse gas pollution reduction target aimed at creating good-paying union jobs and securing U.S. leadership on clean energy technologies. Washington (DC): The White House; [accessed 2022 Dec 12]. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>.
- Tolbert M, O'Reilly E, Sanders R, Rodgers B. 2017. Chemical/drilling fluid spills and spills page [official communication; email from BOEM on 2017 Dec 4-6]. 7 p.
- Tong D, Zhang Q, Zheng Y, Caldeira K, Shearer C, Hong C, Qin Y, Davis SJ. 2019. Committed emissions from existing energy infrastructure jeopardize 1.5°C climate target. *Nature*. 572:373-377. doi:10.1038/s41586-019-1364-3.
- Törnqvist TE, Jankowski KL, Li Y-X, González JL. 2020. Tipping points of Mississippi Delta marshes due to accelerated sea-level rise. *Science Advances*. 6(21):eaaz5512. doi:10.1126/sciadv.aaz5512.
- Traywick C. 2016. Louisiana's sinking coast is a \$100 billion nightmare for big oil. Bloomberg. 2016 Aug 17. [accessed 2018 Sep 12]. <https://www.bloomberg.com/news/features/2016-08-17/louisiana-s-sinking-coast-is-a-100-billion-nightmare-for-big-oil#:~:text=Saving%20Louisiana's%20coastline%20could%20cost,companies%20for%20even%20more%20cash.>
- Turner RE, Rabalais NN. 2019. The Gulf of Mexico. In: Sheppard C, editor. *World seas: an environmental evaluation*. 2nd ed. London (UK): Academic Press. Chapter 18; p. 445-464. [https://www.researchgate.net/publication/330046116\\_The\\_Gulf\\_of\\_Mexico](https://www.researchgate.net/publication/330046116_The_Gulf_of_Mexico).
- U.S. Congress. 2017. Tax Cuts and Jobs Act of 2017. Public Law 115-97, 131 Stat. 2054 (December 22, 2017). [accessed 2021 Sep 24]. <https://www.congress.gov/115/plaws/publ97/PLAW-115publ97.pdf>.
- U.S. Global Change Research Program. 2018. Fourth national climate assessment. Volume II: impacts, risks, and adaptation in the United States. Washington (DC): U.S. Global Change Research Program. 1526 p. <https://nca2018.globalchange.gov/>.
- U.S. Travel Association. 2020. Economic impact map: the economic impact of the travel industry. Washington (DC): U.S. Travel Association; [accessed 2021 Sep 25]. <https://www.ustravel.org/economic-impact>.

- Upton HF. 2020. COVID-19 and the U.S. seafood sector. Washington (DC): Congressional Research Service. 18 p. Report No.: R46535. [accessed 2021 Oct 13]. <https://crsreports.congress.gov/product/pdf/R/R46535>
- USACE. 2019. Spillway operational effects. New Orleans (LA): U.S. Department of the Army, Corps of Engineers, New Orleans District; [accessed 2019 Sep 11]. <https://www.mvn.usace.army.mil/Missions/Mississippi-River-Flood-Control/Bonnet-Carre-Spillway-Overview/Spillway-Operation-Information/>.
- USCG. 2021. Coast Guard conducts overflights, responds to multiple oil spills along Southeast Louisiana. New Orleans (LA): U.S. Department of Homeland Security, U.S. Coast Guard; [updated 2021 Sep 9; accessed 2021 Oct 21]. <https://content.govdelivery.com/accounts/USDHSCG/bulletins/2eff5e7>.
- USEPA. 2012. National coastal condition report IV. Washington (DC): U.S. Environmental Protection Agency, Office of Research and Development, Office of Water. 334 p. Report No.: EPA-842-R-10-003. [https://www.epa.gov/sites/production/files/2014-10/documents/0\\_nccr\\_4\\_report\\_508\\_bookmarks.pdf](https://www.epa.gov/sites/production/files/2014-10/documents/0_nccr_4_report_508_bookmarks.pdf).
- USEPA. 2017a. Inventory of U.S. greenhouse gas emissions and sinks:1990-2015. Washington (DC): U.S. Environmental Protection Agency. 633 p. Report No.: EPA 430-P-17-001. [https://www.epa.gov/sites/production/files/2017-02/documents/2017\\_complete\\_report.pdf](https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf).
- USEPA. 2017b. National Pollutant Discharge Elimination System Permit (NPDES) for new and existing sources and new dischargers 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. Washington (DC): U.S. Environmental Protection Agency. 146 p. Report No.: GMG290000. [https://www.epa.gov/sites/production/files/2017-09/documents/2017\\_final\\_gp\\_for\\_fr\\_091817.pdf](https://www.epa.gov/sites/production/files/2017-09/documents/2017_final_gp_for_fr_091817.pdf).
- USEPA. 2017c. Region 4, final National Pollutant Discharge Elimination System (NPDES) general permit No. GEG460000 for offshore oil and gas activities in the eastern Gulf of Mexico. Atlanta (GA): U.S. Environmental Protection Agency, Region 4. 610 p. [https://www.epa.gov/sites/default/files/2017-12/documents/final\\_permit\\_offshoreoilgas\\_geg460000\\_-\\_122017-sm.pdf](https://www.epa.gov/sites/default/files/2017-12/documents/final_permit_offshoreoilgas_geg460000_-_122017-sm.pdf).
- USEPA. 2020. 2017 national emissions inventory (NEI) data. Research Triangle Park (NC): U.S. Environmental Protection Agency; [updated 2020 Jul 7; accessed 2021 Feb 28]. <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data>.
- USEPA. 2021a. Climate change and social vulnerability in the United States: a focus on six impacts. Washington (DC): U.S. Environmental Protection Agency. 101 p. Report No.: EPA 430-R-21-003. [accessed 2021 Oct 13]. [https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability\\_september-2021\\_508.pdf](https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf).
- USEPA. 2021b. Emission factors for greenhouse gas inventories. Washington (DC): U.S. Environmental Protection Agency. [accessed 2021 Oct 15]. [https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors\\_apr2021.pdf](https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf).

- USEPA. 2021c. National coastal condition assessment. Washington (DC): U.S. Environmental Protection Agency, Office of Research and Development, Office of Water. 87 p. Report No.: EPA 841-R-21-001.
- USEPA. 2022a. Commercial vessel discharge standards. U.S. Environmental Protection Agency; [accessed 2022 Dec 14]. <https://www.epa.gov/vessels-marinas-and-ports/commercial-vessel-discharge-standards>.
- USEPA. 2022b. The 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 (GMG290000). Dallas (TX): U.S. Environmental Protection Agency, Region 6. 150 p.
- Varnado DA, Fannin JM. 2018. Finalizing and describing new economic impact areas for the Gulf of Mexico region. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 238 p. Report No.: OCS Study BOEM 2018-014. [accessed 2020 Oct 7]. <https://espis.boem.gov/final%20reports/5665.pdf>.
- Vaz AC, Paris CB, Olascoaga MJ, Kourafalou VH, Kang H, Reed JK. 2016. The perfect storm: match-mismatch of bio-physical events drives larval reef fish connectivity between Pulley Ridge mesophotic reef and the Florida Keys. *Continental Shelf Research*. 125:136-146. doi:10.1016/j.csr.2016.06.012.
- Venn-Watson S, Colegrove KM, Litz J, Kinsel M, Terio K, Saliki J, Fire S, Carmichael R, Chevis C, Hatchett W, et al. 2015. Adrenal gland and lung lesions in Gulf of Mexico common bottlenose dolphins (*Tursiops truncatus*) found dead following the *Deepwater Horizon* oil spill. *PLoS ONE*. 10(5):e0126538. doi:10.1371/journal.pone.0126538.
- Vohsen SA, Fisher CR, Baums IB. 2019. Metabolomic richness and fingerprints of deep-sea coral species and populations. *Metabolomics*. 15(3):34. doi:10.1007/s11306-019-1500-y.
- Volz D. 2013. Port Fourchon completes dredging as part of big expansion project. *Professional Mariner*. 2013 Mar 27. [accessed 2018 Nov 16]. <http://www.professionalmariner.com/April-2013/Port-Fourchon-completes-dredging-as-part-of-big-expansion-project/>.
- Wade TL, Sericano JL, Sweet ST, Knapp AH, Guinasso Jr NL. 2015. Spatial and temporal distribution of water column total polycyclic aromatic hydrocarbons (PAH) and total petroleum hydrocarbons (TPH) from the *Deepwater Horizon* (Macondo) incident. *Marine Pollution Bulletin*. 103(1-2):286-293. doi:10.1016/j.marpolbul.2015.12.002.
- Walck L. 2019. All Mississippi coast beaches are open and safe to swim in again, MDEQ says. *SunHerald*. 2019 Oct 4. [accessed 2020 Feb 5]. <https://www.sunherald.com/news/local/article235824547.html>.
- Walker AH, Fingas M. 2017. Oil spills and risk perceptions. Oxford: Gulf Professional Publishing. 70 p.

- Wallace BP, Stacy BA, Rissing M, Cacela D, Garrison LP, Graettinger GD, Holmes JV, McDonald T, McLamb D, Schroeder B. 2017. Estimating sea turtle exposures to *Deepwater Horizon* oil. *Endangered Species Research*. 33:51-67. doi:10.3354/esr00728.
- Wang M, Hu C, Barnes BB, Mitchum G, Lapointe B, Montoya JP. 2019. The great Atlantic *Sargassum* belt. *Science*. 365:83–87. doi:10.1126/science.aaw7912.
- Ward EJ, Oken KL, Rose KA, Sable S, Watkins K, Holmes EE, Scheuerell MD. 2018. Applying spatiotemporal models to monitoring data to quantify fish population responses to the Deepwater Horizon oil spill in the Gulf of Mexico. *Environmental Monitoring and Assessment*. 190:530. doi:10.1007/s10661-018-6912-z.
- Weatherly J. 2019a. Algal bloom cost Mississippi coast tourism \$4.1 million in June, July. *Mississippi Business Journal*. 2019 Oct 23. [accessed 2020 Oct 7]. [https://www.djournal.com/mbj/news/economic-development/algal-bloom-cost-mississippi-coast-tourism-4-1-million-in-june-july/article\\_c1a260e6-270e-5597-b4e7-a19d3c923085.html](https://www.djournal.com/mbj/news/economic-development/algal-bloom-cost-mississippi-coast-tourism-4-1-million-in-june-july/article_c1a260e6-270e-5597-b4e7-a19d3c923085.html).
- Weatherly J. 2019b. State officials: it's safe to swim and eat seafood in coastal Mississippi. *Mississippi Business Journal*. 2019 Jul 18. [accessed 2022 Jan 24]. <https://web.archive.org/web/20190718212620/https://msbusiness.com/2019/07/state-officials-its-safe-to-swim-and-eat-seafood-in-coastal-mississippi/>.
- Wendt L. 2017. Bureau of Ocean Energy Management (BOEM) 2019-2024 national outer continental shelf (OCS) oil and gas leasing program [official communication; email from Muscogee (Creek) Nation on 2017 Sep 29]. 2 p.
- WGNO. 2016. \$8.5 billion natural gas plant and terminal planned for Plaquemines Parish. *WGNO*. 2016 Dec 21. [accessed 2022 Jan 24]. <https://wgno.com/2016/12/21/8-5-billion-natural-gas-plant-and-terminal-planned-for-plaquemines-parish/>.
- Wheeling K. 2020. The debate over the United Nations' energy emissions projections. *EOS*. 101. doi:10.1029/2020EO152901.
- White ER, Froehlich HE, Gephart JA, Cottrell RS, Branch TA, Bejarano RA, Baum JK. 2021. Early effects of COVID-19 on US fisheries and seafood consumption. *Fish and Fisheries*. 22(1):232-239. doi:10.1111/faf.12525.
- Wilson D, Billings R, Chang R, Do B, Enoch S, Perez H, Sellers J. 2019a. Year 2017 emissions inventory study. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 231 p. Report No.: OCS Study BOEM 2019-072. [accessed 2020 Nov 22]. [https://espis.boem.gov/final%20reports/BOEM\\_2019-072.pdf](https://espis.boem.gov/final%20reports/BOEM_2019-072.pdf).
- Wilson D, Billings R, Chang R, Enoch S, Do B, Perez H, Sellers J. 2017. Year 2014 Gulfwide emissions inventory study. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 289 p. Report No.: OCS Study BOEM 2017-044. [accessed 2020 Nov 22]. <https://espis.boem.gov/final%20reports/5625.pdf>.

- Wilson D, Stoeckenius T, Brashers B, Do B. 2019b. Air quality modeling in the Gulf of Mexico region. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 656 p. Report No.: OCS Study BOEM 2019-057. [accessed 2020 Oct 8]. [https://espis.boem.gov/final%20reports/BOEM\\_2019-057.pdf](https://espis.boem.gov/final%20reports/BOEM_2019-057.pdf).
- Woetzel J, Pinner D, Samandari H, Engel H, Krishnan M, Kampel C, Vasmel M. 2020. Climate risk and response: physical hazards and socioeconomic impacts. Will mortgages and markets stay afloat in Florida? New York (NY): McKinsey Global Institute. 30 p. <https://www.mckinsey.com/~media/mckinsey/business%20functions/sustainability/our%20insights/will%20mortgages%20and%20markets%20stay%20afloat%20in%20florida/mgi-will-mortgages-and-markets-stay-afloat-in-florida.pdf>.
- Wolvovsky E, Anderson W. 2016. OCS oil and natural gas: potential lifecycle greenhouse gas emissions and social cost of carbon. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 56 p. Report No.: OCS Report BOEM 2016-065. <https://www.boem.gov/sites/default/files/oil-and-gas-energy-program/Leasing/Five-Year-Program/2017-2022/OCS-Report-BOEM-2016-065---OCS-Oil-and-Natural-Gas---Potential-Lifecycle-GHG-Emissions-and-Social-Cost-of-Carbon.pdf>.
- Wright RM, Correa AMS, Quigley LA, Santiago-Vázquez LZ, Shamberger KEF, Davies SW. 2019. Gene expression of endangered coral (*Orbicella* spp.) in Flower Garden Banks National Marine Sanctuary after Hurricane Harvey. *Frontiers in Marine Science*. 6:672. doi:10.3389/fmars.2019.00672.
- Wu X, Nethery RC, Sabath MB, Braun D, Dominici F. 2020. Air pollution and COVID-19 mortality in the United States: strengths and limitations of an ecological regression analysis. *Science Advances*. 6(45):eabd4049. doi:10.1126/sciadv.abd4049.
- Yacovitch TI, Daube C, Herndon SC. 2020. Methane emissions from offshore oil and gas platforms in the Gulf of Mexico. *Environmental Science & Technology*. 54(6):3530-3538. doi:10.1021/acs.est.9b07148.
- Ylitalo GM, Collier TK, Anulacion BF, Juairé K, Boyer RH, da Silva DAM, Keene JL, Stacy BA. 2017. Determining oil and dispersant exposure in sea turtles from the northern Gulf of Mexico resulting from the *Deepwater Horizon* oil spill. *Endangered Species Research*. 33:9-24. doi:10.3354/esr00762.
- Zimmer B, Duncan L, Aronson RB, Deslarzes KJP, Deis DR, Robbart ML, Precht WF, Kaufman L, Shank B, Weil E, et al. 2010. Long-term monitoring at the East and West Flower Garden Banks, 2004-2008. Volume I: technical report. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement, Gulf of Mexico OCS Region. 240 p. Report No.: OCS Study BOEMRE 2010-052. [accessed 2020 Dec 23]. <https://permanent.fdlp.gov/gpo30155/Vol.%201/5058.pdf>.
- Zimmerman AN, Johnson CC, Bussberg NW, Dalkilic MM. 2020. Stability and decline in deep-sea coral biodiversity, Gulf of Mexico and US West Atlantic. *Coral Reefs*. 39:345-359. doi:10.1007/s00338-020-01896-9.

## **CHAPTER 7**

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## **CHAPTER 8**

## **GLOSSARY**



## 8 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).

**Anaerobic**—Capable of growing in the absence of molecular oxygen.

**Annular preventer**—A component of the pressure control system in the BOP that forms a seal in the annular space around any object in the wellbore or upon itself, enabling well control operations to commence.

**Anthropogenic**—Coming from human sources, relating to the effect of humankind on nature.

**Antipatharian Transitional Zone**—The area located between 50 and 90 m (164 and 295 ft), where available light is reduced and there is a gradual ecosystem change from tropical shallow-water corals that are dependent on light to deeper water species, such as antipatharian black corals that are not.

**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.

**Attainment area**—An area that is shown by monitored data or by air-quality modeling calculations to be in compliance with primary and secondary ambient air quality standards established by USEPA.

**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<sup>2</sup>).

**Blowout**—An uncontrolled flow of fluids below the mudline from appurtenances on a wellhead or from a wellbore.

**Blowout preventer (BOP)**—One of several valves installed at the wellhead to prevent the escape of pressure either in the annular space between the casing and drill pipe or in open hole (i.e., hole with no drill pipe) during drilling completion operations. Blowout preventers on jackup or platform rigs are located at the water's surface; on floating offshore rigs, BOPs are located on the seafloor.

**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.

**Condensate**—Liquid hydrocarbons produced with natural gas; they are separated from the gas by cooling and various other means. Condensates generally have an API gravity of 50°-120°.

**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 Mexico 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.

**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 and Production Plan (DPP)**—A document that must be prepared by the operator and submitted to BOEM for approval before any development and production activities are conducted on a lease or unit in any OCS area other than the western Gulf of Mexico.

**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 Mexico.

**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.

**Direct employment**—Consists of those workers involved in the primary industries of oil and gas exploration, development, and production operations (Standard Industrial Classification Code 13—Oil and Gas Extraction).

**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.

**Economically recoverable resources**—An assessment of hydrocarbon potential that takes into account the physical and technological constraints on production and the influence of costs of exploration and development and market price on industry investment in OCS exploration and production.

**Effluent**—The liquid waste of sewage and industrial processing.

**Effluent limitations**—Any restriction established by a State or USEPA on quantities, rates, and concentrations of chemical, physical, biological, and other constituents discharged from point sources into U.S. waters, including schedules of compliance.

**Epifaunal**—Animals living on the surface of hard substrate.

**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 nmi (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 determine whether economic quantities of oil or natural gas deposit are present.

**False crawls**—Refers to when a female sea turtle crawls up on the beach to nest (perhaps) but does not and returns to the sea without laying eggs.

**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.

**Gathering lines**—A pipeline system used to bring oil or gas production from a number of separate wells or production facilities to a central trunk pipeline, storage facility, or processing terminal.

**Geochemical**—Of or relating to the science dealing with the chemical composition of and the actual or possible chemical changes in the crust of the earth.

**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.

**Hermatypic coral**—Reef-building corals that produce hard, calcium carbonate skeletons and that possess symbiotic, unicellular algae within their tissues.

**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.

**Hermatypic**—Corals in the order Scleractinia that build reefs by depositing hard calcareous material for their skeletons, forming the stony framework of the reef. Corals that do not contribute to coral reef development are referred to as ahermatypic (non-reef-building) species.

**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.

**Kick**—A deviation or imbalance, typically sudden or unexpected, between the downward pressure exerted by the drilling fluid and the upward pressure of *in-situ* formation fluids or gases.

**Landfall**—The site where a marine pipeline comes to shore.

**Lease**—Authorization that is issued under Section 8 or maintained under Section 6 of the Outer Continental Shelf Lands Act 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.

**Longshore sediment transport**—The cumulative movement of beach sediment along the shore (and nearshore) by waves arriving at an angle to the coastline and by currents generated by such waves.

**Macondo**—Prospect name given by BP to the Mississippi Canyon Block 252 exploration well that the *Deepwater Horizon* rig was drilling when a blowout occurred on April 20, 2010.

**Macondo spill**—The name given to the oil spill that resulted from the explosion and sinking of the *Deepwater Horizon* rig from the period between April 24, 2010, when search and recovery vessels on site reported oil at the sea surface, and September 19, 2010, when the uncontrolled flow from the *Macondo* well was capped.

**Marshes**—Persistent, emergent, nonforested wetlands characterized by predominantly cordgrasses, rushes, and cattails.

**Military warning area**—An area established by the U.S. Department of Defense within which military activities take place.

**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.

**Nepheloid**—A layer of water near the bottom that contains significant amounts of suspended sediment.

**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.

**Nonhazardous oil-field wastes (NOW)**—Wastes generated by exploration, development, or production of crude oil or natural gas that are exempt from hazardous waste regulation under the Resource Conservation and Recovery Act (*Regulatory Determination for Oil and Gas and Geothermal Exploration, Development and Production Wastes*, dated June 29, 1988, 53 FR 25446; July 6, 1988). These wastes may contain hazardous substances.

**Oceanic zone**—Offshore water >200 m (656 ft) deep. It is the region of open sea beyond the edge of the continental shelf and includes 65 percent of the ocean's completely open water.

**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.

**Organic matter**—Material derived from living plants or animals.

**Outer Continental Shelf (OCS)**—All submerged lands that comprise the continental margin adjacent to the United States and seaward of State offshore lands.

**Passerines**—Perching birds (members of the Order Passeriformes) and songbirds.

**Potential Biological Removal (PBR)**—Of or pertaining to the open sea; associated with open water beyond the direct influence of coastal systems.

**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.

**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.

**Ram**—The main component of a blowout preventer designed to shear casing and tools in a wellbore or to seal an empty wellbore. A blind shear ram accomplishes the former and a blind ram the latter.

**Recoverable reserves**—The portion of the identified hydrocarbon or mineral resource that can be economically extracted under current technological constraints.

**Recoverable resource estimate**—An assessment of hydrocarbon or mineral resources that takes into account the fact that physical and technological constraints dictate that only a portion of resources can be brought to the surface.

**Recreational beaches**—Frequently visited, sandy areas along the Gulf of Mexico 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.

**Riser insertion tube tool**—A “straw” and gasket assembly improvised during the *Macondo* spill response that was designed to siphon oil and gas from the broken riser of the *Deepwater Horizon* rig lying on the sea bottom (an early recovery strategy for the *Macondo* spill in May 2010).

**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.

**Sciaenids**—Fishes belonging to the croaker family (Sciaenidae).

**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.

**Shear ram**—The component in a BOP that cuts, or shears, through the drill pipe and forms a seal against well pressure. Shear rams are used in floating offshore drilling operations to provide a quick method of moving the rig away from the hole when there is no time to trip the drill stem out of the hole.

**Site fidelity or philopatry**—The tendency to return to a previously occupied location.

**Spill of National Significance**—Designation by the USEPA Administrator under 40 CFR § 300.323 for discharges occurring in the inland zone and the Commandant of the U.S. Coast Guard for discharges occurring in the coastal zone, authorizing the appointment of a National Incident Commander for spill-response activity.

**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.

**Subsea isolation device**—An emergency disconnection and reconnection assembly for the riser at the seafloor.

**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.

- 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.
- Tidal prism**—The volume of water in an estuary or inlet between mean high tide and mean low tide, or the volume of water leaving an estuary at ebb tide.
- Trunkline**—A large-diameter pipeline receiving oil or gas from many smaller tributary gathering lines that serve a large area; common-carrier line; main line.
- 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.
- Water test areas**—Areas within the eastern Gulf where U.S. Department of Defense research, development, and testing of military planes, ships, and weaponry take place.
- Weathering (of oil)**—The aging of oil due to its exposure to the atmosphere, causing marked alterations in its physical and chemical makeup.



## **APPENDIX A**

### **PROPOSED LEASE MITIGATING MEASURES (STIPULATIONS)**



## **A PROPOSED LEASE MITIGATING MEASURES (STIPULATIONS)**

### **A.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.

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 for the 2017-2022 National OCS Oil and Gas Program, which will be considered for GOM Lease Sales 259 and 261, as well as from lease stipulations applied in previous lease sales. The Topographic Features and Live Bottom (Pinnacle Trend) Stipulations have been applied as programmatic mitigation in the 2017-2022 National OCS Program EIS (BOEM 2016c; 2016d) and Record of Decision (BOEM 2017d) and, therefore, would apply to all leases issued for GOM Lease Sales 259 and 261 in designated lease blocks. The other nine lease stipulations described below could be considered for GOM Lease Sales 259 and 261, as applicable. The analysis of any stipulations for any particular alternative does not ensure that the Assistant Secretary for Land and Minerals Management will make a decision 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 of the Interior, and any stipulations to be included in a lease sale are described in the Record of Decision 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. The BSEE has the authority to monitor and enforce these conditions and, under 30 CFR part 250 subpart 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 package will include maps indicating which blocks will have potential lease stipulations, and the “List of Blocks Available for Leasing” contained in the Final Notice of Sale package will identify the lease stipulations applicable to each block. The Final Notice of Sale package will contain the Final Notice of Sale, information to lessees, and lease stipulations. In addition, the Final Notice of Sale Package will show any additional areas not available for lease, including areas that have been removed from leasing in the Record of Decision. A list of potential lease stipulations for Gulf of Mexico 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;
- Stipulation No. 10 – Restrictions due to Rights-of-Use and Easements for Floating Production Facilities; and
- Stipulation No. 11 – Royalties on All Produced Gas.

## **A.2 STIPULATION NO. 1 – MILITARY AREAS**

### **A.2.1 Stipulation Overview**

Stipulation No. 1 may be included in leases, issued as a result of an OCS oil and gas lease sale, located within the Warning Areas and Eglin Water Test Areas as shown in **Figure A-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.

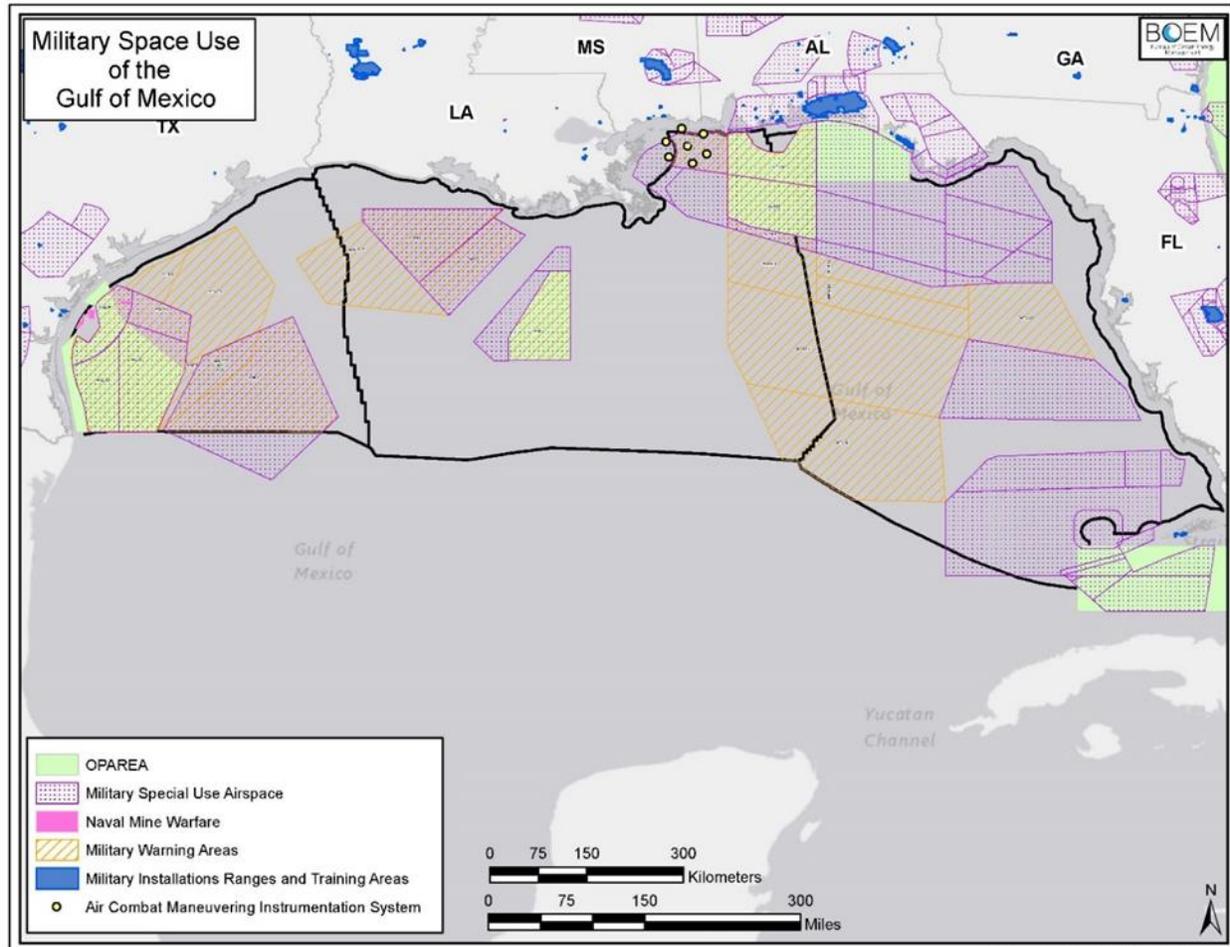


Figure A-1. Military Warning Areas and Eglin Water Test Areas in the Gulf of Mexico

## A.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	Contact(s)	Email	Phone
W-59	Naval Air Station JRB 159 Fighter Wing 400 Russell Avenue, Box 27 Building 285 (Operations) New Orleans, Louisiana 70143-0027	TSgt. Michael Frisard	michael.j.frisard.mil@mail.mil	(504) 391-8637
		TSgt. Scott Fenton	scott.p.fenton2.mil@mail.mil	(504) 391-8695 /8696
W-92	Fleet Area Control and Surveillance Facility Attention: Deputy Airspace Officer 118 Albemare Ave. P.O. Box 40 Jacksonville, Florida 32212	Ronald McNeal	ronald.mcNeal@navy.mil	(904) 542-2112
W-147	147 OSS/OSA 14657 Sneider Street Houston, Texas 77034-5586	Sgt. Dion Folley	dion.r.folley.mil@mail.mil	(281) 929-2142
		Sgt. Gina Turner	gina.l.turner@mail.mil	(281) 929-2710 /2803
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	Tom Bily	thomas.bily@navy.mil	(361) 961-0145
W-453	Air National Guard – CRTC 4715 Hewes Avenue, Building 60 Gulfport, Mississippi 39507-4324		usaf.ms.ms-crtc.mbx.msrtc-director-of-operations@mail.mil	(228) 214-6027

Warning and Water Test Area	Command Address	Contact(s)	Email	Phone
W-602	VQ-4 Operations Department 7791 Mercury Road Tinker AFB, Oklahoma 73145-8704		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	Steven C. Dietzius, Technical Director (96TW/CT)		(850) 882-0762
	Range and Operations Sustainment Section 96 TW/XPO Eglin AFB, Florida 32542	Mr. Charles Smith	charles.smith.7@us.af.mil	(850) 882-5614

### A.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 stipulation.

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.

## **A.3 STIPULATION NO. 2 – EVACUATION**

### **A.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 easternmost 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.

### **A.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 fourteen (14) days normally will be given before requiring a suspension or evacuation, but in no event will the notice be less than four (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 Mexico 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 seventy-two (72) hours; however, any such suspension may be extended by order of the BSEE Gulf of Mexico 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 Mexico 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.

### **A.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.

## **A.4 STIPULATION NO. 3 – COORDINATION**

### **A.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.

#### **A.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 Mexico 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 Mexico RD may approve the EP with conditions, disapprove it, or require modification in accordance with 30 CFR part 550. The BOEM Gulf of Mexico 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 Mexico 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 Mexico 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.

### **A.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 the national security or defense.

## **A.5 STIPULATION NO. 4 – PROTECTED SPECIES**

### **A.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. The Protected Species Stipulation has been applied to all blocks leased in the GOM since December 2001. This stipulation was developed in consultation with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service and the U.S. Department of the Interior, Fish and Wildlife Service in accordance with consultation requirements under the Endangered Species Act and the Marine Mammal Protection Act, and is designed to minimize or avoid potential adverse impacts to federally protected species under both Acts.

### **A.5.2 Potential Stipulation Language**

- A. The Endangered Species Act (16 U.S.C. §§ 1531 *et seq.*) and the Marine Mammal Protection Act (MMPA) (16 U.S.C. §§ 1361 *et seq.*) 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 that 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.
- B. The lessee and its operators 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 March 13, 2020 (2020 NMFS BiOp), as amended. This includes mitigation, particularly any appendices to 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 BiOp; and any additional reporting required by BOEM or BSEE developed as a result of implementation of the 2020 NMFS BiOp and 2021 Amended Incidental Take Statement (ITS) and Revised Appendices.

- The 2020 NMFS BiOp may be found here: <https://www.fisheries.noaa.gov/resource/document/biological-opinion-federally-regulated-oil-and-gas-program-activities-gulf-mexico>
  - The Appendices and protocols may be found here: <https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico>
  - The 2021 Amended ITS and Revised Appendices may be found here: <https://www.fisheries.noaa.gov/resource/document/amended-incident-take-statement-and-revised-appendices>
2. 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 2020 NMFS BiOp and 2021 Revised Appendix C. If oil and gas industry activity is responsible for the injured or dead animal (e.g., injury or death was caused by a vessel strike, entrapment or entanglement), the responsible parties must notify BOEM and BSEE within 24 hours of the strike or entrapment/entanglement by email to [protectedspecies@boem.gov](mailto:protectedspecies@boem.gov) and [protectedspecies@bsee.gov](mailto:protectedspecies@bsee.gov), respectively.
  3. Unless previously approved by BOEM or BSEE through a plan or permit issued under this lease, notify BOEM at least 15 days prior to any proposed vessel transit of the Bryde's whale area, and receive prior approval for that transit from BOEM. The Bryde's whale area, as described in the 2020 NMFS BiOp, includes the area from 100- to 400-meter isobaths from 87.5° W to 27.5° N as described in the status review (Rosel et al. 2016), plus an additional 10 km around that area.

The lessee and its operators, personnel, and subcontractors, while undertaking activities authorized under this lease, must implement and comply with the specific mitigation measures outlined in the following Appendices of the 2020 NMFS BiOp and 2021 Amended ITS and Revised Appendices:

- Appendix A: "Seismic Survey Mitigation and Protected Species Observer Protocols";
- Appendix B: "Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols";
- Appendix C: "Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols";
- Appendix I: "Explosive Removal of Structure Measures"; and
- Appendix J: "Sea Turtle Handling and Resuscitation Guidelines".

Certain post-lease approvals (e.g., for activities proposing new and unusual technologies, certain seismic surveys) will require step-down review by NMFS, as provided by the 2020 NMFS BiOp and 2021 Amended ITS, and additional mitigations to protect ESA-listed species may be applied at that time. 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 2020 NMFS BiOp, the 2021 ITS and Appendices, or through new or activity-specific consultations. The most current applicable terms and conditions and reasonable and prudent measures from the 2020 NMFS BiOp, 2021 Amended ITS and Appendices, or other relevant consultations will be applied to 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 2020 NMFS BiOp and 2021 Amended ITS (including Appendices), and additional measures in the conditions of approvals for their plans or permits.

### **A.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. Among other protections, these requirements and conditions provide protection by ensuring that operations are conducted at least a minimum distance away from the animal.

## **A.6 STIPULATION NO. 5 – TOPOGRAPHIC FEATURES**

### **A.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 GOM. The 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 were mitigated to the greatest extent possible. This stipulation does not prevent the recovery of oil and gas resources, but would serve to protect valuable and sensitive biological resources.

Because this stipulation has been applied as programmatic mitigation in the 2017-2022 National OCS Oil and Gas Program EIS (BOEM 2016c; 2016d) and Record of Decision (BOEM 2017d), it would apply to all leases issued for GOM Lease Sales 259 and 261 in designated lease blocks within the areas indicated in **Figure A-2**. The detailed topographic features map package is available from BOEM's New Orleans Office, Public Information Office and on BOEM's website 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 on BOEM's website 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 on BOEM's website 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 on BOEM's website at <https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Gulf-of-Mexico-Region/topomap.pdf>.

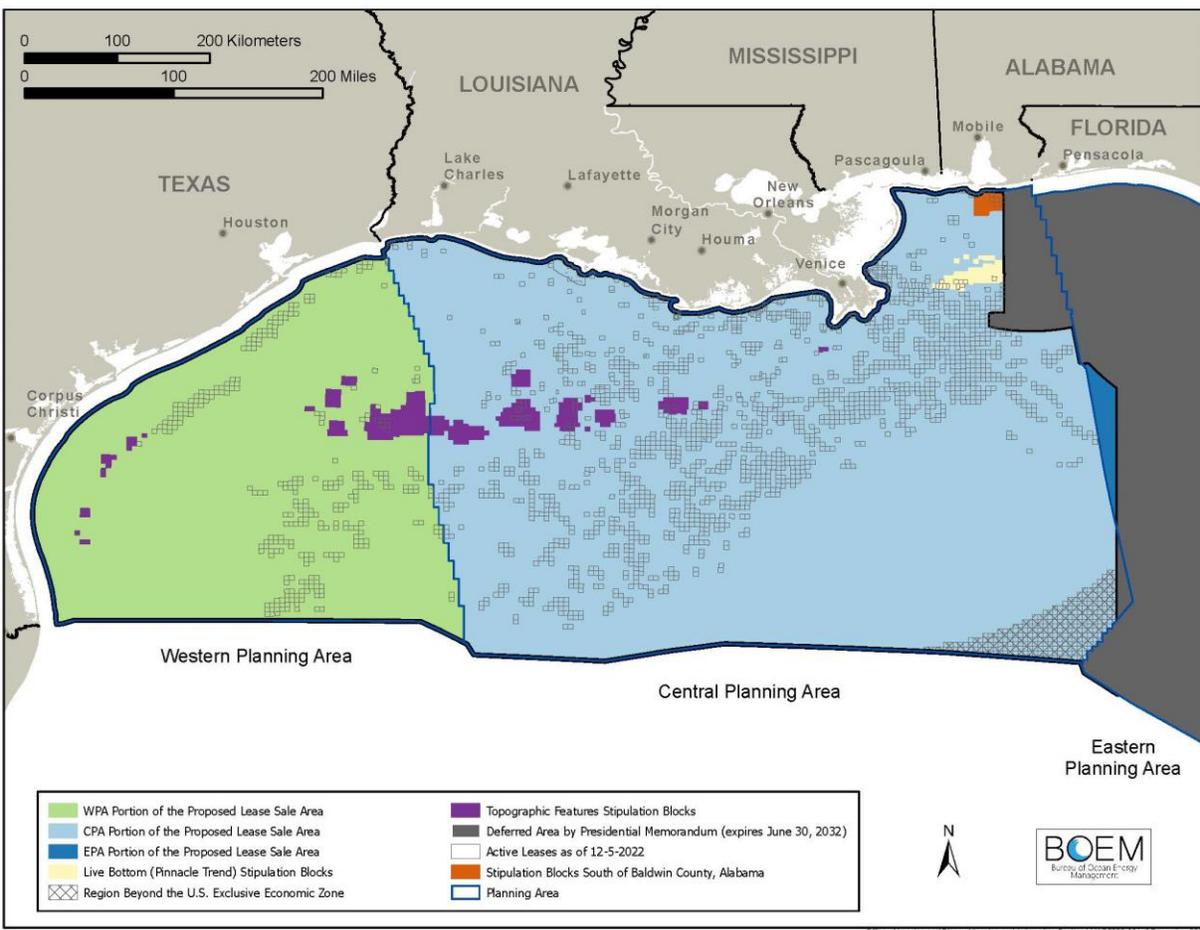


Figure A-2. Blocks That Could Be Subject to the Topographic Features Stipulation, Live Bottom Stipulation, or the Blocks South of Baldwin County, Alabama, Stipulation in the Gulf of Mexico Overlaid with the Lease Sale Areas of Lease Sales 259 and 261.

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/MMS (BOEM)-funded studies of topographic highs in the GOM; 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 A-2**.

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 A.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 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 **Chapter A.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 mi [6 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.

### **A.6.2 Potential Stipulation Language**

The stipulation provides for protection of the following banks through the applicable mitigating measures in the Western Planning Area.

<b>Bank Name</b>	<b>No Activity Zone (defined by isobaths in meters)</b>
<b>Shelf Edge Banks</b>	
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 <sup>1</sup>	85
Stetson Bank	52
Appelbaum Bank	85
<b>Low-Relief Banks<sup>2</sup></b>	
Mysterious Bank	74, 76, 78, 80, 84
Coffee Lump	Various
Blackfish Ridge	70
Big Dunn Bar	65
Small Dunn Bar	65
32 Fathom Bank	52
Claypile Bank <sup>3</sup>	50
<b>South Texas Banks<sup>4</sup></b>	
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:**

<sup>1</sup> Central Planning Area bank in the Gulf of Mexico with a portion of its "1-Mile Zone" and/or "3-Mile Zone" in the WPA.

<sup>2</sup> Only paragraph A applies.

<sup>3</sup> 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.

<sup>4</sup> Only paragraphs A and B apply.

The stipulation provides for protection of the following banks through the applicable mitigating measures in the Central Planning Area:

Bank Name	No Activity Zone (defined by isobaths in meters)
Alderdice Bank	80
Bouma Bank	85
Bright Bank <sup>1</sup>	85
Diaphus Bank <sup>2</sup>	85
Elvers Bank	85
Ewing Bank	85
Fishnet Bank <sup>2</sup>	76
Geyer Bank	85
Jakkula Bank	85
McGrail Bank	85
Parker Bank	85
Rezak Bank	85
Sackett Bank <sup>2</sup>	85
Sidner Bank	85
Sonnier Bank	55
Sweet Bank <sup>3</sup>	85

## Notes:

<sup>1</sup> Gulf of Mexico CPA bank with a portion of its “3-Mile Zone” in the Gulf of Mexico Western Planning Area.

<sup>2</sup> Only paragraphs A and B apply.

<sup>3</sup> Only paragraph A applies.

The lessee and its operators, personnel, and subcontractors are responsible for carrying out the specific mitigation 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” on the Bureau of Ocean Energy Management website 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.

### **A.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 the 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 2017 (Johnston et al. 2013; 2015; 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 2017-2022 National OCS Oil and Gas Program EIS (BOEM 2016c; 2016d) and Record of Decision (BOEM 2017d) would apply to all leases issued for GOM Lease Sales 259 and 261 in designated lease blocks, will continue to protect the biota of the banks by mitigating OCS oil- and gas-related activities to the greatest extent possible. This stipulation does not prevent the recovery of oil and gas resources but would serve to protect valuable and sensitive biological resources.

## A.7 STIPULATION No. 6 – UNITED NATIONS CONVENTION ON THE LAW OF THE SEA ROYALTY PAYMENT

### A.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. Exclusive Economic Zone, formerly known as the “Western Gap” (Figure A-3).

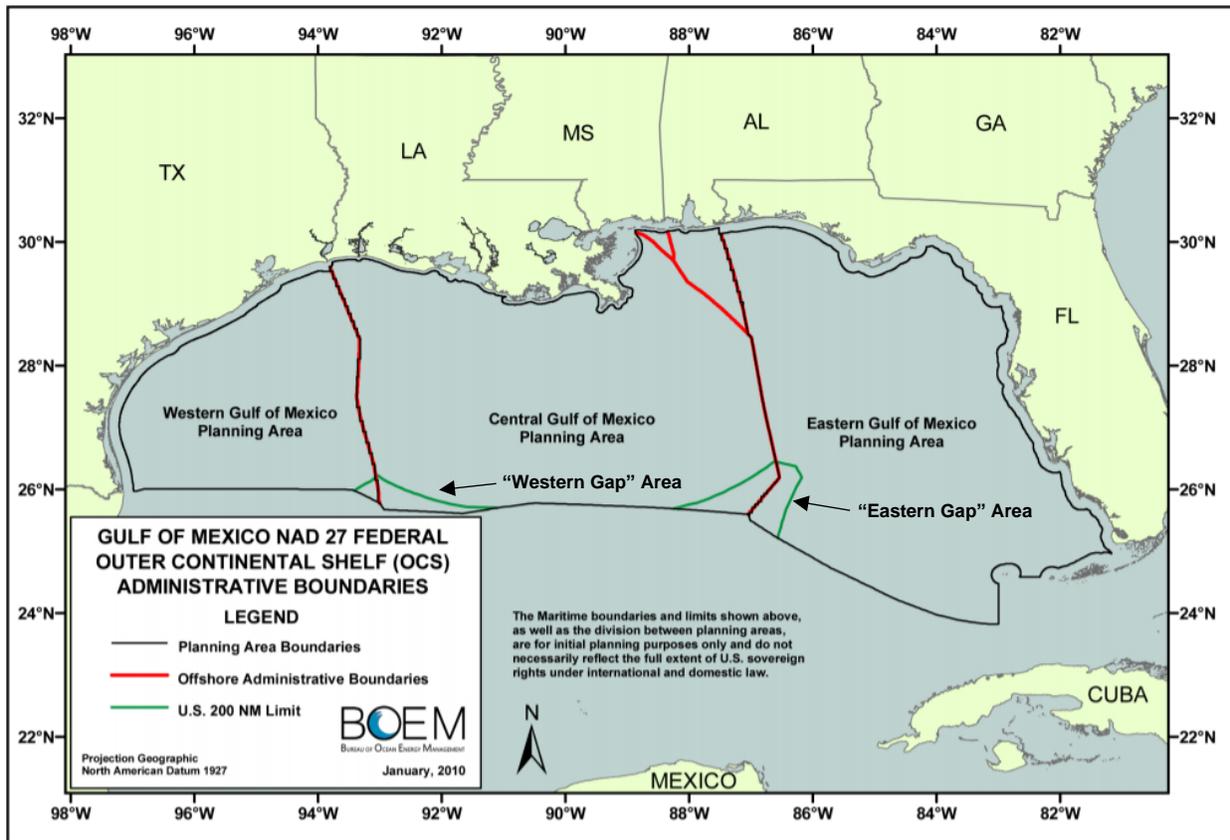


Figure A-3. Gulf of Mexico OCS Administrative Boundaries, the “Western Gap” Area, and the “Eastern Gap” Area.

### A.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.

### **A.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 Exclusive Economic Zone as defined in UNCLOS.

## **A.8 STIPULATION No. 7 – AGREEMENT BETWEEN THE UNITED STATES OF AMERICA AND THE UNITED MEXICAN STATES CONCERNING TRANSBOUNDARY HYDROCARBON RESERVOIRS IN THE GULF OF MEXICO**

### **A.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 miles (2.6 nmi; 4.8 km) of the Maritime and

Continental Shelf Boundary with Mexico, commonly referred to as the “Eastern Gap” (**Figure A-3**). The Eastern Gap area is comprised of any and all blocks in the WPA and CPA that are wholly or partially located within 3 statute miles (2.6 nmi; 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 Gulf of Mexico beyond 200 nmi (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.

### **A.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.

### **A.8.3 Effectiveness of the Lease Stipulation**

The Transboundary Agreement removes uncertainties regarding development of transboundary resources in the resource-rich Gulf of Mexico. As a result of the Agreement, nearly 1.5 million ac 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.

## **A.9 STIPULATION NO. 8 – LIVE BOTTOM**

### **A.9.1 Stipulation Overview**

BOEM protects live bottoms in the GOM 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 lithology 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 GOM, 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 on BOEM's website 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 on BOEM's website 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 on BOEM's website 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 2017-2022 National OCS Oil and Gas Program EIS (BOEM 2016c; 2016d) and Record of Decision (BOEM 2017d), would apply to all leases issued for GOM Lease Sales 259 and 261 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 A-2 and Figure A-4**). Within the Live Bottom (Pinnacle Trend) Stipulation blocks, no bottom-disturbing activities may occur within 30 m (100 ft) of any hardbottom/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 A-4**). 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.

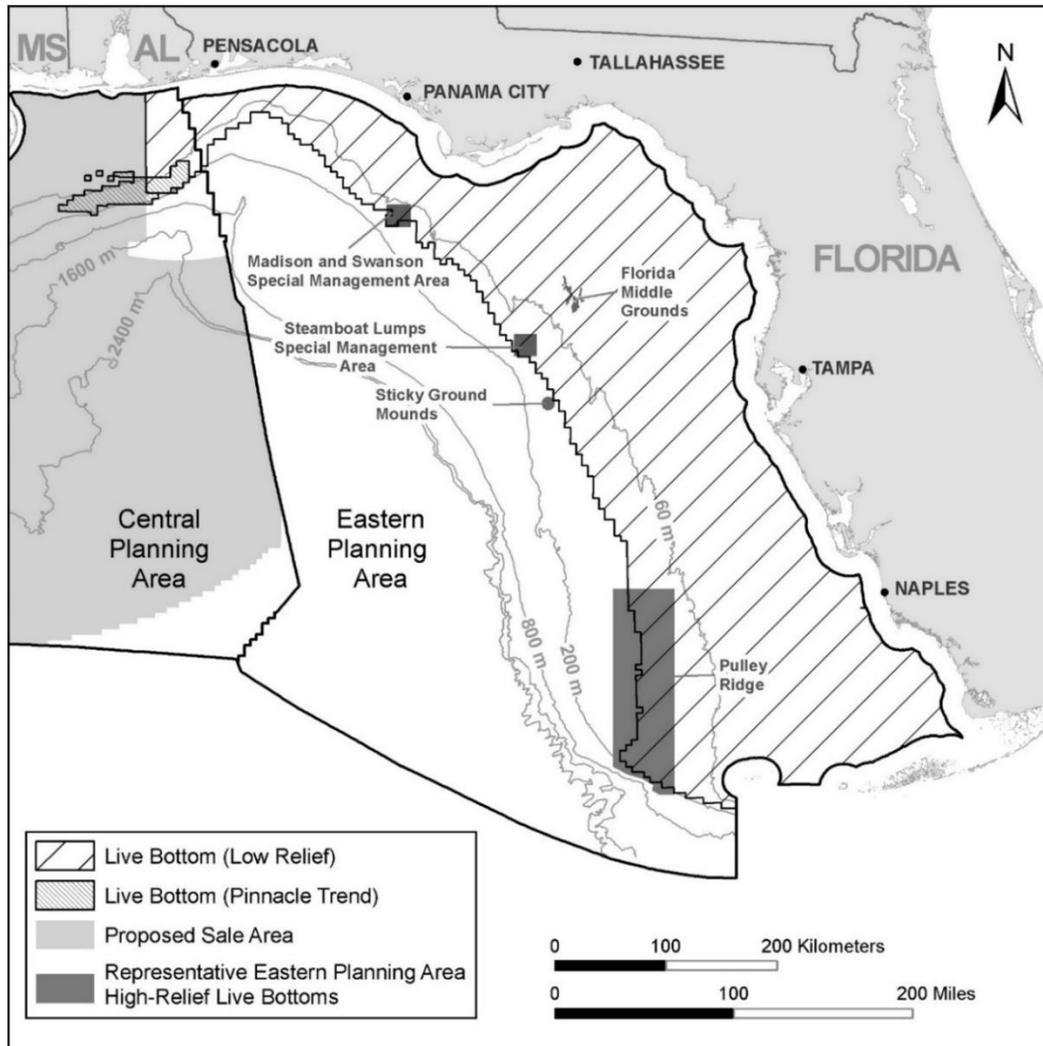


Figure A-4. Live Bottom (Low Relief) Stipulation Blocks in the EPA and CPA.

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 GOM, 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 2017-2022 National OCS Oil and Gas Program EIS (BOEM 2016c; 2016d) and Record of Decision (BOEM 2017d), and would apply to all leases issued for GOM Lease Sales 259 and 261 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.

### **A.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 Mexico 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 Mexico 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.

### **A.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 would 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 is mitigated to the greatest extent possible. The stipulation, which is applied as programmatic mitigation in the 2017-2022 National OCS Oil and Gas Program EIS (BOEM 2016c; 2016d) and Record of Decision (BOEM 2017d), would apply to all leases issued for GOM Lease Sales 259 and 261 in designated lease blocks and will continue to protect the biota of live bottom areas by mitigating OCS oil- and gas-related activities to the greatest extent possible. 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 25 km (15 mi) of the area (Continental Shelf Associates Inc. and Texas A&M University Geochemical and Environmental Research Group 2001).

## **A.10 STIPULATION NO. 9 – BLOCKS SOUTH OF BALDWIN COUNTY, ALABAMA**

### **A.10.1 Stipulation Overview**

This stipulation could be included on leases on blocks south of and within 15 mi (24 km) of Baldwin County, Alabama (**Figure A-2**). 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.

### **A.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).

### **A.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. Prior to the decision in 1999 on the Final Notice of Sale for Lease Sale 172, BOEM's New Orleans Office'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 has effectively mitigated visual impacts to the greatest extent possible.

## A.11 STIPULATION NO. 10 – RESTRICTIONS DUE TO RIGHTS-OF-USE AND EASEMENTS FOR FLOATING PRODUCTION FACILITIES

### A.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 A-5** 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.

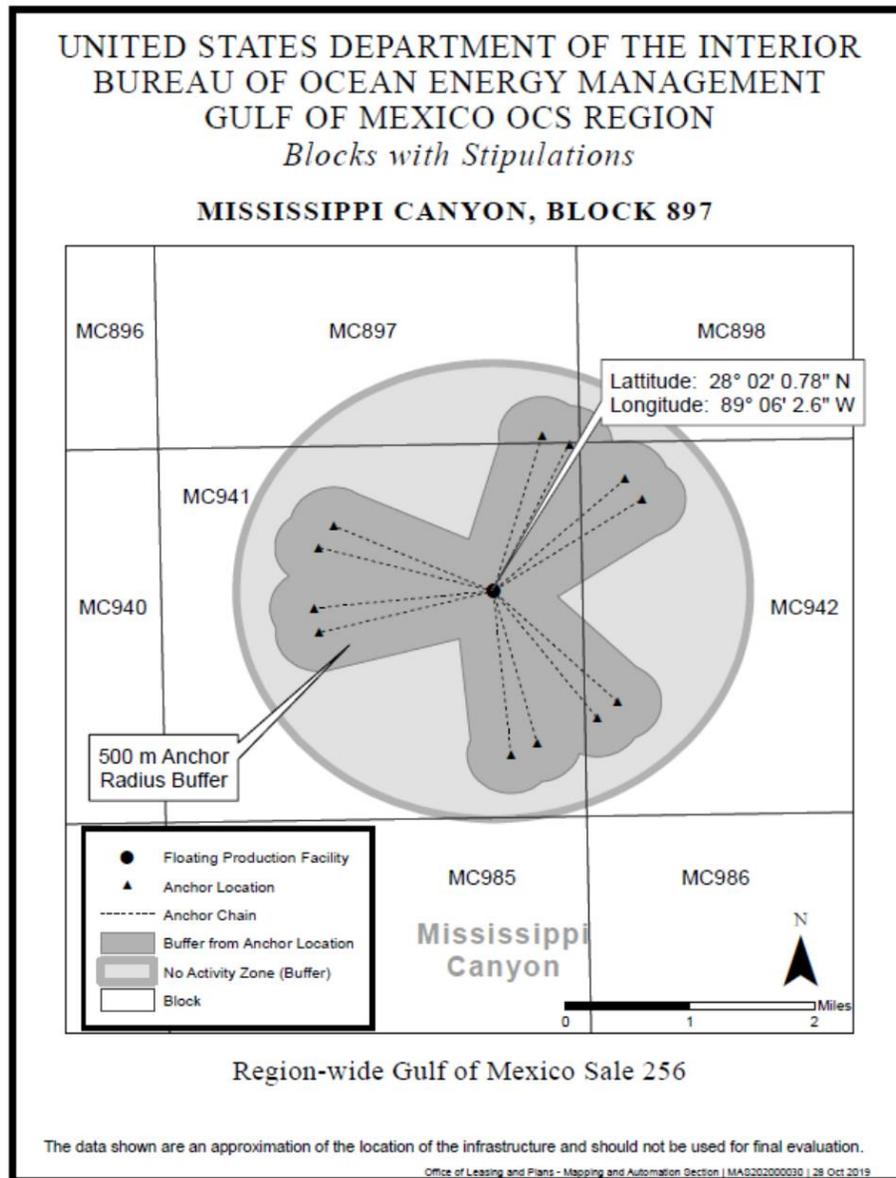


Figure A-5. Example Map of a Block Subject to This Stipulation under Regionwide Gulf of Mexico Lease Sale 256 (complete Notice of Sale package can be found on BOEM's website at <https://www.boem.gov/sale-256>).

### **A.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.

### **A.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.

## **A.12 STIPULATION NO. 11 – ROYALTIES ON ALL PRODUCED GAS**

### **A.12.1 Stipulation Overview**

This stipulation may be included in all leases issued as a result of an OCS oil and gas lease sale.

### **A.12.2 Potential Stipulation Language**

The proposed stipulation reads as follows:

Pursuant to Section 50263 of the Inflation Reduction Act of 2022 Public Law 117-169, 136 Statute 1818 (2022), royalties must be assessed and paid accordingly by the lessee(s)/operator(s) on all gas produced under this lease, including all gas that is consumed or lost by venting, flaring, or negligent releases through any equipment during upstream operations. The lessee(s)/operator(s) must value any gas or liquid hydrocarbons, including that consumed or lost by venting, flaring, or negligent releases, in accordance with the provisions of 30 CFR part 1206.

This royalty will not apply with respect to:

- (1) gas vented or flared for not longer than 48 hours in an emergency situation that poses a danger to human health, safety, or the environment;

- (2) gas used or consumed within the area of the lease, unit, or communitized area for the benefit of the lease, unit, or communitized area; or
- (3) gas that is unavoidably lost.

For any gas that the lessee(s)/operator(s) produces, but for which the lessee(s)/operator(s) does not pay royalties, the lessee(s)/operator(s) bear the burden of proof in demonstrating to the satisfaction of BOEM and the Office of Natural Resource Revenues that one or more of these exceptions to the requirement to pay royalties under this stipulation applies.

### **A.12.3 Effectiveness of the Lease Stipulation**

This is a new lease stipulation that may be included in all leases issued as a result of an OCS oil and gas lease sale. Pursuant to Section 50263 of the Inflation Reduction Act of 2022, Public Law 117-169, 136 Statute 1818 (2022), royalties must be assessed and paid accordingly by the lessee(s)/operator(s) on all gas produced under this lease, including all gas that is consumed or lost by venting, flaring, or negligent releases through any equipment during upstream operations. The lessee(s)/operator(s) must value any gas or liquid hydrocarbons, including that consumed or lost by venting, flaring, or negligent releases, in accordance with the provisions of 30 CFR part 1206.

**APPENDIX B**

**CONSULTATION CORRESPONDENCE**



**B CONSULTATION CORRESPONDENCE****United States Department of the Interior****BUREAU OF OCEAN ENERGY  
MANAGEMENT, REGULATION, AND ENFORCEMENT**

Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, Louisiana 70123-2394

In Reply Refer To: MS 5430

**JUL 30 2010**

Dr. Roy E Crabtree, Ph.D.  
Regional Administrator  
Southeast Region  
National Marine Fisheries Service  
263 13<sup>th</sup> Avenue South  
St. Petersburg, Florida 33701

Dear Dr. Crabtree,

The Bureau of Offshore Energy Management, Regulation, and Enforcement (BOEM; formerly the Minerals Management Service) requests that the National Marine Fisheries Service (NMFS) reinitiate consultation (based on the existing consultation and resulting Biological Opinion (BO) dated June 29, 2007) under Section 7 of the Endangered Species Act (ESA) of 1973 on the effects of the Five-Year Outer Continental Shelf Oil and Gas Leasing Program (2007-2012) in the Central and Western Planning Areas of the Gulf of Mexico. This request is in response to the Deepwater Horizon (DWH) incident and is meant to comply with 50 CFR § 402.16.

BOEM believes the DWH incident and the resulting oil spill necessitate this reinitiation action. We understand the oil spill and the associated impacts to listed species and designated critical habitat cannot be fully quantified at this time and that some potentially relevant information will not be available until after NMFS completes its emergency response consultations under the ESA. However, we acknowledge that the spill volumes and scenarios used in the analysis for the existing NMFS BO need to be readdressed given the "rare event" of a spill exceeding 420,000 gallons as referenced in the current NMFS BO has occurred and that affects to and the status of some listed species or designated critical habitats may have been altered as a result of the DWH incident and therefore require further consideration.

We also recognize that both NMFS and BOEM will need to agree upon an extended consultation timeframe in order to allow for NMFS to first complete the emergency response consultations and re-establish the environmental baseline. Further, we recognize that oil spill response efforts have required and may continue to require much of the NMFS's resources. We ask that you provide us an initial estimate on a consultation timeframe. We understand, however, that this timeframe may be adjusted depending on the timing and outcome of the aforementioned actions.

We will consider the existing NMFS BO to remain in effect until the reinitiated consultation is completed and a new BO is available. In the interim, BOEM will continue to comply with all Reasonable and Prudent Measures and their Terms and Conditions under this existing BO along with implementing the current BOEM-imposed mitigation, monitoring and reporting requirements. In addition, BOEM will continue to institute the BO's Conservation Recommendations, such as pile driving noise characterization, standardization of observer qualifications and protocols, reduction of marine debris, and general scientific research efforts on the effects of oil and gas activities on listed species and designated critical habitat. Based on the most recent and best available information at the time, BOEM 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. Further, BOEM will continue to provide NMFS with any additional information relevant to this ESA Section 7 consultation reinitiation if and when it becomes available.

We look forward to working with NMFS during this formal consultation reinitiation process. If you have any questions or require any additional information, please contact Deborah Epperson, Protected Species Biologist, Leasing and Environment Division, [Deborah.Epperson@mms.gov](mailto:Deborah.Epperson@mms.gov) or 504-736-3257.

Sincerely,



Joseph A. Christopher  
Regional Supervisor



## United States Department of the Interior

### BUREAU OF OCEAN ENERGY MANAGEMENT, REGULATION, AND ENFORCEMENT

Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, Louisiana 70123-2394

In Reply Refer To: MS 5430

**JUL 30 2010**

Mr. James Boggs, Field Supervisor  
Louisiana Field Office  
U.S. Fish and Wildlife Service  
646 Cajundome Boulevard, Suite 400  
Lafayette, Louisiana 70506-4290

Dear Mr. Boggs,

The Bureau of Offshore Energy Management, Regulation, and Enforcement (BOEM; formerly the Minerals Management Service) requests that the Fish and Wildlife Service (FWS) reinitiate consultation (based on the existing consultation dated September 14, 2007) under Section 7 of the Endangered Species Act (ESA) of 1973 on the effects of the Five-Year Outer Continental Shelf Oil and Gas Leasing Program (2007-2012) in the Central and Western Planning Areas of the Gulf of Mexico. This request is in response to the Deepwater Horizon (DWH) incident and is meant to comply with 50 CFR § 402.16.

The existing consultation was completed using the informal consultation process and found that this program was not likely to adversely affect listed species or designated critical habitats. The FWS provided its written concurrence with that determination in a letter to BOEM dated September 14, 2007. At this time, BOEM believes the DWH incident and the resulting oil spill necessitate reconsideration of this ESA consultation. We understand the oil spill and the associated impacts to listed species and designated critical habitat cannot be fully quantified at this time and that some potentially relevant information will not be available until after the FWS completes its emergency response consultations under the ESA. However, we acknowledge that the spill volumes and scenarios used in the analysis for the existing FWS consultation need to be readdressed given the "rare event" of a spill exceeding 420,000 gallons as referenced in the current NMFS BO has occurred and that affects to and the status of some listed species or designated critical habitats may have been altered as a result of the DWH incident and therefore require further consideration.

We also recognize that both FWS and BOEM will need to agree upon an extended consultation timeframe in order to allow for FWS to first complete the emergency response consultations and re-establish the environmental baseline. Further, we recognize that oil spill response efforts have required and may continue to require much of the FWS's resources. We ask that you provide us an initial estimate on a consultation timeframe. We understand, however, that this timeframe may be adjusted depending on the timing and outcome of the aforementioned actions.

We will consider the existing consultation to remain in effect until the reinitiated consultation is completed. In the interim, BOEM will continue to comply with all mitigation, monitoring and reporting measures incorporated into the September 14, 2007 consultation by FWS. Based on the most recent and best available information at the time, BOEM 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. Further, BOEM will continue to provide FWS with any additional information relevant to this ESA Section 7 consultation request if and when it becomes available.

We look forward to working with FWS during this consultation reinitiation process. If you have any questions or require any additional information, please contact Deborah Epperson, Protected Species Biologist, Leasing and Environment Division, [Deborah.Epperson@mms.gov](mailto:Deborah.Epperson@mms.gov) or 504-736-3257.

Sincerely,



Joseph A. Christopher  
Regional Supervisor



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

1875 Century Boulevard  
Atlanta, Georgia 30345

In Reply Refer To:  
FWS/R4/ES

SEP 27 2010

Joseph A. Christopher  
Regional Supervisor  
Bureau of Ocean Energy Management, Regulation and Enforcement  
Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, Louisiana 70123-2394

RE: MS-5430, Request to Reinitiate Consultation under Section 7 of the Endangered Species Act of 1973 on the Effects of the Five-Year Outer Continental Shelf Oil and Gas Leasing Program (2007-2012) in the Central and Western Planning Areas of the Gulf of Mexico in Response to the Deepwater Horizon Incident.

Dear Mr. Christopher:

The U.S. Fish and Wildlife Service (Service) received the subject request dated July 30, 2010 on August 4, 2010. We concur with your assessment that at this time the Deepwater Horizon incident and the resulting oil spill necessitate reconsideration of the existing consultation dated September 14, 2007, and concluded informally. The incident and resulting oil spill represent new information regarding potential adverse affects to endangered and threatened species that has not previously been assessed. Furthermore, the status of some listed species or designated critical habitats may have been altered as a result of the Deepwater Horizon incident and therefore require further consideration.

As acknowledged in your letter, the Service is fully engaged in oil spill response efforts, which continues to require much of our resources. We are engaged in emergency section 7 consultations with the Coast Guard, U.S. Army Corps of Engineers as well as other federal agencies to minimize the adverse effects of oil spill response efforts on listed species. Once the emergency response efforts cease we will be able to conclude emergency response consultations. Only after we have fully assessed the effects of response actions, as well as the released oil, can we begin to effectively re-assess the effects of the five-year outer continental shelf oil and gas leasing program (2007-2012) in the central and western planning areas of the Gulf of Mexico, as these steps will be necessary to re-establish the environmental baseline of species and habitat status.

At this time it is difficult to predict a timeframe for completion of the aforementioned actions and emergency consultations. Current response activities and level of resource commitment to the response are expected to continue through early December when response activities may be reduced. It may be timely to hold a meeting to discuss the consultation process and timelines after the first of the year.

**TAKE PRIDE  
IN AMERICA** 

Mr. Christopher

2

As you have identified, the potential spill volumes and scenarios used in the analysis for the existing consultation do need to be re-addressed given the "rare event" of a spill exceeding 420,000 gallons. We encourage the Bureau to conduct additional modeling to address this scenario and its potential effects on listed species and their designated critical habitats. Additional discussion as to the specifics of the modeling, as well as other information relevant to the consultation should be discussed at a future meeting. Please contact Deborah Fuller (337) 291-3124 at the Lafayette, Louisiana Field Office to schedule a meeting. I look forward to discussing this further.

Sincerely,



"fer"

Cynthia K. Dohner  
Regional Director



# United States Department of the Interior

## BUREAU OF OCEAN ENERGY MANAGEMENT

Gulf of Mexico OCS Region  
 1201 Elmwood Park Boulevard  
 New Orleans, LA 70123-2394

In Reply Refer To: MS 5430

**FEB 03 2012**

Dr. Roy E. Crabtree  
 Regional Administrator, Southeast Region  
 National Marine Fisheries Service  
 263 13<sup>th</sup> Avenue South  
 Saint Petersburg, Florida 33701

Dear Dr. Crabtree,

The purpose of this letter is to finalize the interim Endangered Species Act project-specific consultation procedures between the Bureau of Ocean Energy Management (BOEM) and the National Marine Fisheries Service (NMFS). Specifically we are responding to your December 21, 2011 rejoinder to our November 23, 2011 letter (both attached).

These interim procedures are for the Gulf of Mexico oil and gas activities covered by the NMFS June 29, 2007 biological opinion<sup>1</sup>. The BOEM is in the process of completing a biological assessment for a new Section 7 consultation that will supersede this agreement.

Per your request, BOEM has agreed to a 15 calendar day timeline for review of exploration plans (EP) and geological and geophysical (G&G) survey permits. The BOEM also agrees to a 30 calendar day timeline for review of development and production plans (DPP) and development operations coordination documents (DOCD).

As requested, BOEM has clarified (via telecom with NMFS-SERO staff on January 11, 2012) that relevant oil spill response plan (OSRP) information is included in EPs and DOCDs. The NMFS will not require an additional OSRP review. In the event that NMFS needs more information than what is provided in the EP or DOCD, NMFS may request the relevant Regional OSRP on a case-by-case basis.

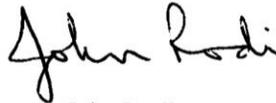
The BOEM will provide NMFS with the requested documents for review in the following manner:

	Timeline	Process
G&G Permits	15	1. BOEM posts public information copy on BOEM website ( <a href="http://www.BOEM.gov">www.BOEM.gov</a> ).
EPs	15	2. BOEM sends notification email to NMFS with relevant web link.
DPPs	30	3. NMFS provides comments to BOEM within allotted time.
DOCDs	30	

The primary NMFS point of contact for review of BOEM activities will be Mr. Kyle Baker. All emails will be sent directly to him ([kyle.baker@noaa.gov](mailto:kyle.baker@noaa.gov)). The primary points of contact for BOEM will be Ms. Mimi Griffitt for EPs, DPPs, and DOCs ([michelle.griffitt@boem.gov](mailto:michelle.griffitt@boem.gov)) and Mr. John Johnson for G&G permits ([john.johnson@boem.gov](mailto:john.johnson@boem.gov)).

Please respond in writing if you concur with this process for interim project-specific consultation. Upon receipt of your concurrence, BOEM will begin sending all new permit/plan applications for your review.

For additional information or questions regarding these interim consultation procedures please contact Dr. Deborah Epperson at [deborah.epperson@boem.gov](mailto:deborah.epperson@boem.gov) or at (504) 736-3257.



John Rodi

Enclosures

cc: J. Bennett (MS 4042)



**UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration**

NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office  
263 13<sup>th</sup> Avenue South  
St. Petersburg, FL 33701-5505  
727.824.5312, FAX 824.5309  
<http://sero.nmfs.noaa.gov>

FEB 8 2012

F/SER32:KPB

Mr. John Rodi, Regional Director  
Bureau of Ocean Energy Management  
Gulf of Mexico OCS Region  
1201 Elmwood Park Blvd  
New Orleans, LA 70123-2394

Re: MS 5430

Dear Mr. Rodi:

This responds to your letter dated February 3, 2012, regarding interim Endangered Species Act (ESA), project-specific consultation procedures with the Bureau of Ocean Energy Management (BOEM). These procedures have been coordinated between personnel from each of our offices. I concur with the implementation of these interim procedures until a new biological opinion is completed on the BOEM/BSEE lease program for the Gulf of Mexico. I look forward to the continued cooperation between our two agencies on these important issues.

For additional coordination regarding these interim consultation procedures, please contact Kyle Baker at [kyle.baker@noaa.gov](mailto:kyle.baker@noaa.gov) or Adam Brame ([adam.brame@noaa.gov](mailto:adam.brame@noaa.gov)) at (727) 824-5312.

Sincerely,

A handwritten signature in black ink, appearing to read "Roy E. Crabtree".

Roy E. Crabtree, Ph.D.  
Regional Administrator





## 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 COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

MAR 13 2020

Refer to NMFS No.: FPR-2017-9234

Dr. Walter Cruickshank  
Acting Director, Bureau of Ocean Energy Management  
1849 C Street, NW  
Washington, D.C. 20240

RE: Endangered Species Act Section 7 programmatic biological opinion on the federally regulated oil and gas program in the Gulf of Mexico

Dear Dr. Cruickshank:

Enclosed is the National Marine Fisheries Service's (NMFS) programmatic biological opinion on the effects of the Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE) Gulf of Mexico Oil and Gas Program; and the US Environmental Protection Agency's (USEPA) proposed action of overseeing air emissions and water discharges from the oil and gas program on endangered and threatened species and designated critical habitats under NMFS' jurisdiction. This consultation also considered the NMFS Permits and Conservation Division's issuance of a 5-year regulation pursuant to the Marine Mammal Protection Act, and subsequent letters of authorization for the take of marine mammals incidental to the oil and gas program. We have prepared the programmatic biological opinion pursuant to section 7(a)(2) of the Endangered Species Act, as amended (ESA; 16 U.S.C. 1536(a)(2)).

The programmatic biological opinion addresses activities and actions associated with all past BOEM leases operating in the Gulf of Mexico at present, as well as future actions and activities associated with new leases awarded in the Gulf of Mexico in the first ten years following issuance of this programmatic biological opinion (through approximately 2029). Because each lease is projected to have a 40-year lifespan, the programmatic biological opinion considers all federally regulated oil and gas program activities including: exploration, development (construction), production, and decommissioning (structure removal) in the Gulf of Mexico expected to occur over the next 50 years. This programmatic biological opinion is comprehensive and includes multiple actions and activities associated with the oil and gas program, and has built in annual review processes for adaptive management in order to streamline and reduce the need for individual future ESA consultations.

The following were considered in the biological opinion: sperm whale, Gulf of Mexico Bryde's whale, Northwest Atlantic loggerhead sea turtle, Kemp's ridley sea turtle, North Atlantic Distinct Population Segment and South Atlantic Distinct Population Segment green sea turtle, leatherback sea turtle, hawksbill sea turtle, Gulf sturgeon, giant manta ray, and oceanic whitetip shark; and Gulf sturgeon and loggerhead critical habitat. Based on our assessment, we concluded that:

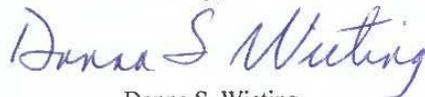


- The NMFS' Protected Resources Permits and Conservation Division's proposed action (i.e., the MMPA rule) will not be completed at the time the biological opinion is released. The opinion may need to be amended once the MMPA rule is finalized depending on the contents of the final rule.
- The USEPA's proposed action is not likely to adversely affect ESA-listed species or designated critical habitat.
- The BOEM/BSEE's proposed action 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 and South Atlantic Distinct Population Segment green sea turtle, leatherback sea turtle, hawksbill sea turtle, Gulf sturgeon, giant manta ray, and oceanic whitetip shark or destroy or adversely modify designated critical habitat; and
- The BOEM/BSEE's proposed action is likely to jeopardize the continued existence of the Gulf of Mexico Bryde's whale. For this reason, the programmatic biological opinion proposes a Reasonable and Prudent Alternative for BOEM and BSEE actions containing mitigation measures to avoid such jeopardy.

This concludes section 7 consultation on this action. The BOEM, BSEE, USEPA, and NMFS Permits and Conservation Division are required to reinstate formal consultation on this action, where it retains discretionary involvement or control over the action and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this consultation; or (4) a new species is listed or critical habitat designated that may be affected by the action.

If you have any questions regarding this biological opinion, please contact me at (301) 427-8407 or [donna.wieting@noaa.gov](mailto:donna.wieting@noaa.gov), or Cathy Tortorici at (301) 427-8495 or [cathy.tortorici@noaa.gov](mailto:cathy.tortorici@noaa.gov).

Sincerely,



Donna S. Wieting  
Director, Office of Protected Resources  
National Marine Fisheries Service

cc: Scott Angelle, BSEE  
Brent Larson, USEPA Region 6  
Molly Davis, USEPA Region 4  
Kelly Fortin, USEPA Region 4  
Jolie Harrison, NMFS



## United States Department of the Interior

### BUREAU OF OCEAN ENERGY MANAGEMENT

Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, LA 70123-2394

In Reply Refer To: GM 673E

Ms. Cathy Tortorici  
Division Chief  
Endangered Species Act Interagency Cooperation Division Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, Maryland 20910

*Via US Mail and Electronic Mail*

Dear Ms. Tortorici:

The Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE, collectively the Bureaus), in the spirit of adaptive management and in agreement with the National Marine Fisheries Service (NMFS), are submitting the following revised procedures for the programmatic biological opinion (BiOp) signed on March 13, 2020, *Biological Opinion for Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico*. We are proposing certain revised procedures and conditions so that some activities previously identified in the activities under the proposed action identified in the BiOp as requiring step-down review will no longer require said reviews. We propose that rather than requesting step-down reviews by NMFS on these activities, we will instead apply new or revised standardized mitigation measures. In support of this proposal, we are providing information below regarding the activity (e.g., approval of Deepwater Operations Plans [DWOPs]) that clarifies the nature of our existing analyses or mitigation and its effectiveness.

As further explained below, we do not believe that these changes to the conditions and mitigations will significantly change the effects of the action on species or designated critical habitat listed under the Endangered Species Act (ESA), and in most cases will reduce any potential impacts to species or designated habitat. Therefore, BOEM, BSEE and NMFS have agreed that these revised procedures will not trigger reinitiation of consultation under 50 CFR 402.16. We request that NMFS, through a reciprocal letter published to NMFS' website or amendment to the BiOp, make any necessary modifications to the Incidental Take Statement (ITS) and Reasonable and Prudent Measures (RPMs) / Terms & Conditions (T&Cs) from the BiOp to reflect these changes to our action's step-down requirements and mitigation measures.

### ***Background***

Due to the programmatic nature of the consultation and broad scope and duration of the actions and activities associated with the proposed action, it was necessary to continue to obtain information about some of the activities that could potentially have adverse impacts to species listed under the ESA after completion of the BiOp. Those activities were subsequently incorporated into a step-down review process as described in the BiOp. The step-down provisions of Section 3.4 of the BiOp identified specific categories of actions or activities anticipated to warrant further review and evaluation by NMFS and BOEM/BSEE (collectively “the agencies”). Those reviews include the following:

- How BOEM/BSEE would evaluate whether such actions would be expected to have effects of an extent and nature consistent with those effects already evaluated in the BiOp;
- Whether there are any potential effects to ESA-listed species that would be different than those already evaluated in the BiOp;
- Whether those effects would be consistent with the effects already evaluated in the BiOp if the activities were modified (e.g., through different mitigation measures); and
- Whether further consultation would be required.

Between April and September 2020, BOEM and BSEE reviewed incoming new and supplemental plans and permit applications for consistency with the BiOp and its RPMs/T&Cs. The Bureaus included NMFS in the step-down review process as necessary prior to BOEM/BSEE approval. Details evolved with each Bureau-level review and with NMFS comments received in response to requests for step-down review. The categories of activities for step-down review<sup>1</sup> that are relevant to the Bureaus’ revised procedures outlined in this letter include the use of vessels with moon pools and activities involving slack lines in the water associated with diving and other operations as part of the oil and gas program in the Gulf of Mexico. As a result, BOEM and BSEE, in concert with NMFS, developed standard mitigation measures to be applied as standard conditions of approval (COAs) on these activities. We determined that these standard measures, when applied to these activities, provide greater certainty with respect to the potential effects of these activities on ESA-listed species.

As outlined in 3.4 Step-down Review, “Aspects of this step-down review process may be discussed and possibly revised during annual activity reviews, as necessary (e.g., phasing out of certain type reviews).” Although we have not yet reached an annual review, we are proposing at this time to modify how we manage certain activities such that they will no longer require step-down review. We propose that, instead of doing step-down reviews on these particular activities, we instead will apply a set of standardized mitigation measures where appropriate. As further explained below, we do not believe that this modification will change the effects of the action on ESA-listed species or designated critical habitat, so we do not believe these changes trigger reinitiation of consultation under 50 CFR 402.16. However, we request that NMFS amend its ITS, RPMs, and T&Cs to reflect these changes to the step-down requirements and mitigation measures in the BiOp.

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<sup>1</sup> For example, NMFS included in the BiOp a requirement for step-down reviews for seismic surveys. However, BOEM is not proposing at this time any additional mitigations to remove the need for NMFS review of those activities and thus that step-down review will continue.

Below are the categories of activities that we propose would not require further step-down reviews under the revised action. The bulleted list and subsequent descriptions below are BOEM and BSEE's requested changes to the step-down review procedures/protocols currently outlined in the BiOp in the following order:

- Activities that may use slack lines, including diving activities, in the water column;
- Activities that may use a vessel with an enclosed moon pool;
- DWOP; and
- Certain geological and geophysical activities, using equipment operating at and above 180 kHz or using coring.

*Use of equipment that entail lines in the water column*

There are several types of activities associated with federally regulated oil and gas activities in the Gulf of Mexico that utilize lines in the water column which could result in an entanglement risk to ESA-listed species. These activities include, but are not limited to, the use of diver lines employed during pipeline installation, removal and decommissioning in place activities, and deployment of remotely operated vehicles (ROV) with tethers on drilling rigs.

Divers are employed during pipeline installation and removal, and decommissioning activities for several different functions. They generally conduct the following activities:

- Uncover pipelines, connect and disconnect pipeline segments, connect and disconnect associated equipment, perform cutting activities, install endcaps, bury pipelines and equipment and take instrument readings.
- Setting saws on main structure members for non-explosive removals and on cross members for explosive or non-explosive structures removals.
- Surveying for post-structure removal debris or as a preliminary site clearance even when site clearance trawling activities will be conducted later, and, in some instances, in lieu of trawling.

Other instances where slack-lines may be in the water include operational and/or safety lines, ropes or netting in moon pools.

Through BOEM and BSEE review of permit applications and plans to ensure consistency with the BiOp, BOEM and BSEE have gained a greater understanding of the volume and variety of activities that use lines in the water column associated with both structure removal and pipeline activities. As a result of the increased level of understanding of activities that utilize lines in the water column and the potential risks to ESA-listed species associated with these activities, the agencies jointly developed a programmatic approach, via standard mitigation measures, to minimize potential risks from these activities to ESA-listed species. We will be applying the new mitigation measures, required through the slack-line COAs (see attachment below), to new or modified permits and plans going forward.

The slack-line COAs will be applied to all categories of activities (plans, G&G permitting, pipeline, and structures removals) where slack lines could be utilized. BOEM and BSEE

determined that the use of slack lines in the water column is not likely to adversely affect ESA-listed species due to the limited past interactions and low potential for entanglement or entrapment of listed species in these lines. With the application of the standard mitigation measures through the requirement of the slack-line COAs (see attachment below), the potential for entanglement associated with lines in the water column would be further minimized.

BOEM and BSEE would continue to conduct permit application and plan reviews for these activities to ensure compliance with the requirements of the BiOp. In cases where the reviews identify other BiOp-required categories for step-down review, BOEM would still refer the activity to NMFS through the step-down review process. With the application of the slack-line COAs, the potential risk of entanglement associated with slack lines in the water column will be effectively minimized, and therefore we request that no further step-down reviews be required for those permits/projects that have potential lines in the water where the slack line COAs are applied. As this revised process for slack-lines does not significantly change the effects on listed species or designated critical habitat and is expected to only further reduce those effects previously identified, the Bureaus and NMFS agree that this revision does not require reinitiated consultation.

#### *Vessels with Moon pools*

Through the plan and permit application reviews, BOEM has determined that moon pools are a feature of a variety of vessels utilized across the federally regulated oil and gas program. Vessels used for diving or drilling activities often contain moon pools. As discussed previously, diving activities are a feature of a variety of tasks associated with structure removals and pipeline installation, removal and decommissioning in place. Additionally, vessels used to support pipeline installation and removal activities may contain moon pools.

Through the plan and permit application review process, BOEM and BSEE have gained a greater understanding of the volume and variety of activities that utilize moon pools. As a result of the increased level of understanding of activities that utilize moon pools, and the potential low risks to ESA-listed species associated with these activities, the agencies jointly developed a programmatic approach, via standard mitigation measures, to minimize potential risks from these activities to ESA-listed species. We will begin applying new mitigation measures, required through the COAs (see attachment below) to new and modified plans and permits going forward.

The moon pool COAs would be applied to all categories of activities (plans, G&G permitting, pipeline and structures removals) where moon pools would be utilized. The range of activities reasonably expected with moon pools are:

- Deploying or retrieving Remotely Operated Vehicles (ROVs);
- Deploying or retrieving Autonomous Underwater Vehicles (AUVs);
- Drilling apparatus deployment, use and retrieval;
- Using various submarine tools that are attached via tethers;
- Use by human divers for entry and exit; and
- Pipelaying or decommissioning activities.

BOEM and BSEE have determined that the use of moon pools in the situations listed above is not likely to adversely affect ESA-listed species due to known limited interactions and the low potential for entanglement or entrapment of listed species within moon pools. The application of the moon pool COAs would further reduce the potential for entanglement or entrapment; therefore, the Bureaus and NMFS concur that consultation does not need to be reinitiated due to these additional COAs and mitigations. If moon pool activities fall outside the scope of those described in the bullets above, then a detailed description of those activities will need to be provided to the Bureau and NMFS and a step-down review would still be required, so that a determination of potential effects to ESA listed species can be made.

BOEM and BSEE would continue to conduct permit application and plan reviews for these activities to ensure compliance with the BiOp during all individual activities. In cases where the reviews identify other BiOp-required categories for step-down reviews, the Bureau will refer the activity to NMFS through the step-down review process. With application of the moon pool COAs, the potential risk of entanglement and entrapment associated with moon pools will be effectively minimized, therefore we request that NMFS concur that no further step-down reviews are required for the specific permit and plan activities that potentially utilize moon pools when the moon pool COAs (see attachment below) are applied.

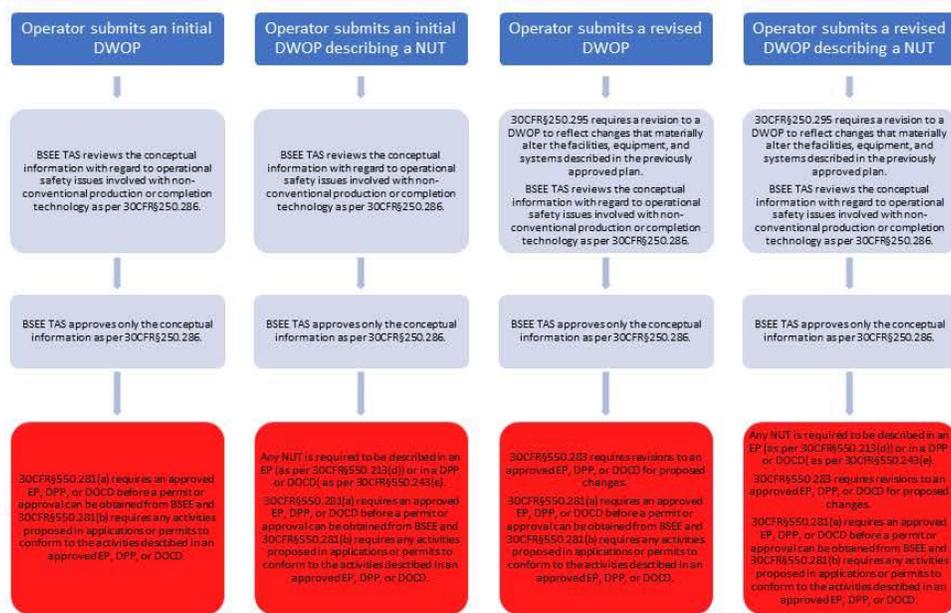
#### *DWOPs*

As described in 30 CFR § 250.286, a DWOP is a plan that provides conceptual information for the BSEE Technical Assessment Section to review a deepwater development project, or any other project that uses non-conventional production or completion technology, from a total system approach. The information described in a DWOP may be used as a supplement to other required submittals, but a DWOP “does not replace . . . other submittals required by the regulations such as Exploration Plans (EPs), Development and Production Plans (DPPs), and Development Operations Coordination Documents (DOCDs)” as per 30 CFR § 250.286(a). Additionally, 30 CFR § 550.281(b) also requires that activities permitted by BSEE be addressed in an approved EP, DPP, or DOCD and not just a DWOP. In other words, any actions or activities that may be described or proposed in a DWOP cannot be immediately approved or permitted through that plan because they must first be detailed in an associated EP, DPP, DOCD, and/or an associated permit application submitted for review and approval. BSEE approval of a DWOP does not immediately approve any “on the water” activities that could result in impacts to an endangered species or affect designated critical habitat.

BSEE proposes to no longer submit DWOPs for step-down review, as originally described in Section 3.4 of the BiOp. The associated regulatory requirements for DWOPs only allow for review and approval of the conceptual information, and therefore, do not result in immediate approval of any proposed actions or activities under a DWOP. Any activity that requires step-down review would therefore go through that review at the later plan or permit application stage when the specific, activity details are more certain; therefore, requiring step-down review at the earlier DWOP phase as well is both premature (as no activities can commence before, and the plans will be more certain at, the EP, DPP, DOCD, or permit application stage) and unnecessarily duplicative. The conceptual information provided in a DWOP does not meet the criteria described in section 3.4 of the BiOp because no action nor activity can commence, as per

30 CFR § 250.286. At this point in the regulatory review process NMFS would see only the conceptual information in a DWOP. The proposed actions or activities could only be meaningfully evaluated under the BiOp at the EP, DPP, DOCD, or permit application stage if step-down reviews are required for the relevant activity. New or Unusual Technology (NUT) is defined as technologies that have not been used previously or extensively in a BOEM Outer Continental Shelf (OCS) region or have not been used previously under anticipated operating conditions (30 C.F.R. §550.200).

BSEE created the following chart to describe this regulatory review process:



BSEE conducts reviews of conceptual information under a DWOP for administrative purposes and that review would have no effect on ESA-listed species or critical habitat. Any new and unusual technology proposed under the DWOP review process is required to be represented in an associated, subsequent EP, DPP, DOCD, or permit application to capture that new and unusual technology or other activity requiring step-down review. Therefore, we request that no further step-down reviews be required for DWOPs as the information in these plans will be detailed in an associated EP, DPP, DOCD, or permit application and undergo review by BOEM or BSEE to determine if a step-down review is required at that time. As noted above, as approval of a DWOP results in no effects to listed species or designated critical habitat, this procedural change does not require reinitiation of consultation.

***Non-airgun high-resolution geophysical (HRG) survey equipment that operates at and above 180 kHz***

As described in the BiOp, non-airgun HRG sources include but are not limited to side-scan sonars, boomers, sparkers (in limited situations) and compressed high-intensity radiated pulse sub-bottom profilers and single-beam or multibeam depth sounders. As described in Appendix A of the BiOp, non-airgun HRG sources with frequencies  $\geq 180$  kHz have acoustic characteristics that do not require detailed effects analyses because their frequency ranges are outside the general hearing ranges of all marine mammals, sea turtles and fish. As the HRG sources with frequencies  $\geq 180$  kHz would not be detectable by any ESA-listed species, these sources would have “no effect” on any ESA-listed species and any associated critical habitat in the Gulf of Mexico.

Therefore, BOEM is requesting that HRG survey activities utilizing equipment that operates exclusively at frequencies  $\geq 180$  kHz no longer require further step-down reviews; as HRG surveys at these frequencies result in no effects to listed species or designated critical habitat, this procedural change does not require reinitiation of consultation. BOEM and BSEE would continue to conduct permit and plan reviews for these and similar activities to ensure compliance with the 2020 BiOp and all relevant T&Cs and RPMs (through application of COAs) is ensured during individual activities. In cases where BOEM reviews identify other triggers for step-down review, including the use of HRG survey equipment with operating frequencies  $< 180$  kHz, BOEM will still refer those activities to NMFS for step-down reviews. BOEM will continue to document any instances of the use of HRG sources, including those with frequencies  $\geq 180$  kHz, in the annual review with NMFS.

***Coring activities as part of geotechnical surveys***

Coring activities occur as part of geotechnical surveys and are not associated with geophysical surveys (e.g., seismic and HRG surveys). As part of the proposed action in the BiOp, coring activities occur in minimal numbers relative to other G&G activities. Bottom sampling uses devices that penetrate anywhere from a few centimeters to several meters below the sea floor. Samples of near-surface sediments are typically obtained by dropping a piston core or gravity core (a dart or essentially a weighted tube) to the ocean floor and recovering it with an attached wire line. Samples can also be obtained using a grab (a device with a jaw-like mechanism) or with a dredge, which is a wire cage dragged along the sea floor. These coring activities are fully described in the BiOp and are expected to have few to no environmental effects, mainly related to a local and temporary decrease in water quality in the immediate area of the core, effects so minimal that they are either insignificant or discountable. Coring activities currently require step-down review because the BiOp requires that all G&G activities undergo step-down review. However, we propose to no longer carry out step-down reviews for coring activities as originally required under the general category for G&G activities in Section 3.4 of the BiOp, because they were determined not likely to adversely affect ESA-listed species or designated critical habitat. Therefore, this procedural change does not alter the effects on listed species or designated habitat and reinitiation is not required.

**Conclusion**

As described above, we have determined certain oil and gas activities either have no or little effect on ESA-listed species or, with the additional proposed mitigations, effects can be effectively reduced such that further step-down reviews are unnecessary. While the effects were already so low as to be discountable or would only be reduced with application of the mitigation, the type of effects of the action are not different than those analyzed in the BiOp and the level of effects would not be significantly altered. As such no reinitiation is necessary. Therefore, in the spirit of adaptive management, BOEM and BSEE request that NMFS modify the ITS, RPMs, and T&Cs as necessary to reflect the above changes to the step-down review process.

Again, we appreciate the opportunity to continue to work together on a reasonable implementation of the BiOp.

Sincerely,

AGATHA-  
MARIE KALLER

Digitally signed by AGATHA-MARIE KALLER  
DN: cn=US, o=U.S. Government,  
ou=Department of the Interior, ou=Bureau of  
Ocean Energy Management, c=AGATHA-  
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Date: 2020.11.03 13:47:58 -0600'

Arie Kaller  
Supervisor, Office of Environment, BOEM

I agree:

TOMMY  
BROUSSARD

Digitally signed by  
TOMMY BROUSSARD  
Date: 2020.11.03  
13:56:28 -06'00'

TJ Broussard  
Regional Environmental Officer, Office of Environmental Compliance, BSEE

cc: Michael Celata,  
Field Special Assistant – Interior Region 6,  
Director, Gulf of Mexico Office; Bureau of Ocean Energy Management  
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New Orleans, LA 70123

Lars Herbst  
Field Special Assistant – Interior Region 4,  
Director, Gulf of Mexico OCS Office; Bureau of Safety and Environmental Enforcement  
1201 Elmwood Park Blvd (GE432A)  
New Orleans, LA 70123

Attachment

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**MOON POOL MONITORING Condition of Approval:**

A moon pool has been identified during review of your plan submittal. The requirements below must be followed for any activities entailing use of the moon pool, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk. If any protected species (i.e. species protected under the Endangered Species Act [ESA] and/or Marine Mammal Protection Act [MMPA]) is detected in the moon pool, you are required to follow the appropriate procedures described in the *Reporting Requirements* condition of approval (COA) in your plan approval.

Application of these measures includes, but is not limited to, dive support vessels, service vessels, pipelaying vessels, drillships, floating platforms (e.g., SPAR), mobile offshore drilling units, and other facilities with enclosed moon pools (e.g., well in the hull of a vessel, with or without a door).

General Requirements

- Where the moon pools have hull doors, the operator(s) should keep the doors closed as much as reasonably practicable when no activity is occurring within the moon pool, unless the safety of crew or vessel require otherwise. This will prevent protected species from entering the confined area during periods of non-activity.
- Use of a moon pool requires regular monitoring while open to the water column and if a vessel is not underway. Regular monitoring means 24-hour video monitoring with hourly recurring checks for at least five minutes of the video feed, or hourly recurring visual checks of the moon pool for at least five minutes by a dedicated crew observer with no other tasks during that short visual check.
- If water conditions are such that observers are unable to see within a meter of the surface, operations requiring the lowering or retrieval of equipment through the moon pool must be conducted at a rate that will minimize potential harm to protected species.

Closure of the Hull Door

- Should the moon pool have a hull door that can be closed, then prior to and following closure, the moon pool must be monitored continuously by a dedicated crew observer with no other tasks to ensure that no individual protected species is present in the moon pool area. If visibility is not clear to the hull door from above (e.g., turbidity or low light), 30 minutes of monitoring is required prior to hull door closure.
- If a protected species is observed in the moon pool prior to closure of the hull door, the hull door must not be closed, except for human safety considerations. Once the observed animal leaves the moon pool, the operator may commence closure. If the

## Attachment

observed animal remains in the moon pool after closure, contact NMFS or BSEE prior to the closure of the hull doors according to reporting requirements (see *Reporting Requirements COA* under *Reporting of Observations of Protected Species within an Enclosed Moon Pool*).

*Movement of the Vessel (no hull door) and Equipment Deployment/Retrieval*

- Prior to movement of the vessel and/or deployment/retrieval of equipment, the moon pool must be monitored continuously for a minimum of 30 minutes, by a dedicated crew observer with no other tasks, to ensure no individual protected species is present in the moon pool area.
- If a protected species is observed in the moon pool prior to movement of the vessel, the vessel must not be moved and equipment must not be deployed or retrieved, except for human safety considerations. If the observed animal leaves the moon pool, the operator may commence activities. If the observed animal remains in the moon pool contact BSEE prior to planned movement of the vessel according to reporting requirements (see *Reporting Requirements COA* under *Reporting of Observations of Protected Species within an Enclosed Moon Pool*).
- Should a protected species be observed in a moon pool prior to activity commencement (including lowering or retrieval of equipment), recovery of the animal or other actions specific to the scenario may be required to prevent interaction with the animal. If protected species are observed during activity, only reporting is required (see *Reporting Requirements COA*). Operators must not take such action except at the direction of, and after contact with, NMFS (see *Reporting Requirements COA*).

**SLACK-LINE PRECAUTIONS Condition of Approval:**

If operations require the use of flexible, small diameter (< 2 inch) lines to support operations (with or without divers), operators/contractors must reduce the slack in the lines, except for human safety considerations, to prevent accidental entanglement of protected species (i.e. species protected under the Endangered Species Act [ESA] and/or Marine Mammal Protection Act [MMPA]). This requirement includes tether lines attached to remotely operated equipment. The requirements below must be followed for any activities entailing use of flexible, small diameter lines that will not remain continuously taut, except when complying with these requirements would put the safety of divers, crew or the vessel at risk:

- Operators must utilize tensioning tools and/or other appropriate procedures to reduce unnecessary looseness in the lines and/or potential looping;
- The lines must remain taut, as long as additional safety risks are not created by this action;

## Attachment

- A line tender must be present at all times during dive operations and must monitor the line(s) the entire time a diver is in the water; and
- Should the line tender and/or diver become aware of an entanglement of an individual protected species, the reporting requirements described in the *Reporting Requirements* COA must be followed as soon as safety permits.

**REPORTING REQUIREMENTS Condition of Approval:**

Review of your proposed activities identified use of equipment that has the potential for entanglement and/or entrapment of protected species (i.e. species protected under the Endangered Species Act [ESA] and/or Marine Mammal Protection Act [MMPA]) that could be present during operations. In case of entrapment, procedures and measures for reporting are dependent upon the situation at hand. **These requirements replace those specific to dead and injured species reporting in respective sections of Appendix A (insofar as they relate to geophysical surveys) and Appendix C of the 2020 Biological Opinion on the Bureau of Ocean Energy Management's Oil and Gas Program Activities in the Gulf of Mexico.**

Incidents Requiring **Immediate** Reporting

Certain scenarios or incidents require immediate reporting to Federal agencies; these are described below:

Should any of the following occur at any time, **immediate reporting** of the incident is required after personnel and/or diver safety is ensured:

- Entanglement or entrapment of a protected species (i.e., an animal is entangled in a line or cannot or does not leave a moon pool of its own volition).
- Injury of a protected species (e.g., the animal appears injured or lethargic).
- Interaction, or contact with equipment by a protected species.
- Any observation of a leatherback sea turtle within a moon pool (regardless of whether it appears injured, or an interaction with equipment or entanglement/entrapment is observed).

1. As soon as personnel and/or diver safety is ensured, report the incident to National Marine Fisheries Service (NMFS) by contacting the appropriate expert for 24-hr response. If you do not receive an immediate response, you must keep trying until contact is made. Any failed attempts should be documented. Contact information for reporting is as follows:
  - a. **Marine mammals:** contact **Southeast Region's Marine Mammal Stranding Hotline at 1-877-433-8299.**
  - b. **Sea turtles:** contact **Brian Stacy, Veterinary Medical Officer at 352-283-3370.** If unable to reach Brian Stacy, contact Lyndsey Howell at (301) 301-3061. This includes the immediate reporting of **any observation of a leatherback sea turtle within a moon pool.**
  - c. **Other protected species** (e.g., giant manta ray, oceanic whitetip shark, or Gulf sturgeon): contact the **ESA Section 7 biologist at 301-427-8413**

## Attachment

([nmfs.psoreview@noaa.gov](mailto:nmfs.psoreview@noaa.gov)) and report all incidents to [takereport.nmfsser@noaa.gov](mailto:takereport.nmfsser@noaa.gov).

- d. Minimum reporting information is described below:
  - i. Time, date, water depth, and location (latitude/longitude) of the first discovery of the animal;
  - ii. Name, type, and call sign of the vessel in which the event occurred;
  - iii. Equipment being utilized at time of observation;
  - iv. Species identification (if known) or description of the animal involved;
  - v. Approximate size of animal;
  - vi. Condition of the animal during the event and any observed injury / behavior;
  - vii. Photographs or video footage of the animal, only if able; and
  - viii. General narrative and timeline describing the events that took place.
2. After the appropriate contact(s) have been made for guidance/assistance as described in 1 above, you may call BSEE at 985-722-7902 (24 hours/day) for questions or additional guidance on recovery assistance needs (if still required) and continued monitoring requirements. You may also contact this number if you do not receive a timely response from the appropriate contact(s) listed in 1. above.
  - a. Minimum post-incident reporting includes all information described above (under 1.d.i-viii) in addition to the following:
    - i. NMFS liaison or stranding hotline that was contacted for assistance;
    - ii. For moon pool observations or interactions:
    - iii. Size and location of moon pool within vessel (e.g., hull door or no hull door);
    - iv. Whether activities in the moon pool were halted or changed upon observation of the animal; and
    - v. Whether the animal remains in the pool at the time of the report, or if not, the time/date the animal was last observed.

*Reporting of Observations of Protected Species within an Enclosed Moon Pool*

If a protected species is observed within an enclosed moon pool and does not demonstrate any signs of distress or injury or an inability to leave the moon pool of its own volition, measures described in this section must be followed (only in cases where they do not jeopardize human safety). Although this particular situation may not require immediate assistance and reporting as described under *Incidents Requiring Immediate Reporting* (see above), a protected species could potentially become disoriented with their surroundings and may not be able to leave the enclosed moon pool of their own volition. In order for operations requiring use of a moon pool to continue, the following reporting measures must be followed:

**Within 24 hours of any observation, and daily after that** for as long as an individual protected species remains within a moon pool (i.e., in cases where an ESA listed species has

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entered a moon pool but entrapment or injury has not been observed), the following information must be reported to BSEE ([protectedspecies@bsee.gov](mailto:protectedspecies@bsee.gov)):

1. For an initial report, all information described under 1.d.i-viii above should be included.
2. For subsequent daily reports:
  - a. Describe the animal's status to include external body condition (e.g., note any injuries or noticeable features), behaviors (e.g., floating at surface, chasing fish, diving, lethargic, etc.), and movement (e.g., has the animal left the moon pool and returned on multiple occasions?);
  - b. Description of current moon pool activities, if the animal is in the moon pool (e.g., drilling, preparation for demobilization, etc.);
  - c. Description of planned activities in the immediate future related to vessel movement or deployment of equipment;
  - d. Any additional photographs or video footage of the animal, if possible;
  - e. Guidance received and followed from NMFS liaison or stranding hotline that was contacted for assistance;
  - f. Whether activities in the moon pool were halted or changed upon observation of the animal; and
  - g. Whether the animal remains in the pool at the time of the report, or if not, the time/date the animal was last observed.



## 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](mailto: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](mailto:tre.glenn@boem.gov), and Mr. Daniel Leedy at (504) 736-2597 or [daniel.leedy@bsee.gov](mailto:daniel.leedy@bsee.gov).

Sincerely,

**AGATHA-  
MARIE KALLER**

Arie Kaller  
Supervisor, Office of Environment  
BOEM, Gulf of Mexico OCS Region

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,  
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Date: 2021.02.12 06:41:16 -06'00'

cc: Ms. [Brigitte Firmin](mailto:brigitte_firmin@fws.gov), [brigitte\\_firmin@fws.gov](mailto:brigitte_firmin@fws.gov)  
Mr. [Joe Hodges](mailto:joe_hodges@fws.gov), [joe\\_hodges@fws.gov](mailto:joe_hodges@fws.gov)  
Mr. T.J. Broussard, [t.j.broussard@boem.gov](mailto:t.j.broussard@boem.gov)

Enclosure:

**Eastern Black Rail**

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## 1. Species Description

In April 2010 the US Fish & Wildlife Service (FWS) received a petition to list 404 aquatic, riparian, and wetland species from the southeastern U.S., which included the eastern black rail (*Laterallus jamaicensis jamaicensis*). On September 27, 2011, the FWS published a 90-day finding on 374 of the petitioned species, including the eastern black rail, indicating that listing may be warranted (Federal Register 2011). On October 9, 2018 the FWS proposed to list the eastern black rail as threatened (Federal Register 2018). A final rule to the listing of the eastern black rail was published on October 8, 2020, with an effective date of November 9, 2020 (Federal Register, 2020). There is currently no critical habitat established for eastern black rail (USFWS, 2020). The eastern black rail (*Laterallus jamaicensis jamaicensis*) is protected under the Migratory Bird Treaty Act (USFWS, 2013).

The eastern black rail is a subspecies of the black rail and is a small and cryptic wetland dependent subspecies. The eastern black rail relies on salt, brackish, and freshwater marsh habitats that can be tidally or non-tidally influenced (Federal Register, 2018). Within these habitats the birds use the transition zone between the emergent wetlands and the upland interface (Federal Register, 2020) vegetated by emergent plants, including rushes, grasses, and sedges. The eastern black rail requires dense vegetative cover, made up of fine-stemmed emergent plants that form a dense canopy or cover. If scrub densities become too high, the habitat may become unsuitable. The eastern black rail uses areas of moist or flooded soils with, or adjacent to, very shallow waters (<6 centimeters). The eastern black rail forages on small aquatic and terrestrial invertebrates, especially insects and seeds (USFWS, 2018).

Historically, the eastern black rail was widely distributed in the eastern United States, Mexico, Central America, and the Caribbean in both inland and coastal areas. However, the distribution of the eastern black rail in New England, the Appalachian, and Central Lowlands has effectively been eliminated. Some populations remain in both inland and coastal areas within the Mid-Atlantic Coastal Plain, Southeast Coastal Plain, Southwest Coastal Plain and Great Plains. Current information suggests that there are two populations in the south-central U.S: one migratory population breeds in Colorado and Kansas then winters in Texas; the second non-migratory population lives in Texas year-round. A third population occurs in the U.S. Atlantic coast and is suspected to migrate and winter on the southern Atlantic coast and in the Caribbean and Central America (Federal Register, 2018). Migration of the eastern black rail is poorly understood. Within the Gulf of Mexico region, wintering and resident birds are found primarily along the Texas Coast, the western Louisiana Coast, and the Gulf Coast of Florida (Federal Register, 2018; USFWS, 2018). Eastern black rail sightings in the other Gulf Coast states would be considered a vagrant or as an accidental migrant.

Based on the best available data, there are currently no precise population estimates for this subspecies. However, over the past 10 to 20 years, the U.S. population has experienced declines of 75% or greater. In 2017, pre-Hurricane Harvey, population estimates along the upper Texas coast were estimated at 1,299 individuals (USFWS, 2018). The upper Texas coast was significantly impacted by flooding from Hurricane Harvey and the eastern black rail are expected to have experienced population declines from such impacts. Between 355 and 815 breeding pairs are estimated to reflect the Atlantic Coast and Florida Atlantic and Gulf Coast populations

(USFWS, 2018). Again, those areas were impacted by multiple hurricane events after those estimates.

## 2. Environmental Baseline Factors

The oil from the *Deepwater Horizon* (DWH) event has had serious direct and indirect impacts to coastal and marine birds, and such effects were far more serious for birds using the Central Planning Area (CPA) than the Western Planning Area (WPA), because the extent of the spill remained east of the WPA boundary. At this time, it is unknown what the long-term impacts are to respective species populations. Data are lacking on spatial and temporal aspects of search effort, and, more important, data on sex-age composition of the collected sample. Sex-age composition data would be beneficial because they provide insights into the short- and long-term impacts for a given avian species, as well as information necessary to gauge a species' recovery potential. It is reasonable to infer from the limited data available that not all species groups were impacted similarly and that not all species within a group were impacted similarly. There may be delayed effects for some species due to major impacts to certain year classes (i.e., subadults), such that the impacts will not be realized until the dead individuals would have attained breeding age. Individual life-history strategies, starting population size and trajectory, and sex and age composition of the population before the DWH event will ultimately dictate the impacts at the population level. It should also be noted that the total body count and the total modeled estimate of avian mortality from an oil spill is a poor indicator of "effect" or "impact" to a given species' population, because not all birds are of equal reproductive value to the population (i.e., reproductive age females are "worth" more to the population). To address this, some form of calculating and/or deriving lost bird-years and recovery to baseline conditions is necessary and requires knowledge of the age-sex composition of the oiled sample of birds, as well as age-sex structure of the target population (Multisale EIS-USDOJ, BOEM, 2012a-c).

Unavailable information on the effects to coastal and marine birds from the DWH event (and thus changes to the avian baseline in the affected environment) makes an understanding of the potential impacts from the Outer Continental Shelf (OCS) oil and gas activities less clear. Relevant data on the status of bird populations after the DWH event may take years to acquire and analyze through the Natural Resource Damage Assessment (NRDA) process, and impacts from the DWH event may be difficult or impossible to discern from other factors.

For Endangered Species Act (ESA) purposes, the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE) continue to maintain that a low-probability catastrophic spill is neither a direct nor an indirect effect of the proposed action. A low-probability catastrophic spill is, by definition, not reasonably certain to occur. The National Marine Fisheries Service (NMFS) indicate that under their ESA guidance they may also consider the risk of a catastrophic event discountable as it may have adverse effects but a very low risk occurrence; regardless, the Bureaus believe that a future catastrophic spill is not reasonably certain to occur, as the risk is exceedingly low, particularly after the implementation of new safety measures and advances in containment technologies after the DWH event. The Bureaus do, however, recognize FWS's interest in considering this type of event for informational purposes. The information and analyses that BOEM has provided, as part of this consultation, is information based on the best available information as required under ESA and by BOEM expert opinion. Other methods of analysis are significantly limited in their applicability and availability, nor would they provide any meaningful or useful information to be used to assess risk of catastrophic spill occurrence at this programmatic level of oil and gas activities in the Gulf of Mexico. While the Bureaus acknowledge that, even with the most stringent standards, risk can never be wholly eliminated, they believe that the risk of a

catastrophic spill, which was small even before the DWH spill, has been further reduced with the development of this suite of safety protocols, regulations, and new technologies. The Bureaus believe, with a high level of confidence, that a catastrophic oil spill is now even less likely to occur during the consultation period of this proposed action (see Appendix L in the Biological Assessment).

### 3. Routine Activities

#### 3.1 Major Factors

The possible effects of routine activities on eastern black rail along the Gulf of Mexico are discussed below.

- habitat loss and fragmentation;
- behavioral effects due primarily to disturbance from OCS helicopter and service-vessel traffic and associated noise;
- mortality due to exposure and intake of OCS-related contaminants, e.g., produced waters and discarded debris; and
- sublethal, chronic effects from air emissions.

##### 3.1.1 Habitat Loss and Fragmentation

The greatest negative impact to coastal and marine birds is the loss, alteration, and fragmentation of preferred or critical habitat (Fahrig, 1997 and 1998). This is particularly true for threatened and/or endangered species, whereby populations tend to be at or approaching some critical threshold in abundance (Dennis et al., 1991; Belovsky et al., 1994).

Pipeline landfalls, terminals, and other onshore OCS-related infrastructure can destroy or fragment otherwise suitable avian habitats (e.g., wetlands), resulting in the displacement of associated avian communities. Seabird nesting colonies are particularly sensitive to disturbance and habitat alteration or loss, and known colonies should always be avoided by construction activities. Environmental regulations (Section 404 of the Clean Water Act, U.S. Dept. of the Army Corps of Engineers) require restoration (or mitigation) of wetlands modified (e.g., drain, fill, dredge) or destroyed by pipe laying barges and associated onshore infrastructure. However, onshore pipelines cross a wide variety of coastal environments and can affect certain species often not associated with freshwater, marine, or estuarine systems.

Fidelity to coastal and marine roosting, nesting, and foraging sites likely varies among species and within and among years for a given species along the Gulf Coast. Site abandonment along the northern Gulf Coast has often been attributed primarily to habitat loss and fragmentation, and also to excessive human disturbance (Visser et al., 2005; LeDee et al., 2008). Many of the overwintering shorebird species remain within relatively well-defined, winter-use areas throughout the season, and some species exhibit among-year wintering site fidelity, at least when not disturbed by humans (Drake et al., 2001). These species are particularly vulnerable to localized impacts resulting in habitat loss or fragmentation unless they disperse to more favorable habitats when disturbed. This assumes that such habitats are available, in proximity to, and are of similar or greater quality compared with the disturbed habitat (Block and Brennan, 1993; Johnson, 2005).

Eastern black rails are considered both resident and migratory to the Texas Coast and migratory to the Florida Gulf Coast (Federal Register 2018). Because of the eastern black rail's use of the specific transition zone between wetlands and uplands and their specific vegetative needs (Tolliver, 2017), their ability to relocate to suitable habitat may be less likely than other wading bird species. These habitat types have experienced significant declines, with some areas in the

eastern black rail's historical range losing over 90% of their prairie habitat (Sampson and Knopf, 1994). The displacement into the secondary selected habitat may be of lesser quality, resulting in reduced survival and reproduction (Knutson et al., 2006).

Birds may relocate from an impacted habitat to an alternative habitat, but several factors may affect this ability and success (Boulinier and Lemel, 1996). However, the newly-occupied habitat may be of lesser quality, resulting in reduced survival and reproduction (Knutson et al., 2006). This may have short-term or long-term implications, depending on the species (Battin, 2004). In their study of non-OCS oil and gas development at Padre Island National Seashore in Texas, Lawson et al. (2011) documented declines in abundance of several species of wintering passerines with decreasing distance from roads. However, the authors did not detect a difference in abundance among active drilling sites, active pumping stations, abandoned well sites, or roads (Lawson et al., 2011, Figure 1).

### 3.1.2 Helicopter and Vessel Traffic

Disturbance effects related to OCS activities (e.g., air and vessel traffic) can have variable impacts to avian populations depending on the type, intensity, frequency, duration, and distance to the disturbance source (Bélanger and Bédard, 1989; Conomy et al., 1998; Blumstein, 2003). For birds, hearing sensitivity seems most acute in the range of 1–5 kHz, similar to the most sensitive mammals in this range; above and below that range, avian performance appears to be inferior (Manci et al., 1988, p. 32). Birds vocalize as a form of communication for predator detection-avoidance, food-finding, and migration. More important, for many avian species, aural communication (i.e., calls or songs) is used for locating mates, determining mate quality, and maintaining pair bonds (Welty and Baptista, 1988). Anthropogenic sound (i.e., noise pollution) may mask or otherwise interfere with avian communication (Bayne and Dale, 2011). Disturbance-related impacts do not typically result in direct mortality. Rather, effects tend to manifest themselves through the following:

- behavioral changes (Bélanger and Bédard, 1990);
- reduced pairing success (Habib et al., 2007);
- selection of alternative habitats that may be suboptimal;
- creating barriers to movement or decreasing available habitat (Bayne et al., 2005a and 2005b);
- decreases in foraging time (Verhulst et al., 2001);
- reduced foraging efficiency;
- reduced time spent resting or preening (Tarr et al., 2010);
- prey switching;
- increases in energy expenditures due to flight behavior and temporary displacement (compared to resting, preening, or foraging) (Platteeuw and Henkens, 1997; Ackerman et al., 2004); and
- possible decreases in reproductive effort or nest success (Béchet et al., 2004; McGowan and Simons, 2006).

Overall, the literature reviewed suggests negative short- and long-term disturbance effects to birds (Carney and Sydeman, 1999).

Noise, with particular reference to military aircraft as a disturbance factor, has been previously reviewed by Larkin et al. (1996), Gutzwiller and Hayden (1997), and Efroymson et al. (2000). Helicopters appear to exert a greater influence on avian behavior (flight initiation distance, duration in flight, and distance flown) than airplanes, which is likely due to the much higher decibel level associated with the prop wash (Ward et al., 1994 and 1999). Komenda-Zehnder et al. (2003, p. 10) recommended minimum flight altitudes (above sea level) of 450 m (1,476 ft) for helicopters and 300 m (984 ft) for airplanes, based on results for disturbance to wintering waterbirds (mostly ducks). In the Gulf of Mexico, all aircraft are required to follow the Federal Aviation Administration's Advisory Circular 91-36C (1984) minimum altitude of 610 m (2,000 ft). This requirement is not tracked and it is likely that some of the helicopters departing from onshore sites to offshore platforms fly below the Federal Aviation Administration's minimum in areas of high bird density (e.g., waterbird colonies, beach-nesting bird colonies, and National Wildlife Refuges) to reduce total travel time or reduce fuel consumption, and during periods of inclement weather, high winds, or low ceilings. Although helicopter traffic in support of offshore oil and gas activities is anticipated to occur frequently, such disturbances tend to be relatively short in duration.

### 3.1.3 Air Emissions

In North America, there is a dearth of information concerning potential impacts of air pollution on birds, other than effects related to acid rain (Hames et al., 2002; Rimmer et al., 2005). In his review of air pollution impacts on wildlife, Newman (1979) stated that information was too limited to draw conclusions regarding species sensitivity.

Sources of air pollution on the OCS in support of routine activities include the following:

1. service support vessels, i.e., boats, ships, etc.;
2. helicopters;
3. generators and other related gas- or diesel-powered engines on platforms;
4. flaring; and
5. other equipment on platforms (i.e., vents, fugitives, glycol dehydrators, pneumatic pumps, and pressure level controllers, boilers, heaters, and burners).

In their Gulfwide inventory of emissions from platforms, Wilson et al. (2010) documented a 19 percent increase (up over 9,000 tons since previous inventory) in volatile organic compounds (VOCs), and the overall activity of flaring increased. For more details about the list of OCS-related emission sources, the types of pollutants monitored, and total platform emission estimates, refer to Wilson et al. (2010, Table 8-1).

It is well known that the myriad constituents of air pollution (e.g., As, Cd, Se, H<sub>2</sub>S, NO<sub>x</sub>, CO, CO<sub>2</sub>, CH<sub>4</sub>, O<sub>3</sub> [ozone], Pb, Hg, MeHg, Fl, Al, SO<sub>2</sub>, PAH's, chlorofluorocarbons, hydrochlorofluorocarbons, particulate matter [PM], and fly ash) may be harmful to wildlife (Newman and Schreiber, 1988; Schreiber and Newman, 1988) and humans. These and other pollutants are regulated onshore by the U.S. Environmental Protection Agency (USEPA) under the Clean Air Act (CAA) of 1970 and subsequent provisions. Under provisions of the CAA Amendments of 1990, the USEPA Administrator has jurisdiction in OCS areas eastward of 87.5°W longitude in the Gulf of Mexico and, in consultation with the Secretary of the Interior and the Commandant of the U.S. Coast Guard, established the requirements to control air pollution in that area of the Gulf. Effects of air pollutants on birds can result in major die-offs or effects can be relatively subtle including behavioral changes; changes in distribution and habitat

use; increased susceptibility to parasites, diseases, and infections; physiological and respiratory stress; and anemia (Newman, 1979; Newman and Schreiber, 1988; Eeva et al., 1994). According to Newman and Schreiber (1988), the low number of reported incidents involving wildlife is likely a function of lack of awareness and recognition of the problem rather than a low incidence of occurrence (Newman and Schreiber, 1988, Tables 1-2). Air pollution may result in changes to avian populations through their distribution or abundance, but it may be difficult to separate emission-related effects from other population-limiting factors (i.e., food limitation, change in distribution of preferred foods, weather-related effects to habitats, or anthropogenic impacts to habitats, etc.) and their interactions (Schreiber and Newman, 1988, p. 350). In addition, cross-seasonal effects or annual variation in recruitment or mortality may be occurring in other regions (e.g., food shortage on the wintering grounds or on staging areas, major mortality event during migration [Newton 2006 and 2007]), masking air pollution effects or making it more difficult to discern such effects.

Recovery potential for a species or its ability to withstand additional population-level losses due to anthropogenic impacts, including air pollution, is largely a function of its life-history strategy (Sæther and Bakke, 2000; Sæther et al., 2004). It is likely that birds using the CPA would encounter greater levels of air pollution than birds using the WPA or Eastern Planning Area (EPA) due to (1) greater number of platforms and more flaring from platforms at a given point-in-time in the CPA than WPA, (2) greater number of total vessel trips in the CPA than WPA, and (3) greater number of helicopter support trips in the CPA than WPA (see the “OCS oil and gas activities Analysis” section below). Therefore, total air pollution associated with CPA OCS oil and gas activities would likely be greater in the CPA than in the WPA (Wilson et al., 2010). This does not consider between-area differences in prevailing winds, differences in associated infrastructure onshore, or other sources of inputs onshore.

There are very few studies assessing contaminants’ effects on black rails (Eddleman et al. 1994), despite the fact that contaminants’ impacts on waterbirds have long been studied. One concern specific to eastern black rails is the wide-spread use of pesticides to control mosquito marsh populations (Morris et al., 2005; Poulin et al., 2010; Lagadic et al., 2014), but the importance of mosquitoes to the eastern black rail’s diet is currently unknown. Overall, according to the FWS, there is no evidence of specific contaminant threats to the eastern black rail that could impact the subspecies at a population level (U.S. Fish and Wildlife Service, 2018).

#### 3.1.4 Produced Water

Produced water impacts on birds can vary from short term to long term and from sublethal to lethal. Produced water has previously received limited attention relative to potential effects to birds using offshore waters or as a chronic source of pollution (Stephenson, 1997; Wiese et al., 2001). The reasons are based on the following assumptions:

1. the regulatory limits established by USEPA eliminate or significantly reduce the potential for negative effects to birds; and
2. produced water and its constituent pollutants will be diluted simply as a function of the dilution potential of the ocean, eliminating or minimizing potential harm to birds.

Produced water, including its constituent pollutants, is the largest waste stream associated with oil and gas production (Veil et al., 2004; Welch and Rychel, 2004). The volume of produced water is not constant over time and increases over the life of an individual well (Veil et al., 2004). It has been estimated that U.S. wells produce 7 bbl of produced water for every barrel of

oil and may comprise as much as 98 percent of the material brought to the surface for wells nearing the end of productivity (Veil et al., 2004). Produced water is composed of a number of different substances, including trace heavy metals, radionuclides, sulfates, treatment chemicals, produced solids, and hydrocarbons (see Veil et al., 2004, Table 2-1, for a complete list of substances and amounts from Gulf of Mexico wells). Pollutants discharged into navigable waters of the U.S. are regulated by USEPA under the Clean Water Act of 1972 and subsequent provisions (33 U.S.C. §1251 et seq.). Specifically, a NPDES permit must be obtained from USEPA under Sections 301(h) and 403 (45 FR 65953, October 3, 1980) of the Clean Water Act. However, not all water pollutants are regulated or are regulated at levels that will prevent effects to wildlife, including birds (Fraser et al., 2006, pp. 148–150).

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).

### 3.1.5 Marine Debris

Ingestion or entanglement with plastic materials may lead to injury or death. The effects of plastic ingestion may be long-term and may include physical deterioration due to malnutrition; plastic material cannot digest often leading to a distention of the stomach, thus preventing its contraction and simulating a sense of satiation (Moser and Lee, 1992; Pierce et al., 2004). The chemical toxicity of some plastics can be high, posing a hazard in addition to obstruction and impaction of the gut (Fry et al., 1987). Some birds also feed plastic debris to their young, which could reduce fledging success and offspring survival rates. As a result of stress from the consumption of debris, individuals may weaken, facilitating infection and disease; migratory species may then not have the energetic capacity to initiate migration or complete the migration process. The Notice to Lessee (NTL) 2012-BSEE-G01, issued on January 1, 2012, applied to activities permitted before March 13, 2020 and provides standards for marine trash and debris awareness and elimination. On March 13, 2020, updated guidance was provided under Appendix B of the Biological Opinion issued by NMFS. The Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols can be accessed on the NOAA Fisheries website (<https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico>). The updated guidance provides standards for activities permitted after March 13, 2020.

### 3.1.6 OCS Oil and Gas Activities

The routine activities are discussed below and are expected to be of short duration and limited in scope.

#### 3.1.6.1 Vessel and Air Traffic

Service vessels would use selected nearshore and coastal (inland) navigation waterways, or corridors, and should adhere to regulations set forth by the U.S. Coast Guard (USCG) for reduced vessel speeds within these inland areas. The effects would be limited to the immediate vicinity of the vessel and would be of short duration. Impacts are expected to “not likely to adversely affect” this species.

The Federal Aviation Administration and corporate helicopter policy advise helicopters to maintain a minimum altitude of 700 ft (213 m) while in transit offshore and 500 ft (152 m) while working between platforms. When flying over land, the specified minimum altitude is 1,000 ft (305 m) over unpopulated areas or across coastlines and 2,000 ft (610 m) over populated areas and biologically sensitive areas such as National Wildlife Refuges and National Parks. Many relatively undisturbed coastal areas and refuges provide preferred and/or critical habitat for feeding, resting (or staging), and nesting birds. The effects are expected to be of short duration and limited in scope. Impacts from helicopter flights associated with routine activities are expected to “not likely to adversely affect” this species.

Overall, the predicted scenario statistics suggest a far greater number of exploration and production wells, more installed structures, far greater length of installed pipelines, and much higher level of support related activities in the CPA compared with the WPA or EPA.

#### 3.1.6.2 Air Pollution

Emissions of pollutants into the atmosphere from the activities associated with CPA OCS oil and gas activities should result in minimal effects on offshore and onshore air quality because of the prevailing atmospheric conditions, emission heights and rates, and pollutant concentrations. The most likely pathway for air pollution to affect birds is through acidification of inland waterbodies and soils, and a subsequent change in trophic structure (White and Wilds, 1998; USDOC, NOAA, 2011a). Even though the levels of activity are much greater in the CPA compared with the WPA or EPA, impacts to birds from decreased air quality due to routine activities are expected to be negligible because air quality impacts from CPA OCS oil and gas activities are unlikely to impact ambient air quality (but see Wilson et al., 2010).

#### 3.1.6.3 Produced Water

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). The degradation of coastal and estuarine water quality expected to result from OCS-related discharges, particularly when added to existing degradation from other sources, may affect coastal birds directly by means of acute or chronic toxic effects from ingestion or contact, or indirectly through the contamination of food sources or habitat loss and/or degradation (Fraser et al., 2006). Operational discharges or runoff in the offshore environment could also affect seabirds that remain and feed in the vicinity of offshore OCS structures and platforms (Wiese et al., 2001; Burke et al., 2005). These impacts could also be both direct and indirect. Many seabirds feed and nest in the Gulf; therefore, water quality may also affect breeding success (measured as the ratio of fledged birds per nest to hatched birds per nest). The NPDES permit maximum allowable oil and grease concentration is an average of 29 mg/L per month for the OCS and specifies a maximum (daily average) of 42mg/L daily, which are events

that may cause sheens (Fraser et al., 2006, p. 149). However, the permittee is required to monitor free oil using the visual sheen test method on the surface of the receiving water. Monitoring is performed once per day when discharging, during conditions when observation of a sheen on the surface of the receiving water is possible in the vicinity of the discharge, and when the facility is manned. It is unlawful to discharge produced water that causes a visible sheen. Impacts from produced-water discharges associated with routine activities are expected to “not likely to adversely affect” this species.

#### 3.1.6.4 Habitat Loss and Fragmentation

The analysis of the potential impacts to coastal environments (**Chapters 3.1.2.1 and 4.2.1.3**) concludes that WPA, CPA, or EPA OCS oil and gas activities are not expected to adversely alter barrier beach configurations beyond existing, ongoing impacts in localized areas downdrift of artificially jettied and maintained channels. Adverse impacts of pipeline and navigation canals are the most significant OCS-related and proposed-action-related impacts to wetlands that may be used by many species of birds. Initial impacts are locally significant and largely limited to where OCS-related canals and channels pass through wetlands.

#### 3.1.6.5 Trash and Debris

Coastal and marine birds are susceptible to entanglement in floating, submerged, and beached marine debris, specifically in plastics discarded from both offshore sources and land-derived litter and waste disposal. It is believed that coastal and marine birds are less likely to become entangled in or ingest OCS-related trash and debris due to BSEE regulations that prohibit the disposal of equipment, containers, and other materials into offshore waters by lessees (30 CFR 250.300). Also, MARPOL, Annex V, Public Law 100-220 (101 Statute 1458), prohibits the disposal of any plastics, garbage, and other solid wastes at sea or in coastal waters (effective January 1, 1989, and enforced by USCG). The BSEE policy regarding marine debris prevention is outlined in NTL 2012-BSEE-G01 and Appendix B, Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols, found in the Biological Opinion issued by the NMFS on March 13, 2020. As such, impacts to birds from OCS-related trash and debris associated with routine activities are expected to be negligible.

#### 4. Accidental Events

The following analysis includes information developed and incorporated in the wake of the DWH event (Oil Spill Commission, 2011b). Additional information on oil-spill impacts to birds and results from avian monitoring related to the DWH event can be found in **Chapter 4.1.1.14.1 of the Multisale EIS** (USDOJ, BOEM, 2012b). A more detailed discussion of catastrophic oil-spill events can be found in **Appendix B**—but as noted above, BOEM does not consider a catastrophic event to be an effect of the OCS oil and gas activities as it is not reasonably certain to occur. Additional information regarding oil-spill occurrence, probabilities, and volumes for the Gulf of Mexico can be found in Anderson and Labelle (2000), and Oil Spill Commission (2011b).

These results and the reviews from the Oil Spill Commission (2011c, 2011d, and 2011e) suggest that oil-spill probabilities and estimates of spill size and frequency may be biased low, or at a minimum, impacts to infrastructure from hurricanes should also be considered as a variable when attempting to model oil spill-related parameters and associated risk (Stewart and Leschine, 1986; Pulsipher et al., 1998; Kaiser and Pulsipher, 2007). The BOEM has run a new OSRA catastrophic spill analysis included in the Multisale EIS, and the EPA FEIS.

Due to the aging infrastructure, particularly pipelines, spill-related risks or probabilities may not be constant over the life of the OCS oil and gas activities, especially in the event of hurricanes. This section discusses impacts to coastal and marine birds resulting from accidents reasonably certain to occur as associated with the OCS oil and gas activities. Impact-producing factors include oil spills and oil-spill cleanup activities, including the release of rehabilitated birds. As previously mentioned in **Chapters 4.1.1.14.1 and 4.1.1.14.2 of the Multisale EIS** (USDOJ BOEM, 2012a–2012c), it is recognized that, due to either the small initial population size, the initial population trajectory, or both, for threatened and endangered avian species, any spill and associated cleanup activities would likely have a proportionately greater negative effect to the population (Dennis et al., 1991; Belovsky et al., 1994). With the DWH event, Congress and various Federal commissions have indicated potential interest in holding parties involved in accidental events that impact migratory birds responsible under the Migratory Bird Treaty Act (Alexander, 2010; Corn and Copeland, 2010).

##### 4.1 Oil Spills and Response

Oil spills represent the greatest potential direct and indirect impact to coastal and marine bird populations. Birds that are heavily oiled succumb to acute toxicity effects shortly after exposure (Clark, 1984; Leighton, 1993). If the physical oiling of individuals or local flocks of birds occurs, some degree of both acute and chronic physiological stress associated with direct and secondary uptake of oil would be expected. Small coastal spills, pipeline spills, and spills from accidents in navigable waterways can contact and affect the different groups of coastal and marine birds, most commonly seabirds, divers, marsh- and wading birds, waterfowl, and some species of shorebirds (King and Sanger, 1979, Table 1; Williams et al., 1995, Table 5; Camphuysen, 2006, Table 6).

Lightly oiled birds can sustain tissue and organ damage from oil ingested during feeding and grooming or from oil that is inhaled. Birds that are heavily oiled usually die. Lighter polycyclic aromatic hydrocarbons (PAHs), like naphthalene and phenanthrene, are volatile and water-soluble, but they are somewhat more persistent compared with lighter, more volatile, and more

water-soluble hydrocarbons like benzene (Albers, 2006). Low levels of oil may have multiple deleterious effects, including the following:

- changes in behavior;
- interference with feeding drive and food detection;
- alteration of food preferences and ability to discriminate between poor compared to ideal food items;
- predator detection and avoidance;
- definition and defense of breeding and feeding territories;
- kin recognition;
- weakening of pair bonds (Butler et al., 1988);
- changes in incubation behavior (Butler et al., 1988; Fry et al., 1986);
- reduced provisioning of nestlings and fledglings, leading to reduced growth and survival (Trivelpiece et al., 1984; Boersma et al., 1988); and
- alteration of homing ability and fidelity for highly philopatric species.

Residual material that remains after evaporation and solubilization are water-in-oil emulsions (mousse), which are the primary pollutant onshore after oil from offshore spills actually reaches land. The mixing of mousse and sediments form aggregates that have the odor of oil and, after photo- and biological oxidation, form asphaltic “tarballs” and pavements (Briggs et al., 1996). Mousse emulsions may be the most toxic petroleum component because they are the most hydrophobic and will penetrate the hydrophobic core of the plasma membrane of cells and will cause disruption of the membrane and enter the cells as well (Briggs et al., 1996 and 1997). Common symptoms of exposed birds include dehydration, gastrointestinal problems, infections, arthritis, pneumonia, hemolytic anemias, cloacal impaction, and eye irritation. Therefore, antibiotic treatments, nutritional support, rehydration, and other protocols are used at rehabilitation centers (Briggs et al., 1996 and 1997).

When oil gets into vegetated or unvegetated sediment, low redox potentials, absence of light, and waterlogged substrate may result in oil that can neither be oxidized by bacteria and sunlight nor evaporate. The oil may also remain in its unweathered toxic state indefinitely. However, weathering-related effects on the oil from its path offshore to the coast ameliorates, to some extent, toxicity at the shoreline.

The use of feeding areas at the sea surface and intertidal wetland zone, where spilled oil tends to accumulate, makes the waterbirds, shorebirds, and some species of seabirds vulnerable to exposure to oil (Dunnet, 1982). If physical oiling of individuals or local groups of birds occurs, some degree of both acute and chronic physiological stress associated with direct and secondary uptake of oil would be expected (Burger and Fry, 1993; Leighton, 1993). Affected individuals may initially appear healthy, but they may be affected by physiological stress that does not occur until much later. Biochemical impacts of lighter PAHs have not been extensively described but may include increased susceptibility to physiological disorders including disruption of homeostasis; weakened immune systems and reduced resistance to disease; and disruption of respiratory functions (Briggs et al., 1996). The physiology and biochemical network of a bird

has many components, interactions, and functions that may provide potential points of attack from petrochemicals (Welty and Baptista, 1988). The network and internal feedback system also provide routes by which an effect on one process can lead to cascading sublethal, chronic effects in other systems (Burger and Fry, 1993; Albers, 2006).

Under natural conditions, water does not penetrate through the vanes of the feathers because air is present in the tiny pores in the lattice structure of the feather vane. Oil, with its reduced surface tension, and hydrophobic characteristics, adheres to keratin and mats the feather barbules into clumps; the lattice opens up (breaks down) and water penetrates and displaces insulating air (Lambert et al., 1982; O'Hara and Morandin, 2010). Oil also mats the feathers together, displacing insulating properties of trapped air (Jenssen, 1994). Dispersants also reduce water surface tension in the feather lattice pores (due to their surfactant component), and render them water-attracting instead of water-repelling (Stephenson, 1997; Stephenson and Andrews, 1997). Thus, at a certain surface tension, water will penetrate the feathers, and death from reduced thermoregulatory function may result (Lambert et al., 1982; Stephenson, 1997; Stephenson and Andrews, 1997). Birds that must feed on or in the water will lose heat faster than semiaquatic birds (e.g., wading- and shorebirds) that can feed with dry plumage on land (Jenssen, 1994).

Ingestion of oil by birds affects reproductive ability (Velando et al., 2005a and 2005b; Zabala et al., 2010). It may reduce eggshell thickness, resulting in eggs being cracked by incubating adults. Alonso-Alvarez et al. (2007a and 2007b) used blood chemistry of yellow-legged gulls (*Larus michahellis*) to compare long-term sublethal toxicity of the *Prestige* oil spill with short-term experimental sublethal toxicity in captive birds fed small amounts of fuel oil. Long-term effects were measured about 19 months after the spill. Short-term effects were measured in captive birds fed a small amount of fuel oil for 7 days. Adults from oiled colonies and fuel-oil-fed experimental birds had higher total PAHs and lower levels of three natural metabolites. Calcium was lower in oil-fed females than in control females, but it was the same in oil-fed and control males. Calcium is critical to females during follicular development because it is used for production of the egg shell. Ingestion of oil may alter liver enzyme function, osmoregulatory function, adrenocortical processes, and corticosteroid levels, and it may cause anemia (Lambert et al., 1982; Rocke et al., 1984; Pérez et al., 2010). Burger (1997) reported that exposure to small amounts of oil reduces immune response to diseases or results in decreases in body mass such that impacts may not be documented for many years or until oiled birds face additional environmental stressors, at which time exposed birds tend to experience higher levels of mortality compared with unexposed birds.

External oiling of eggs can slow embryonic growth, induce tumor growth, reduce gas conductance through the eggshell, and decrease hatchability (Jenssen, 1994). Impacts on vital life-history characteristics such as growth rates (Szaro et al., 1978a and 1978b; Trivelpiece et al., 1984) or reproductive parameters such as reproductive success can occur, resulting in possible local population extinction. Indirect effects occur by fouling of nesting habitat and by displacement of individuals, breeding pairs, or populations to less favorable habitats; changes in preferred prey abundance and distribution have also been documented (Esler et al., 2002; Golet et al., 2002; Velando et al., 2005b). Competition from con- and hetero-specifics may prevent displaced birds from accessing and occupying unoiled or undisturbed habitats, particularly for seabird colonies in southeastern Louisiana.

Oil spill response activities along the shore may disturb nesting populations of birds and reduce the suitability of the habitat due to air, vehicle, and foot traffic. The operation may use personnel with varied experience or training that can contribute to such impacts.

In general, research on long-term survival and reproduction of rehabilitated, oiled birds is limited, and results to date are mixed (Anderson et al., 1996; Sharp, 1996; Anderson and Labelle, 2000; but see Golightly et al., 2002; Mazet et al., 2002; Underhill et al., 1999). Success of rehabilitation for oiled birds may be a function of capture and handling methods, overall oiling and exposure of the individual, facility design, and availability of food, water, and space while in captivity, as well as species-specific characteristics, including body size, metabolism, and resting-heart-rate. It is critical that rehabilitated birds remain disease-free while in captivity. A major concern for holding wild animals, including birds, in facilities post-spill is the potential to expose the wild population to diseases once rehabilitated individuals are released. In some cases, the loss from disease could equal or exceed losses due to oil contamination. The efficacy of rehabilitation of birds after an oil spill remains a contentious and unresolved issue among avian ecologists and the scientific community alike (Estes, 1998; Jessup and Mazet, 1999).

Timing (i.e., if peak periods in bird density overlap temporally with the spill; Fraser et al., 2006), location (high compared to low bird density area), wind conditions, wave action, and distance to the shore may have a greater overall effect on bird mortality than spill volume and fluid type (Wilhelm et al., 2007; Castège et al., 2007; Byrd et al., 2009). *Exxon Valdez* spilled only about 10.8 million gallons, but it killed about 100,000–300,000 birds (Piatt et al., 1990a and 1990b; Piatt and Ford, 1996). The sea state at the time of the *Exxon Valdez* accident was relatively calm, and the oil was heavy, high-viscosity crude, resulting in little capability for chemical treatment or natural dispersal, breakdown, and weathering. Because of its undispersed state, the *Exxon Valdez* oil affected principally surface-dwelling and shore-dwelling organisms, such as birds. As oil weathered, the exposure of seabirds to oil from the *Exxon Valdez* spill shifted from direct oiling to ingestion of oil with prey or of contaminated prey (Piatt and Anderson, 1996; Seiser et al., 2000; Golet et al., 2002; Esler et al., 2010; but see also Wiens et al., 2001 and 2004). For a long-term review of the ecosystem following the *Exxon Valdez* spill, refer to Peterson et al. (2003).

Parsons (1994) provides the following unique before–after data for impacts of a spill on birds. Extensive shoreline and salt marsh were oiled by a January 1990 Exxon spill in the Arthur Kill and Kill van Kull estuaries of New York Harbor. Double-crested cormorants had achieved their maximum population growth by 1991. Productivity of herring gulls remained unchanged by the spill. Most heron populations increased after the spill. The greater black-backed gull population declined. Snowy egrets and glossy ibis used salt marsh and mud flat habitat, some of which was oiled. Black-crowned night heron and glossy ibis had delayed nesting after the spill and, along with snowy egret, showed lower reproductive success after the spill. Reproductive parameters like egg laying and hatching were generally higher than during the chick-rearing period, likely attributable to reduced food availability for provisioning chicks. Waterfowl were not affected seriously, except for a short-term decline in mallards. Short- and long-term responses by birds to an oil spill are likely to be species-specific and may be a function of the species' life history and its habitat use and diet (Piatt et al., 1990a; Burger and Fry, 1993; Votier et al., 2005). For a given avian species, if its preferred habitat and food resource are also impacted by a spill, the species will be forced to locate and settle in alternative habitats, modify its foraging behavior, or select alternative food resources. Conversely, fidelity to the impacted area could result in

reduced energy uptake through reduced food availability, reduced foraging success, prey switching, or residual sublethal toxicity effects, which may negatively impact body condition and survival (e.g., after the *Exxon Valdez* spill, harlequin ducks [Esler et al., 2000 and 2002] and pigeon guillemots [Seiser et al., 2000; Golet et al., 2002]).

#### 4.1.1 OCS Oil and Gas Activities

Oil spills introduced specifically into coastal waters (as opposed to spills immigrating to coastal waters from offshore) as a result of OCS oil and gas activities are assumed to encroach upon adjacent coastal lands. The Oil Spill Risk Analysis (OSRA) is a model that calculates the movement of hypothetical spills by successively integrating time sequences of two spatially gridded input fields: the surface ocean currents and the sea level winds. Thus, the OSRA model generates time sequences of hypothetical oil spill impact locations—essentially, oil-spill trajectories to assist in estimating impacts to resources. It does not consider the unlikely and unanticipated scenario of an OCS oil spill occurring in close proximity to eastern black rail preferred habitat at the same time as an extremely high tide, wetland loss, a hurricane and sea level rise. OSRA modeling for all three planning areas (CPA, WPA, and EPA) has been completed and is provided below. For more details on OSRA, see Appendix G.

Representative species of the seven bird groups are widely distributed across the Gulf; therefore, an oil spill, depending on its size and distribution, would likely affect only a small fraction of a given species' population. The combined probabilities varied greatly depending on duration (10 days compared to 30 days) and the avian species group considered in the WPA and CPA. The combined probabilities (which represent the estimated probability that 1 or more hypothetical spills  $\geq 1,000$  bbl will both occur and contact a resource) associated with avian habitats varied little, irrespective of spill duration (10 days versus 30 days) and the avian species group or threatened or endangered species considered in the EPA.

Depending on the size of the spill, location, time of year, duration, and magnitude of associated oil-spill cleanup efforts, associated activities may impact or further exacerbate coastal bird issues regardless of personnel training and experience (National Audubon Society, Inc., 2010). Should such a spill occur, the OSRA model projected a spill risk within 10 and 30 days for the WPA, CPA and EPA (Figures 1-5). The counties where this species occurs is in Table 1.

**Table 1. Coastal counties or parishes of the Gulf of Mexico with eastern black rail occurrence (USFWS, 2018)**

Florida		Louisiana	Texas	
Broward	Lee Levy Manatee	Cameron	Aransas	Jefferson
Charlotte	Miami-Dade Monroe		Brazoria	Jackson
Collier Citrus Dixie	Pasco Pineallas		Calhoun	Kleberg

Florida		Louisiana	Texas	
Escambia Franklin	Santa Rosa		Chambers Matagorda	
Gulf Hernando	Sarasota Taylor		Galveston Nueces	
Jefferson	Wakulla			

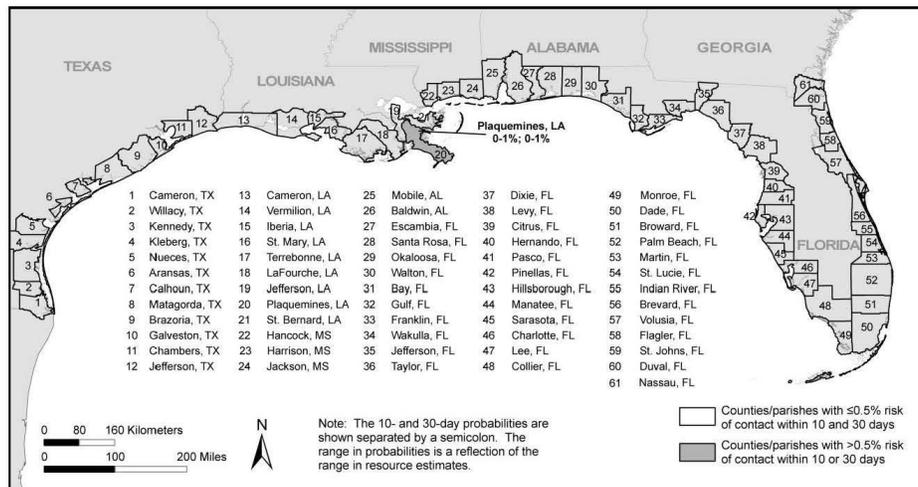
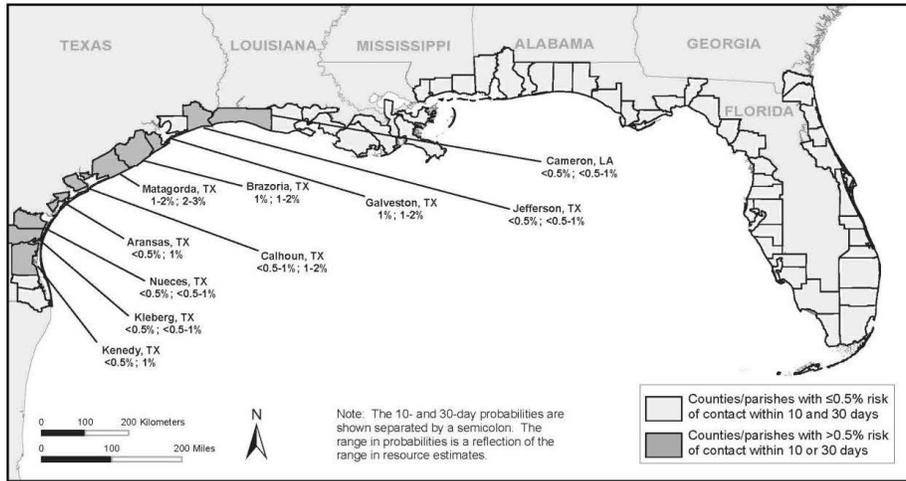
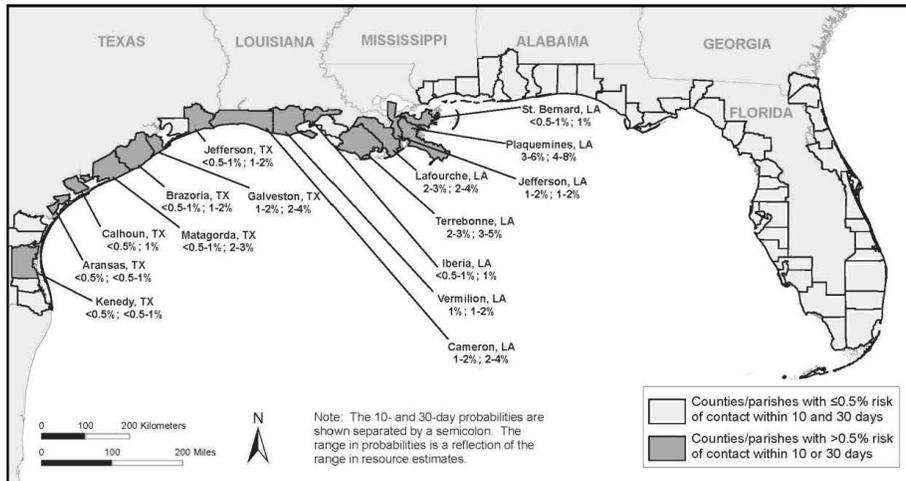


Figure 1. OSRA probabilities of an accidental oil spill (≥1,000 bbl) occurring and contacting within 10 and 30 days the shoreline (counties and parishes) as a result of EPA OCS oil and gas activities.



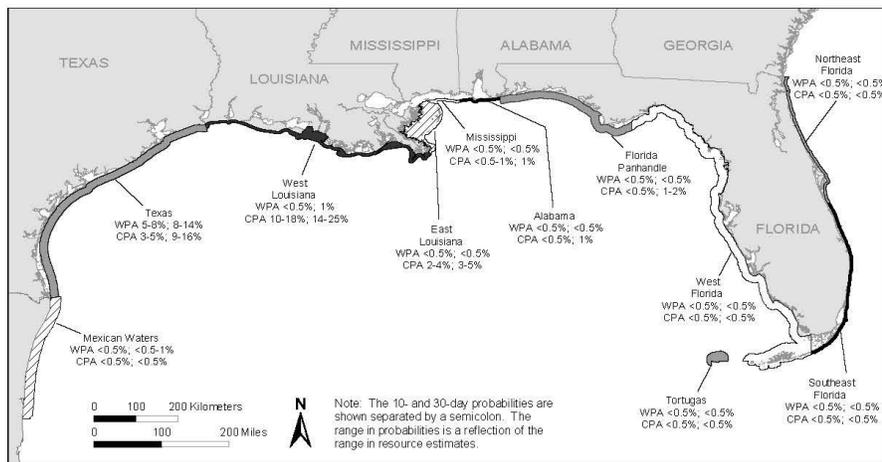
**Figure 2. OSRA probabilities of an accidental oil spill (≥1,000 bbl) occurring and contacting within 10 and 30 days the shoreline (counties and parishes) as a result of a WPA OCS oil and gas activities (only counties and parishes with a >0.5% risk of contact within 10 or 30 days are labeled).**



**Figure 3. OSRA probabilities of an accidental oil spill (≥1,000 bbl) occurring and contacting within 10 and 30 days the shoreline (counties and parishes) as a result of a CPA OCS oil and gas activities (only counties and parishes with a >0.5% risk of contact within 10 or 30 days are labeled).**

In general terms, coastal waters of the planning areas are expected to be impacted by many, frequent, small spills (<1 bbl); few, infrequent, moderately-sized spills (>1 bbl and <1,000 bbl); and a single, large ( $\geq 1,000$  bbl; risk of <1–2) spill. The assessment of spill frequency (i.e., frequent, infrequent, unlikely) is based relative to the 40-year life span of a lease. Pipelines pose the greatest risk of a large spill occurring in coastal waters. Estimates from spill data show that Federal offshore waters will be subjected to many frequent small spills ( $\leq 1$  bbl); few, infrequent, moderately-sized spills (>1 bbl and <1,000 bbl); and rare large spills ( $\geq 1,000$  bbl) as a result of OCS oil and gas activities.

Oil spills introduced specifically into coastal waters (as opposed to spills immigrating to coastal waters from offshore) as a result of OCS oil and gas activities are assumed to encroach upon adjacent coastal lands (For more details on OSRA, see Appendix G). 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) and 5–8 percent and 8–14 percent (from WPA) of impacting Texas State offshore waters. State offshore waters in Louisiana are divided into east and west Louisiana. West Louisiana has a 10–18 percent and 14–25 percent probability (from CPA) and <0.5 percent and a 1 percent (from WPA) while east Louisiana has a 2–4 percent and 3–5 percent probability (from CPA) and <0.5 percent and <0.5 percent (from WPA).



**Figure 4. OSRA probabilities of oil spills ( $\geq 1,000$  bbl) occurring and contacting within 10 and 30 days state offshore waters as a result of a WPA or CPA OCS oil and gas activities.**

The OSRA modeling results (10- and 30-day probabilities) indicate that a large spill (>1,000 bbl), if it were to occur in Federal offshore waters (EPA), would have a <0.5 percent probability of impacting Texas State offshore waters. State offshore waters in Louisiana are divided into east and west Louisiana. West Louisiana has a <0.5–1.0 percent probability while east Louisiana has a <0.5–1.0 percent probability of impacts if such a spill were to occur. The OSRA model

projected a spill impact risk of <0.5 percent for state offshore waters eastward of Louisiana as a result of activities in the EPA.

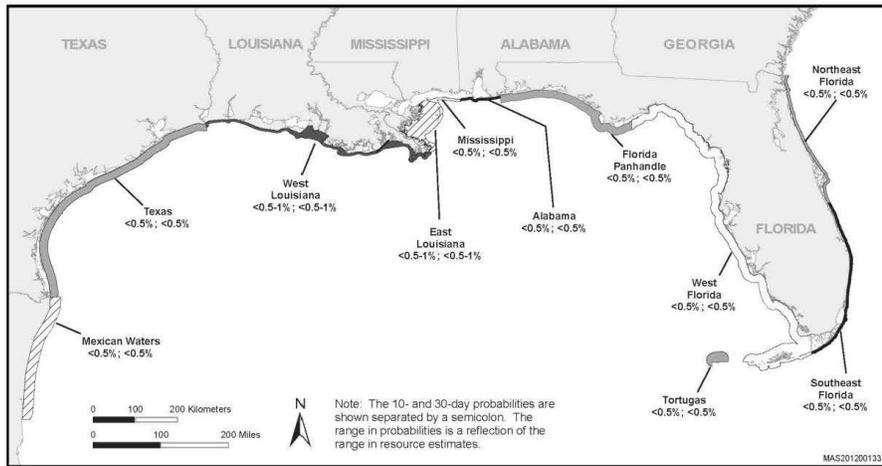


Figure 5. OSRA Probabilities of oil spills (≥1,000 bbl) occurring and contacting within 10 and 30 days state offshore waters as a result of an EPA OCS oil and gas activities.

## 5. Cumulative Effects

This cumulative analysis considers impact-producing factors (refer also to CEQ, 1997; Pierce, 2011) that may adversely affect populations of threatened and endangered avian species, as well as nonthreatened and nonendangered species related to OCS and non-OCS activities.

### 5.1 OCS-Related and Non-OCS-Related Air Pollutants

Air pollutants include the amount of sulfur dioxide (and other regulated pollutants) expected to be released due to OCS oil and gas activities, as well as State oil and gas activities. These pollutants may adversely affect coastal and marine birds and their habitats (**Chapter 4.1.1.14.2**). Pollutant emissions into the atmosphere from the activities under the cumulative analysis are expected to have minimal effects on offshore air quality because of the prevailing atmospheric conditions, emission heights, and pollutant concentrations, as regulated by USEPA (but see Wilson et al., 2010, Tables 8-1 and 8-2).

Emissions of pollutants into the atmosphere under the cumulative analysis are projected to have minimal effects on onshore air quality because of the atmospheric regime, emission rates, and the distance of these emissions from the coastline. Onshore impacts to air quality from emissions under the OCS cumulative analysis are expected to be within both Class I and Class II PSD allowable increments, as applied to the respective subareas. Increases in onshore annual average concentrations of NO<sub>x</sub>, SO<sub>x</sub>, and PM<sub>10</sub> under the cumulative analysis are estimated to be less than Class I and Class II PSD allowable increments for the respective subareas as per both the steady-state and plume dispersion analyses, and they are assumed to be below concentrations that could harm coastal and marine birds (but see **Chapter 4.1.1.14.2**; see also Newman, 1979; Newman and Schreiber, 1988).

Although direct impacts (i.e., mortality) on coastal and marine birds due to air quality under the cumulative analysis are expected to be minimal, indirect impacts may include chronic, sublethal effects including reduced egg viability and hatchability, smaller overall clutch sizes, reduced fledging body mass, and overall fledging success, leading to overall reduced recruitment (refer to Eeva et al., 1997, 2003, and 2005). These effects could be the result of impacts to a bird's habitat or food supply rather than directly on individual birds, per se. If habitat and food resources are negatively impacted by air pollutants during the pre-laying period, it could influence energy devoted to the clutch. At the same time, these same effects could manifest themselves by reduced provisioning rates by adults to nestlings and/or fledglings or by provisioning at similar rates, but with different food resources (i.e., prey switching, whereby the alternative prey has less per capita energy).

Although the incremental contributions of offshore emissions are below or within those allowed by law, it is uncertain to what extent the contributions from OCS-related activities to the overall production of air pollutants on an annual or cumulative basis (refer to Wilson et al., 2010, Tables 8-1 and 8-2) could adversely impact avian populations in the Gulf of Mexico region. Nevertheless, these impacts would not be expected to rise to population-level impacts across the Gulf.

## 5.2 Water Quality Degradation

Water quality (**Chapters 4.2.1.2.1.1-4.2.1.2.2.4**) of coastal environments will be affected by bilge water from service vessels and point- and nonpoint source discharges from supporting infrastructure associated with OCS oil and gas development (refer to Veil et al., 2004, Table 2-1, for a complete list of substances and amounts from Gulf of Mexico wells). Water quality in marine waters will be impacted by the discharges from drilling, production, and platform removal operations (Veil et al., 2004; Welch and Rychel, 2004; Fraser et al., 2006). Degradation of coastal and inshore water quality resulting from factors related to OCS oil and gas activities; crude oil imports by tankers; and other commercial, military, and recreational offshore and coastal activities is expected to impact coastal and marine birds (**Chapter 4.1.1.16.2**; see also Fraser et al., 2006).

In 2008, USEPA (2008) rated the overall condition of the waters in the Gulf of Mexico at 2.2 (on a scale from 1 to 5, with 5 being highest), one of the lowest scores of any region in the U.S. NOAA (USDOC, NOAA, 2011a, Figure 54) noted that almost half of the 37 major estuarine systems in the Gulf of Mexico were considered moderately polluted. Further, 14 percent of all Superfund sites nationwide that have been cleaned up or remediated occur in the Gulf Coast region (USDOC, NOAA, 2011a, p. 40); 99 of 189 (52%) counties and parishes in Texas, Louisiana, Alabama, Mississippi, and Florida are coastal. Not included during USEPA's monitoring program (USEPA, 2008) were waters in the hypoxic zone (O<sub>2</sub> depleted water) found on the Gulf of Mexico continental shelf adjacent to the outflows of the both the Mississippi and Atchafalaya Rivers (Rabalais et al., 2002a). This area is well known and represents the second largest coastal zone of hypoxia in the world (Rabalais et al., 2001 and 2002b). Thus, the waters of the Gulf Coast region are some of the most contaminated in the U.S. The incremental addition related to OCS oil and gas activities would contribute to further degradation of water quality, but this remains a small addition when compared with all other natural and anthropogenic sources.

## 5.3 Platform and Pipeline Oil Spills and Any Improperly Directed Spill Response Activities

Oil spills have the greatest potential to impact coastal and marine birds. Use of waterbird, marshbird, shorebird, and seabird feeding areas at the sea surface and at the intertidal wetland zone, where spilled oil may accumulate, makes many avian species extremely vulnerable to spilled oil. Exposure to small amounts of oil may result in long-term, sublethal, chronic impacts on birds with the potential to impact food resources through changes in distribution and abundance (i.e., availability of preferred foods) (e.g., Esler et al., 2002). Mortality from oil spills is often related to numerous symptoms of toxicity. Pipelines are roughly 2 times more likely to produce >1,000 bbl spills compared with facilities.

The extensive oil and gas industry operating in the Gulf area may have caused low-level, chronic, petroleum contamination of coastal waters (Holdway, 2002; Jernelöv, 2010). Outside of a catastrophic event, petroleum spills or releases that result from OCS oil and gas activities would be expected to be small, particularly when compared with naturally occurring seeps in the GOM. Nevertheless, lethal effects are expected primarily from uncontained, inshore oil spills and associated, spill-response activities in wetlands, and other biologically sensitive coastal habitats (National Audubon Society, Inc., 2010; USDOF FWS, 2010e).

#### **5.4 Aircraft and Vessel Traffic and Noise from Helicopters and Service Vessels**

Helicopter and service-vessel traffic related to OCS activities would likely disturb feeding, resting, and nesting behavior of birds (at least temporarily), and it may also cause temporary or permanent abandonment of nests, nestlings, fledglings, and emigration from or avoidance of disturbed, preferred habitat (Burke et al., 2005). The Federal Aviation Administration (FAA Advisory Circular 91-36C) and corporate helicopter policy states that helicopters must maintain a minimum altitude of 700 ft (213 m) while in transit offshore and 500 ft (152 m) while working between platforms. When flying over land, the specified minimum altitude is 1,000 ft (305 m) over unpopulated areas or across coastlines and 2,000 ft (610 m) ft over populated areas and biologically sensitive areas, such as wildlife refuges and national parks. The net effect of OCS-related flights on coastal and marine birds is expected to result in temporary, often sporadic disturbances, which may result in displacement of localized individuals. During nesting periods, this could ultimately result in some reproductive failure from nest abandonment or depredation of eggs and young in the absence of a disturbed adult.

Service vessels are expected to use selected nearshore and coastal (inland) navigation waterways, and they are further expected to adhere to guidelines established by USCG for reduced vessel speeds within these inland areas. Routine presence and low speeds of service vessels within these waterways may reduce the disturbance effects from service vessels on nearshore and inland populations of coastal and marine birds. However, to date, efficacy of these measures has not been quantified. It is expected that service-vessel traffic may routinely disturb some populations of coastal and marine birds occurring within these areas.

#### **5.5 Habitat Loss, Alteration, and Fragmentation Resulting from Coastal Facility Construction and Development**

Habitat loss and fragmentation remain the largest threats to avian diversity and abundance in the U.S. and worldwide (Gaston et al., 2003; Barrow et al., 2005; Lepczyk et al., 2008). Cumulative activities related to OCS oil and gas activities will likely contribute to further loss, alteration, and fragmentation of avian habitat although at a much smaller spatial scale than non-OCS private and commercial construction and development activities (White and Wilds, 1998).

#### **5.6 Pipeline Landfalls**

Factors contributing to coastal landloss or modification include construction of pipeline landfalls for OCS oil and gas activities. From 1996 through 2009, there were 12 OCS-related pipeline landfalls in Louisiana and Texas. Adverse impacts of pipeline canals are the most significant OCS-related impacts to wetlands (Ko and Day, 2004a and 2004b; Morton et al., 2006). Initial impacts are locally significant and largely limited to where OCS-related canals pass through wetlands (Johnston et al., 2009). Wetlands are one of the most ecologically diverse and economically important habitats in the Gulf region, providing a host of benefits to the region's fish and wildlife resources (USDOC, NOAA, 2011a).

Dahl (2006) estimated an annual loss rate of 5,540 ac (2,242 ha) for the intertidal estuarine and marine wetland class, mostly in Louisiana, from all impacting factors. He stated that several factors may have contributed to wetland losses between 1998 and 2004, including deficiency in

sediment deposition, canals and artificially created waterways, wave-related erosion, land subsidence, and saltwater intrusion.

### **5.7 Trash and Debris**

Coastal and marine birds may experience chronic physiological stress from sublethal exposure to or intake of contaminants or discarded debris associated with OCS-related activities. This may result in disturbances to and displacement of individuals. Chronic sublethal stress is often a challenge to detect in birds, and more importantly, to directly link to a given environmental stressor independent of other environmental factors (Wiens et al., 2001; Parker and Wiens, 2005). Sublethal stresses may weaken individuals (especially serious for migratory species), making them more susceptible to infection, disease, and parasites. Recruitment of birds and a population's recovery from a major mortality event may take many years, depending upon the species and its life-history strategy.

Much of the floating material discarded from vessels and structures offshore presumably drifts ashore, remains within coastal waters, or eventually sinks. These materials may include lost or discarded fishing gear, such as gill nets and monofilament lines, which cause the greatest overall damage to birds (Tasker et al., 2000; Dau et al., 2009; Ryan et al., 2009). Coastal and marine birds are commonly entangled in discarded trash and debris (Robards et al., 1995). Many species will readily ingest small plastic debris, either intentionally or incidental to consuming prey. Interaction with plastic materials may lead to debilitating injuries or death (Pierce et al., 2004).

It is believed that coastal and marine birds are less likely to become entangled in or ingest OCS-related trash and debris as a result of BSEE regulations regarding the disposal of equipment, containers, and other materials into offshore waters by lessees (30 CFR 250.300, NTL 2012-BSEE-G01, and Appendix B, Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols found in the Biological Opinion issued by NMFS on March 13, 2020). In addition, MARPOL, Annex V, Public Law 100-220 (101 Statute 1458), prohibits the disposal of any plastics at sea or in coastal waters (effective January 1, 1989). To date, the efficacy of these regulations on reducing seabird mortality has not been quantified. Despite these regulations, unknown quantities of plastics and other materials are discarded and lost in the marine environment, and so remain a threat to individual birds (Azzarello and Van Vleet, 1987).

### **5.8 Other Activities Not Related to the OCS Energy Program**

Non-OCS related impacts may result in billions of bird deaths compared to the incremental effect of the OCS oil and gas activities ([http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/BOEM-2012-019\\_v2.aspx](http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/BOEM-2012-019_v2.aspx)).

The below list includes these non-OCS related impacts and are presented in more detail within the Multisale EIS (see Multisale EIS USDOL, BOEM, 2012b, pages 4–810):

- Habitat loss, alteration, and fragmentation associated with commercial and residential development
- Tanker oil spills and spills related to oil and gas activities in coastal state waters and spill-response activities
- Pollution of coastal waters resulting from municipal, industrial, and agricultural runoff and discharge

- Nonconsumptive recreation
- Maintenance and use of navigation waterways
- Collisions of coastal and marine birds with various anthropogenic structures
- Diseases
- Climate change and related impacts
- Storms and floods
- Coastal development
- Fisheries interactions

## 6. Summary and Conclusion

The majority of the effects resulting from BOEM and BSEE routine activities on the eastern black rail are expected to be sublethal (e.g., primarily disturbance-related effects). There is a long-standing and well-developed OCS Program (more than 50 years); there are no data to suggest that routine activities from the preexisting OCS Program are impacting coastal and marine bird populations. When compared with other causes of bird mortality, the routine events associated with the OCS Program are unlikely to result in population-level impacts to the eastern black rail.

Overall, impacts to avian species from routine activities are “not likely to adversely affect” these species. The impacts include the following:

- temporary behavioral changes, temporary or permanent changes in habitat use, temporary changes in foraging behavior, temporary changes to preferred foods or prey switching, temporary or permanent emigration, temporary or permanent reductions in nesting, hatching, and fledging success;
- sublethal, chronic effects due to exposure to or intake of OCS-related contaminants via spilled oil, pollutants in the water from service vessels, produced water, or discarded debris;
- minimal habitat impacts (based on actual acres of footprint) are expected (onshore or within State waters) to occur directly from routine activities resulting from the OCS oil and gas activities (but see Johnston et al., 2009); and
- secondary impacts from pipeline and navigation canals to coastal habitats will occur over the long term and may ultimately displace species to other habitats, if available.

Presently, there are no Gulf of Mexico mitigations (or stipulations) in place specific to the protection and conservation of any birds (including migratory birds) (USDOJ, FWS and USDOJ, MMS, 2009). However, avoidance measures and conditions are routinely placed on permitted activities to protect habitats.

Overall, impacts to coastal and marine birds associated with accidental events (oil spills regardless of size) in the WPA should be less than in the CPA due to the following factors: fewer platforms; lower oil-spill probabilities; and much lower numbers of predicted oil spills, particularly pipeline spills over the life of WPA OCS oil and gas activities. Oil spills (and disturbance impacts associated with clean up) that may be expected as a result of the OCS oil and gas activities could have the greatest impact on coastal and marine birds. Depending on the timing and location of the spill, even small spills can result in major avian mortality events (Piatt et al., 1990a and 1990b; Castège et al., 2007; Wilhelm et al., 2007). Small amounts of oil can affect birds, and mortality from oil spills is often related to numerous symptoms of toxicity (Burger and Gochfeld, 2001; Albers, 2006). Data from actual spills strongly suggest that impacts to a bird species' food supply are typically delayed after initial impacts from direct oiling (e.g., Esler et al., 2002; Velando et al., 2005b; Zabala et al., 2010). Sublethal, long-term effects of oil on birds have previously been documented (Esler et al., 2000; Alonso-Alvarez et al., 2007a), including changes to sexual signaling (Pérez et al., 2010).

Oil-spill impacts on birds from WPA, CPA, or EPA OCS oil and gas activities are expected to be adverse but not significant given the number and relatively small size of spills expected over the 40-year life of OCS oil and gas activities. Impacts of oil-spill cleanup from OCS oil and gas activities are also expected to be adverse but not significant, but they may be negligible depending on the scope and scale of efforts.

Incidental take, as defined at 50 CFR 402.02, refers only to takings that result from an otherwise lawful activity. The Clean Water Act (33 U.S.C. 1251 et seq.), as amended by the Oil Pollution Act of 1990 (33 U.S.C. 2701 et seq.), prohibits discharges of harmful quantities of oil, as defined at 40 CFR 110.3, into waters of the United States. Therefore, even though this biological assessment considers the effects on listed species by oil spills that may result from BOEM and/or BSEE activities, these impacts would result from an unlawful activity (i.e., oil spills) and have no protective coverage under Section 7(o)(2) of the ESA.

Human-induced disturbance effects often tend to get overlooked or underestimated as potential population-limiting factors for birds (Hockin et al., 1992; Newton, 1998, pp. 365-369). The cumulative effect on coastal and marine birds from all sources is expected to result in changes in species composition and distribution, and a discernable (i.e., low thousands) decline in the number of birds that form localized groups or populations. Some of these changes are expected to be permanent and to stem from a net decrease in preferred habitat for all birds, and possibly impacts to and declines in critical habitat for some endangered species. However, the incremental contribution of the OCS oil and gas program to the cumulative impact is considered “not likely to adversely affect” listed bird species, because the effects of the most probable impacts, such as operational discharges and helicopters and service-vessel noise and traffic, are expected to be sublethal; and some displacement of local individuals or flocks may occur, and displaced birds may move to other habitats, if available.

In general, the net effect of habitat loss from oil spills reasonably expected as a result of OCS oil and gas activities, OCS pipeline landfalls, and maintenance and use of navigation waterways, as well as habitat loss and modification resulting from coastal facility construction and development, will probably reduce the overall carrying capacity of the disturbed habitat(s). That is, impacted habitats may result in reductions to both species composition (fewer species) and abundance (lower numbers) as compared with what the area supported historically. These would be the most serious cumulative impacts on birds.

Disease is often lethal and may take millions of birds annually, but it should be considered a “naturally” occurring avian mortality factor unless the pathogen is introduced by humans (see Newton, 1998). Storms and floods represent natural, often major, disturbances to which exposed organisms are generally adapted. An exception would be hurricane-related storm surges, which are exacerbated by coastal wetland loss in Louisiana and throughout the northern Gulf (Costanza et al., 2008; Engle, 2011). Effects from sea-level rise may be particularly severe for many species of breeding marsh birds and shorebirds (e.g., brown pelican, sandwich tern, black skimmer, Forster’s tern, laughing gull, gull-billed tern, royal tern, snowy plover, least tern, and Wilson’s plover; USDOJ FWS, 2010c), and several species of wintering shorebirds that rely on beaches, flats, dunes, sandbars, shorelines, islands, estuaries, and other low-lying, tidally-influenced habitats in the Gulf of Mexico (Galbraith et al., 2002; North American Bird Conservation Initiative, 2010). Even a nominal rise in sea level (USDOC NOAA, 2011a, pp. 36–37) would inundate much of this habitat, making it unsuitable for many, if not most, of these

species. Sea level rise will reduce suitable habitat availability for the eastern black rail and overwhelm habitat persistence. Increased flooding and inundation, saltwater intrusion, and other effects from sea level rise may affect the persistence of coastal or wetland plants that are vital habitat for the eastern black rail (Warren and Niering, 1993; Morris et al., 2002). Further, increased high tide flooding will directly impact the eastern black rail through nest destruction and egg loss at their nesting habitats (Sweet et al., 2017b). Sea level rise may also increase the intensity and frequency of such flooding events.

In conclusion, routine activities and accidental events associated with OCS oil and gas development, are “not likely to adversely affect” the eastern black rail in the Gulf of Mexico. The effects of the OCS oil and gas activities, when viewed in light of the effects associated with other past, present, and reasonably foreseeable future activities may result in adverse impacts to the eastern black rail; however, the effects are not likely to jeopardize the continued existence of this species. A summary of effects from activities is provided in Table 2.

**Table 2. Summary of Potential Effects from OCS Oil and Gas Activities for Eastern Black Rail**

Species	Activity	No Effect	Not Likely to Adversely Affect	Likely to Adversely Affect
Eastern Black Rail	Discharges		X	
	Aircraft Noise and Operation		X	
	Vessel Noise and Operation	X		
	Drilling and Production Noise	X		
	Marine Debris		X	
	Accidental Events (Oil Spills)		X	

## References

For further detail on this document, please see relevant sections in the originally provided Biological Assessment and associated Appendices.

Federal Register. 2011. Endangered and Threatened Wildlife and Plants: Partial 90-Day Finding on a Petition to List 404 Species in the Southeastern United States as Endangered or Threatened With Critical Habitat. Notice of petition finding and initiation of status review. September 27, 2011. 76 FR 187, pp. 59836-59862.

Federal Register. 2018. Endangered and Threatened Wildlife and Plants: 12-Month Petition Finding and Threatened Species Status for Eastern Black Rail With a Section 4(d) Rule. Proposed Rule. October 9, 2018. 83 FR 195, pp. 50610-50630.

Federal Register. 2020. Endangered and Threatened Wildlife and Plants: Threatened Species Status for Eastern Black Rail With a Section 4(d) Rule. Final Rule. October 8, 2020. 85 FR 196, pp. 63764-63803.

Lagadic, L., Roucaute, M., & Caquet, T. (2014). Bti sprays do not adversely affect non-target aquatic. *Journal of Applied Ecology*, 102-113.

Morris, W. F., & Doak, D. F. (2002). *Quantitative Conservation Biology*. Sunderland, Massachusetts: Sinauer Associates, Inc..

Morris, J. A., Wilson, J. D., Whittingham, M. J., & Bradbury, R. B. (2005). Indirect effects of pesticides on breeding yellowhammer (*Emberiza citrinella*). *Agriculture, Ecosystems, and Environment*, 106, 1-16.

Poulin, B., Lefebvre, G., & Paz, L. (2010). Red flag for green spray: Adverse trophic effects of Bti on breeding birds. *Journal of Applied Ecology*, 47, 884-889.

Sampson, F., & Knopf, F. (1994). Prairie conservation in North America. *Bioscience*, 44(6), 418-421.

Sweet, W., Kopp, R. E., Weaver, C. P., Obeysekera, J., Horton, R. M., Thieler, E. R., & Zervas, C. (2017). *Global and Regional Sea Level Rise Scenarios for the United States*. Silver Spring, Maryland: NOAA Technical Report NOS CO-OPS 083. NOAA/NOS Center for Operational Oceanographic Products and Services.

Tolliver, J. (2017). Eastern black rail (*Laterallus jamaicensis jamaicensis*) occupancy and abundance estimates along the Texas coast with implications for survey protocols. Master's thesis. San Marcos: Texas State University.

U.S. Fish and Wildlife Service. 2013. List of migratory bird species protected by the Migratory Bird Treaty Act as of December 2, 2013. Washington (DC): U.S. Department of the Interior, U.S. Fish and Wildlife Service. 53 p.

U.S. Fish and Wildlife Service. 2018. Species status assessment report for the eastern black rail (*Laterallus jamaicensis jamaicensis*), Version 1.2. June 2018. Atlanta, GA.

U.S. Fish and Wildlife Service. 2020. Eastern black rail (*Laterallus jamaicensis jamaicensis*). Atlanta (GA): U.S. Department of the Interior, U.S. Fish and Wildlife Service, Southeast

Region; [accessed 2020 Apr 07]. <https://www.fws.gov/southeast/wildlife/birds/eastern-black-rail/#>.

Warren, R. S., & Niering, W. A. (1993). Vegetation change on a Northeast tidal marsh: Interaction of sea-level rise and marsh accretion. *Ecology*, 74(1), 96-103.



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

Catherine Marzin  
Acting Director, Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, Maryland 20910  
[catherine.marzin@noaa.com](mailto:catherine.marzin@noaa.com)

*Via Electronic Mail*

Dear Ms. Marzin:

The Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE, collectively the Bureaus), are submitting to the National Marine Fisheries Service (NMFS) the following response to the Bryde's whale (possibly renamed in the future to Rice's whale<sup>1</sup>) jeopardy determination and associated reasonable and prudent alternative (RPA) included in NMFS's programmatic biological opinion entitled, *Biological Opinion for Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico*, which was signed on March 13, 2020 (hereinafter, the 2020 BiOp). During ongoing implementation of the 2020 BiOp and during discussions regarding the jeopardy determination and RPA, the Bureaus implemented a condition of approval on all new and modified permit and plan approvals which noted that approval was based on there being no planned transit through the Bryde's whale area and that any future transit through the area would require advance notice and approval by the Bureaus.

After ongoing coordination between the Bureaus and NMFS, and in accordance with 50 CFR 402.15(b), BOEM and BSEE are notifying you that the Bureaus have decided to adopt the RPA for the Bryde's whale which will eliminate the jeopardy determination for that species in the 2020 BiOp. BOEM requests that NMFS, through a reciprocal letter published to NMFS' website or amendment to the 2020 BiOp, acknowledge and accept the Bureaus' adoption of the RPA which eliminates the jeopardy determination for the Bryde's whale, and update the 2020 BiOp incidental take statement and terms and conditions as necessary.

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<sup>1</sup> Rosel, P.E., L.A. Wilcox, T.K. Yamada, and K.D. Mullin. 2021. A new species of baleen whale (*Balaenoptera*) from the Gulf of Mexico, with a review of its geographic distribution. *Marine Mammal Science*.

Again, we appreciate the opportunity to continue to work together on implementation of the 2020 BiOp.

Sincerely,

**MICHAEL  
CELATA**

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MICHAEL CELATA  
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Michael A. Celata  
Regional Director, BOEM

I agree:

Lars Herbst 4/19/21  
Lars Herbst, Regional Director, BSEE

cc: Ms. Cathy Tortorici  
Chief, ESA Interagency Cooperation Division  
Office of Protected Resources  
NOAA's National Marine Fisheries Service  
1315 East-West Highway  
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Ms. Allison Hernandez  
Biologist, ESA Interagency Cooperation Division  
Office of Protected Resources  
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Mr. Jordan Carduner  
ESA Interagency Cooperation Division  
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Dr. Arie Kaller  
Bureau of Ocean Energy Management  
Gulf of Mexico OCS Region  
Regional Supervisor  
Office of Environment  
1201 Elmwood Park Boulevard  
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Mr. TJ Broussard  
Bureau of Safety and Environmental Enforcement  
Gulf of Mexico OCS Region  
Regional Environmental Officer  
Office of Environmental Compliance  
1201 Elmwood Park Boulevard  
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## 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 ( $\geq 1,000$  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 ( $\geq 1,000$  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  $\leq 0.5$  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 ( $\geq 1,000$  bbl) occurring and contacting the shoreline within 10 to 30 days as a result CPA, EPA, and WPA OCS oil and gas activities are  $\leq 0.5$  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**

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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. Broussard, BSEE, New Orleans, LA  
Daniel Leedy, BSEE, New Orleans, LA

#### LITERATURE CITED

Bureau of Ocean Energy Management (2012). Final Environmental Impact Statement Gulf of Mexico OCS Oil and Gas Lease Sales: 2012-2017. Gulf of Mexico OCS Region. New Orleans, LA.

U.S. Fish and Wildlife Service (2018). Species Status Assessment Report for the Eastern Black Rail (*Laterallus jamaicensis jamaicensis*). Region 4. Atlanta, GA.

U.S. Fish and Wildlife Service (2020). Endangered and Threatened Wildlife and Plants; Threatened Species Status for Eastern Black Rail with a Section 4(d) Rule. Region 4. Charleston, SC.



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
1315 East-West Highway  
Silver Spring, Maryland 20910

April 26, 2021

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New Orleans, LA 70123

T.J. Broussard, Regional Environmental Officer  
Office of Environmental Compliance  
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1201 Elmwood Park Blvd.  
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Dear Ms. Kaller and Mr. Broussard,

This letter responds to your letter dated November 3, 2020, requesting a change to your proposed action described in the National Marine Fisheries Service (NMFS) March 13, 2020 programmatic biological opinion (2020 BiOp) on oil and gas activities in the Gulf of Mexico, and your email on November 25, 2020 in which you reiterated your determination that the changes described in the letter will not cause any effect to Endangered Species Act (ESA)-listed species or critical habitat that was not already considered in the biological opinion, and that Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE) (BOEM/BSEE) concluded that reinitiation of consultation is not required. This letter also responds to your letter dated April 15, 2021, requesting a change to Appendix I of the BiOp.

Your request in the November 3, 2020 letter entails the removal of specific activities from the proposed action's step-down review process, as described in section 3.4 of the 2020 BiOp. Step-down review involves BOEM/BSEE and NMFS conducting a project-specific review of an activity. The need for, and type of, project-specific review varies depending on the level of uncertainty at the programmatic consultation stage regarding aspects or potential effects of specific projects, approvals, or other actions that will be implemented in the future.

While we agree it is not necessary to reinitiate consultation on the 2020 BiOp, we are amending the associated incidental take statement (ITS) to reflect the changes in BOEM/BSEE's step-down procedures, as well as to address NMFS' Office of Protected Resources (OPR), Permits and Conservation Division issuance of final regulations to govern the taking of marine mammals incidental to geophysical survey activities conducted by oil and gas industry operators in the



Gulf of Mexico over the course of five years, pursuant to section 101(a)(5) of the Marine Mammal Protection Act (MMPA). These regulations will henceforth in this letter be called “MMPA rule”.

The step-down procedures outlined in the 2020 BiOp identified specific categories of actions or activities anticipated to warrant further review and evaluation by NMFS and BOEM/BSEE.

Those procedures address the following:

- How BOEM/BSEE will evaluate whether such actions or activities would be expected to have effects of an extent and nature consistent with those effects already evaluated in the 2020 BiOp;
- Whether there are any potential effects to ESA-listed species from those actions or activities that would be different than those already evaluated in the 2020 BiOp;
- Whether those effects would be consistent with the effects already evaluated in the 2020 BiOp if the activities were modified (e.g., through different mitigation measures); and
- Whether further consultation would be required based on analysis of the actions or activities.

The categories of activities or plans that BOEM/BSEE requested to be removed from the proposed action’s step-down review requirements are detailed below and include the following:

- activities that require the use of moon pools;
- activities that entail lines in the water (“slack lines”);
- use of geophysical equipment that operates at frequencies above 180 kHz;
- coring activities; and
- conceptual Deepwater Operations Plans.

The requested removal of these categories of activities from the list of categories requiring step-down review in the 2020 BiOp would constitute changes to the proposed action on the part of BOEM/BSEE. As explained below, BOEM/BSEE and NMFS coordinated closely on the development of these changes, based on additional study and information gained during step-down reviews conducted after the 2020 BiOp and ITS were issued, and also coordinated on the development of effective mitigation measures that can be applied programmatically via standardized permit conditions of approval (COA), in order to remove the need for additional step-down review. Accordingly, we do not believe that these changes will change the effects of the action on, or conclusions related to, species or designated critical habitat listed under the ESA, nor do such changes trigger reinitiation of consultation under 50 CFR 402.16. However, the changes make necessary some minor modifications to the ITS and Reasonable and Prudent Measures (RPMs) / terms & conditions (T&Cs) that were issued with the 2020 BiOp, to reflect these changes to step-down review requirements and related changes to mitigation measures. The rationale for our conclusion that the removal of each of these categories of activities from step-down review requirements will not change the anticipated effects of the proposed action on listed species is discussed below.

As described in the November 3, 2020 BOEM/BSEE letter, there are several categories of activities associated with federally regulated oil and gas activities in the Gulf of Mexico that utilize moon pools. Moon pools represent a potential entrapment risk to ESA-listed species. This entrapment risk exists only for “enclosed” moon pools (i.e., well in the hull of a vessel, with or

without a door). There have been documented instances of entrapments of ESA-listed species within moon pools, some of which resulted in injuries to sea turtles, and these instances were the basis for the inclusion of moon pool-related activities in the step-down review process.

NMFS reviewed activities using moon pools via the step-down review process since April 2020. Through these reviews, as well as communications with BOEM/BSEE and industry representatives, NMFS and BOEM/BSEE acquired additional information on the types of activities associated with the use of moon pools (e.g., drilling, pipe-laying, use of divers, etc.), the types of equipment and personnel involved in these activities, and how to best minimize associated potential risks to ESA-listed species.

Since April 2020 there have also been four documented instances of sea turtles observed within moon pools on offshore vessels or structures associated with oil and gas activities in the Gulf of Mexico. BSEE remained in constant communication with the operators during these instances, and also relayed information to us during each response. These instances provided NMFS, BOEM and BSEE with information on risks to ESA-listed species and how best to minimize those risks. In addition, we solicited input from subject matter experts within NMFS on potential impacts to ESA-listed species from entrapment in moon pools, as well as best management practices to minimize impacts when ESA-listed species enter moon pools.

We used the information about moon pools to develop a suite of mitigation measures that BOEM/BSEE will now apply programmatically through COAs to reduce potential effects of this activity on ESA-listed species. We are now confident that the newly-developed programmatic approach to BOEM/BSEE-applied mitigation measures for moon pools is appropriate and sufficiently protective to minimize potential effects from project-specific activities that use moon pools without the need for additional step-down review of such approvals.

Henceforth, BOEM/BSEE will programmatically apply these newly-developed mitigation measures as non-discretionary COAs on all permits that are issued for activities that entail the use of moon pools to minimize or avoid harm to protected species. The application of these COAs and subsequent implementation of the measures for relevant activities will minimize or avoid take related to entanglement and entrapment. A copy of these COAs, provided by the Bureaus, is attached to this letter (in addition to the attached COAs, NMFS will be adding to the Terms and Conditions a requirement for BSEE that instances of protected species observed in a moon pool must be reported daily for as long as an animal remains within the moon pool). Therefore, we are modifying the ITS, RPMs and T&Cs to reflect removal of this category of activities from step-down review requirements. As described above, removal of this category of activities from step-down review requirements does not change the effects of the action or the conclusions of the 2020 BiOp.

As noted in the November 3, 2020 BOEM/BSEE letter, there are several types of activities associated with federally regulated oil and gas activities in the Gulf of Mexico that utilize lines in the water column. These lines in the water column have the potential to result in an entanglement risk to ESA-listed species if they are not taut, or if there is "slack" in the lines. There have been a limited number of reported prior instances of entanglements of protected species due to "slack

lines” in the water associated with oil and gas related activities (as noted in Section 8.6 of the 2020 BiOp) that resulted in injury or death.

There are measures in the 2020 BiOp that address this risk: in the proposed action for the NMFS PR1, there are required measures related to ocean bottom nodes or similar gear to minimize the risk of entanglement. Also part of the proposed action is a requirement for step-down review of activities that may result in an entanglement risk. This was incorporated into the action and ITS at the time of the 2020 BiOp due to the level of uncertainty that remained regarding the scope of activities under the oil and gas program that had potential to result in an entanglement risk, beyond those that were known to have an associated risk of entanglement (e.g., ocean bottom nodes). The 2020 ITS Terms and Conditions included generalized risk reduction for entanglement or entrapment (T&C #1, C, i). Reporting of any instances of entanglement is also required in the Terms and Conditions (T&C #3 part 2, BSEE, B, vii).

Similar to the process described above related to moon pools, NMFS has reviewed activities that utilize slack lines in the water through the step-down review process since April 2020. Through these reviews as well as discussions with BOEM/BSEE and industry representatives, NMFS and BOEM/BSEE acquired information on the types of activities associated with the use of slack lines (e.g., remotely operated vehicles, use of divers for decommissioning activities, etc.) and best practices to minimize associated risks to ESA-listed species. NMFS and BOEM/BSEE also developed revisions to improve reporting measures for observations of dead and injured protected species. NMFS also solicited input from subject matter experts on best practices to avoid impacts to ESA-listed species from entanglement in slack lines.

As with moon pools, we used the information about slack line related activities to develop a suite of mitigation measures that BOEM/BSEE will now apply programmatically to reduce potential effects of this activity on ESA-listed species. We are now confident that the newly-developed programmatic approach to BOEM/BSEE-applied mitigation measures for slack lines is appropriate and sufficiently protective to minimize potential effects from project-specific activities that use slack lines and are sufficiently protective to minimize potential effects from project-specific activities that use slack lines. Henceforth, BOEM/BSEE will programmatically apply these newly-developed mitigation measures as non-discretionary COAs on all permits that are issued for activities that entail the use of slack lines to minimize or avoid harm to protected species.

The application of these COAs and subsequent implementation of the measures for relevant activities will minimize or avoid take related to entanglement. A copy of these COAs, provided by BOEM/BSEE, is attached to this letter. Therefore, we are modifying the ITS, RPMs and T&Cs to reflect removal of this category of activities from the step-down review requirements. As described above, removal of this category of activities from step-down review requirements does not change the effects of the action or the conclusions of the 2020 BiOp.

As described in your letter, Deepwater Operation Plans (DWOP) are plans that are reviewed by BOEM/BSEE that conceptually describe planned activities. Those activities are then reviewed by BOEM/BSEE through internal review procedures when BOEM/BSEE get to a planning document stage, such as a Development and Production Plan (DPP), Exploration Plan (EP), or

Development Operations Coordination Document (DOCD). That review by BOEM/BSEE then determines whether each proposed activity necessitates step-down review by NMFS.

We agree with you that a requirement to also review DWOPs via step-down review, in addition to step-down review of DPPs, EPs or DOCDs for the same activity, is redundant. In addition, those conceptually proposed activities as described in DWOPs may not be an accurate representation of an actual activity that ultimately is described in a DPP, EP or DOCD (i.e., while the same activity is described in a DWOP and in a subsequent DPP, EP or DOCD, the description of the activity in the DPP, EP or DOCD is more accurate than the description in the DWOP as more information on the activity is known at the DPP, EP or DOCD stage of the process). Based on the above, we agree with your request for removal of the requirement for step-down review of DWOPs. This change removes the requirement for step-down review of DWOPs from the proposed action. NMFS will therefore revise the associated RPMs and T&Cs in the ITS accordingly to reflect this removal.

The use of non-airgun geophysical and geotechnical (G&G) survey equipment that operates above 180 kHz and the activity of coring were both G&G-related activities that were included in the 2020 BiOp. However, frequencies above 180 kHz are outside the functional hearing ranges of the species that were considered in the 2020 BiOp (Popper et al. 2019; Bartol et al. 1999; Dow et al. 2008; Lenhardt 1994; Lenhardt 2002; Moein et al. 2006; Piniak 2012; Ridgway et al. 1969; Southall et al. 2007). Grab and piston coring activities, such as bottom sampling detailed in the 2020 BiOp, are expected to occur at minimal levels and do not cause noise in the underwater environment. Pursuant to 2020 BiOp, all G&G activities were required to undergo step-down review. However, based on the best available scientific and commercial information, the 2020 BiOp determined non-airgun geophysical equipment that operates above 180 kHz and coring activities are not expected to have any effects on ESA-listed species. Therefore, we agree with BOEM/BSEE' request that these two categories of activities can be removed from the requirement for step-down review. This change will therefore remove these two activities from the general G&G category that triggers step-down review by NMFS. In other words, all but these two activity categories under G&G will remain part of the step down process.

We conclude that BOEM/BSEE's removal of the above activity categories from the proposed action's step-down review requirements are not expected to change the effects of the proposed action analyzed in the 2020 BiOp. NMFS also concludes that these changes to the proposed action will not change the amount or extent of incidental take associated with the proposed action relative to what was considered in the existing 2020 BiOp. With the new mitigation measures provided in the revised action, NMFS finds that for these categories of activities, the corresponding requirements in the T&Cs in the 2020 BiOp's ITS are no longer required to address uncertainty about the effects of these categories of activities. Accordingly, the analysis and conclusions in the 2020 BiOp will not be changed, and NMFS will amend the ITS and associated RPMs and T&Cs to reflect the changes as described herein for the BOEM/BSEE proposed action.

Your request in the April 15, 2021 letter entails a revision to requirements in Appendix I of the BiOp related to monitoring of explosive severance activities. You noted that the existing flight time requirements could pose logistical and safety issues where flight times surpass fuel tank

capacities for safe operations. Specifically, your request is to revise the time requirement for post-detonation aerial surveys, from 45 minutes to 30 minutes of monitoring, due to logistical and safety concerns about 45 minute post-detonation aerial surveys potentially requiring refueling of helicopters used for monitoring. As stated in your letter, while pre-detonation monitoring is intended to minimize potential impacts on ESA-listed species, post-detonation monitoring is intended only to monitor for any impacts of the activity after it has occurred (i.e., injury or mortality of sea turtles). Thus, a revision to the post-detonation monitoring period would in no way change the ability of aerial surveys to minimize impacts to ESA-listed species due to explosive severance activities. We have confirmed with the Protected Species Observer Program that revising the post-detonation monitoring period from 45 to 30 minutes will not impact the ability to effectively monitor for any impacts to ESA-listed species following explosive severance activities. We therefore agree with your request and have implemented the requested change to Appendix I of the BiOp. We also agree with your conclusion that this revision will not result in any changes to the effects of the action on ESA-listed species or designated critical habitat beyond those considered in the BiOp, nor would it change the amount or extent of take of ESA-listed species as a result of the proposed action, and we therefore agree with your conclusion that this revision does not trigger reinitiation of consultation under 50 CFR §402.16.

Attached to this letter are BOEM/BSEE's request letters, COAs that will be applied programmatically to the respective activities through the BOEM/BSEE internal review process, and amended ITS including revised appendices.

Sincerely,

Cathryn E. Tortorici TORTORICI.CATHRYN@BOEM.BSEE.DOE.GOV  
ELISA.1365826850  
Chief, ESA Interagency Cooperation Division

cc:

Michael Celata  
Field Special Assistant – Interior Region 6,  
Director, Gulf of Mexico Office; Bureau of Ocean Energy Management  
1201 Elmwood Park Blvd (GM333C)  
New Orleans, LA 70123

Lars Herbst  
Field Special Assistant – Interior Region 4,  
Director, Gulf of Mexico OCS Office; Bureau of Safety and Environmental Enforcement  
1201 Elmwood Park Blvd (GE432A)  
New Orleans, LA 70123

Attachment



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
1315 East-West Highway  
Silver Spring, Maryland 20910

May 7, 2021

Michael Celata  
Field Special Assistant – Interior Region 6,  
Director, Gulf of Mexico Office; Bureau of Ocean Energy Management  
1201 Elmwood Park Blvd (GM333C)  
New Orleans, LA 70123

Lars Herbst  
Field Special Assistant – Interior Region 4,  
Director, Gulf of Mexico OCS Office; Bureau of Safety and Environmental Enforcement  
1201 Elmwood Park Blvd (GE432A)  
New Orleans, LA 70123

RE: National Marine Fisheries Service response to the Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement Adoption of the Reasonable and Prudent Alternative for the Gulf of Mexico Programmatic Biological Opinion

Dear Mr. Celata and Mr. Herbst:

Thank you for your letter dated April 19, 2021 regarding the Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement adoption of the National Marine Fisheries Service's Reasonable and Prudent Alternative (RPA) from the March 13, 2020 programmatic biological opinion (2020 BiOp) on oil and gas activities in the Gulf of Mexico. Per the ESA section 7 regulations (50 C.F.R. § 402.02; 16 U.S.C. § 1536(b)(3)(A); 16 U.S.C. § 1536(b)(4); 50 C.F.R. § 402.14(i); § 402.15) there is no requirement to revise the 2020 BiOp or incidental stake statement based on your adoption of the RPA so we will not be issuing a revised BiOp.

We appreciate our continued work together to implement the 2020 BiOp. If you have any questions, please contact Cathy Tortorici, Chief of the ESA Interagency Cooperation Division at [cathy.tortorici@noaa.gov](mailto:cathy.tortorici@noaa.gov) or 301.427.8495.

Sincerely,

MARZIN.CATHERI  
NE.G.1365836082

Digitally signed by  
MARZIN.CATHERINE.G.13658360  
82  
Date: 2021.05.06 15:43:47 -0400

Catherine Marzin  
Acting Director, Office of Protected Resources



cc:

Arie Kaller, Supervisor  
Office of Environment  
Bureau of Ocean Energy Management, Gulf of Mexico  
1201 Elmwood Park Blvd.  
New Orleans, LA 70123

T.J. Broussard, Regional Environmental Officer  
Office of Environmental Compliance  
Bureau of Safety and Environmental Enforcement, Gulf of Mexico  
1201 Elmwood Park Blvd.  
New Orleans, LA 70123



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

August 12, 2021

Refer to NMFS No: FPR-2017-9234 (PCTS);  
OPR-2017-00002 (ECO)

Arie Kaller, Supervisor  
Office of Environment  
Bureau of Ocean Energy Management, Gulf of Mexico  
1201 Elmwood Park Blvd.  
New Orleans, LA 70123

T.J. Broussard, Regional Environmental Officer  
Office of Environmental Compliance  
Bureau of Safety and Environmental Enforcement, Gulf of Mexico  
1201 Elmwood Park Blvd.  
New Orleans, LA 70123

**RE: 2020-2021 Gulf of Mexico BiOp Annual Review and Adaptive Management Process**

Dear Ms. Kaller and Mr. Broussard:

A requirement of the March 13, 2020 Biological Opinion (BiOp) on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico and associated amended incidental take statement is an annual review process involving the National Marine Fisheries Service (NMFS), the Bureau of Ocean Energy Management and the Bureau of Safety and Environmental Enforcement (BOEM/BSEE) every year the BiOp is in effect. Because the first annual review is now due, NMFS Office of Protected Resources staff began discussions with BOEM/BSEE staff regarding the annual review and the timeline for its completion. On July 12, 2021, NMFS sent BOEM/BSEE a proposed timeline (see below) based on our discussions. We are writing to request your comments or revisions to the proposed timeline by August 31, 2021, or we will presume concurrence with the proposed timeline.

The annual review process is critical to ensure that annual aggregate activities and associated effects remain within the scope of the opinion. The annual review process is also important to ensure that adjustments to mitigation and/or monitoring requirements can be made, as necessary, via the adaptive management process.

The proposed action in the BiOp stated for timing: "The annual review will cover all projects that occur within a year and will occur during the second quarter of the year for the previous calendar year." We proposed the timeline below to account for this annual review representing the first time an annual summary report will be submitted by BOEM/BSEE under the BiOp and therefore more time may be necessary to meet the annual review requirements. The proposed timeline includes time for BOEM/BSEE to pull together the necessary information, make adjustments to data management systems, or complete other necessary tasks associated with summarizing the program; and for NMFS to conduct reviews of drafts and prepare comments.



**Review Parameters:**

- Summary report reflects all BOEM/BSEE activities that occurred under the Gulf of Mexico program from March 13, 2020 - March 12, 2021.

**Proposed Timeline:**

September 2021 - Provide draft summary report on program activities (based on draft outline on which NMFS provided comments).

October 2021 - First annual review meeting to resolve comments and ensure full program coverage.

November 2021 - Revised draft summary report for NMFS review

December 2021 - Final summary report

**Proposed October 2021 Meeting Goals:**

- Ensure that the report comprehensively summarizes BOEM/BSEE activities to implement the BiOp
- Identify implemented actions that are working, those that may not be working and how to resolve those points of concern.

As noted above, because this is the first year that we are conducting the annual review, we are attempting to accommodate the need for more time to complete the annual summary report. While we understand that more time may be required during this first annual review process, we want to ensure that a timeline for completion of the annual review process is agreed upon by BOEM/BSEE and NMFS. We look forward to working with you on the annual review process.

If you have any questions, please contact Allison Hernandez at 301-427-8413, or by email [allison.hernandez@noaa.gov](mailto:allison.hernandez@noaa.gov) or Jordan Carduner at 301-427-8483, or by email [jordan.carduner@noaa.gov](mailto:jordan.carduner@noaa.gov), or me at (301) 427-8495, or by email at [cathy.tortorici@noaa.gov](mailto:cathy.tortorici@noaa.gov).

Sincerely,

CARRUBBA.LISAM  
ARIE.1365823932

Digitally signed by  
CARRUBBA.LISAMARIE.136582  
3932  
Date: 2021.08.12 16:09:20 -0400

Dr. Lisamarie Carrubba  
for Cathryn E. Tortorici,  
Chief, ESA Interagency Cooperation Division  
Office of Protected Resources



## FLORIDA DEPARTMENT of STATE

**RICK SCOTT**  
Governor

**KEN DETZNER**  
Secretary of State

Mr. Douglas Jones  
Bureau of Ocean Energy Management  
Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, LA 70123-2394

April 15, 2015

RE: DHR Project File No.: 2015-1591 / Received by DHR: April 3, 2015  
10 Proposed Gulf of Mexico (GOM) Lease Sales – 2017-2022 Draft Proposed Program

Dear Mr. Jones:

Thank you for providing our office with the opportunity to comment in the early stages of the preparation of an environmental impact statement (EIS). Pursuant to 36 CFR Part 800.8, the Bureau of Ocean Energy Management (BOEM) can elect to fulfill its responsibilities under Section 106 of the National Historic Preservation Act of 1966 in coordination with the preparation of an EIS under the National Environmental Policy Act.

We concur that BOEM's proposed 2017-2022 GOM lease sales will have no effect on historic properties provided that BOEM's staff of marine archaeologists evaluates each proposed APE. This office should be notified and given the opportunity to comment should any cultural resources be identified.

If you have any questions, please contact Deena Woodward, Community Assistance Consultant, by email at [Deena.Woodward@dos.myflorida.com](mailto:Deena.Woodward@dos.myflorida.com), or by telephone at 850.245.6333 or 800.847.7278.

Sincerely

Robert F. Bendus, Director  
Division of Historical Resources  
& State Historic Preservation Officer



Division of Historical Resources  
R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399  
850.245.6300 • 850.245.6436 (Fax) [flheritage.com](http://flheritage.com)  
Promoting Florida's History and Culture [VivaFlorida.org](http://VivaFlorida.org)





Jones, Douglas <douglas.jones@boem.gov>

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**RE: DHR project file 2015-1591**

1 message

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**Woodward, Deena S.** <Deena.Woodward@dos.myflorida.com>  
To: "Jones, Douglas" <douglas.jones@boem.gov>

Tue, May 12, 2015 at 7:45 AM

Hi Doug,

We are primarily interested in resources that are identified off of Florida that cannot be avoided. Let me know if you have any other questions.

Sincerely,

Deena S. Woodward

Community Assistance Consultant/Archaeologist | State Lands Compliance and Review | Bureau of  
Historic Preservation | Division of Historical Resources | Florida Department of State | 500 South  
Bronough Street | Tallahassee, Florida 32399 | 850.245.6333 | 1.800.847.7278 | Fax:  
850.245.6439 | dos.myflorida.com/historical



**From:** Jones, Douglas [mailto:douglas.jones@boem.gov]  
**Sent:** Friday, May 08, 2015 10:59 AM  
**To:** Woodward, Deena S.  
**Subject:** DHR project file 2015-1591

Hello Ms. Woodward,

I wanted to follow up on a letter I received from your office, which was in response to our notification of BOEM's 2017-2022 Gulf of Mexico Lease Sale Draft Proposed Program. We appreciate the Florida DHR's concurrence that no historic properties will be affected; however, I wanted to seek clarification (or maybe provide it) on one other statement in your letter. It requests that your office "should be notified and given the opportunity to comment should **any** cultural resources be identified" (emphasis mine). Due to the volume of offshore oil and gas development activities, we receive site specific archaeological surveys virtually every day, and the majority



STATE OF ALABAMA  
ALABAMA HISTORICAL COMMISSION  
468 SOUTH PERRY STREET  
MONTGOMERY, ALABAMA 36130-0900

April 30, 2015

FRANK W. WHITE  
EXECUTIVE DIRECTOR

TEL: 334-242-3184  
FAX: 334-240-3477

Joseph A. Christopher  
Regional supervisor  
Office of Environment  
BOEM  
Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, Louisiana 70123-2394

Re: AHC 2015-0778  
Gulf of Mexico Lease Sales 2017-2022  
GM 673E  
Gulf of Mexico

Dear Mr. Christopher:

Upon review of the above referenced project, we have determined that we agree that the proposed phased approach to meeting Section 106 requirements is reasonable and appropriate for this undertaking. We look forward to working with BOEM on these future projects.

We appreciate your commitment to helping us preserve Alabama's historic archaeological and architectural resources. Should you have any questions, please contact Amanda McBride at 334.230.2692 or [Amanda.McBride@preserveala.org](mailto:Amanda.McBride@preserveala.org). Have the AHC tracking number referenced above available and include it with any future correspondence.

Sincerely,

A handwritten signature in cursive script that reads "Lee Anne Wofford".

Lee Anne Wofford  
Deputy State Historic Preservation Officer

LAW/AMH/amh



# United States Department of the Interior

## BUREAU OF OCEAN ENERGY MANAGEMENT

Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, LA 70123-2394

In Reply Refer To: GM 673E

APR - 3 2015

Pam Breaux  
SHPO  
Department of Culture, Recreation & Tourism  
1051 North Third Street  
Baton Rouge, Louisiana 70802

The proposed undertaking will have no adverse effect on historic properties. This effect determination could change should new information come to our attention.  
*Pam Breaux* 5-12-15  
Pam Breaux Date  
State Historic Preservation Officer

Dear Ms. Breaux:

The Bureau of Ocean Energy Management (BOEM) is pleased to initiate Section 106 consultation, as required by the National Historic Preservation Act, for the 10 proposed Gulf of Mexico (GOM) lease sales in the 2017-2022 draft proposed program. BOEM is proposing to hold one sale each in 2017 and 2022, and two sales each in 2018, 2019, 2020, and 2021. A proposed schedule of lease sales is enclosed. A multiple sale environmental impact statement (EIS) is being prepared and the draft EIS is currently in preparation.

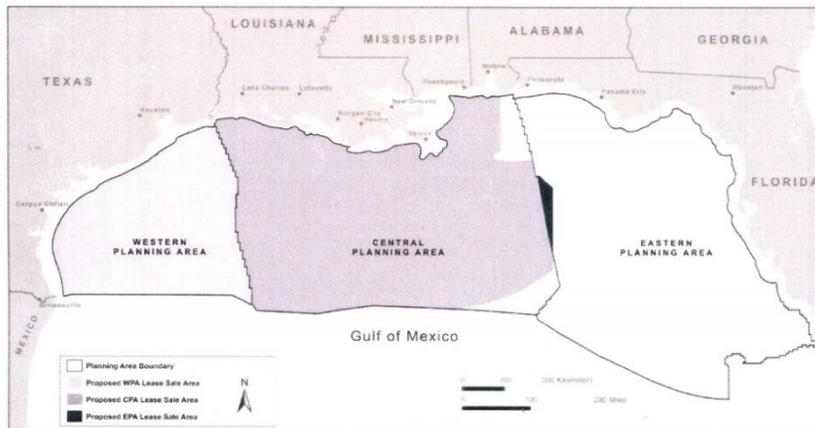


Figure 1. Proposed Lease Sale Area

During periods that the continental shelf was exposed above sea level, the area was open to habitation by prehistoric peoples. The advent of early man into the GOM region is currently

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APR 06 2015

ARCHAEOLOGY

accepted to be around 12,000 years before the present (B.P.). The sea-level curve for the northern GOM suggests that sea level at 12,000 B.P. would have been approximately 45-60 meters (m) [148-197 feet (ft.)] below the present day sea level. On this basis, the continental shelf shoreward of the 45-60 m (148-197 ft.) bathymetric contours has potential for prehistoric sites dating after 12,000 B.P. Because of inherent uncertainties in both the depth of sea level and the entry date of prehistoric man into North America, BOEM adopted the 60 m (197 ft.) water depth as the seaward extent for archaeological site potential in the GOM. Since water depths in the Eastern Planning Area vastly exceed 60 m (197 ft.), with depths in the range between 245 m (800 ft.) and 933 m (3,062 ft.), there is no potential for the presence of submerged prehistoric archaeological sites.

Historic properties within the GOM would likely consist of historic shipwrecks. An historic shipwreck is defined as a submerged or buried vessel, at least 50 years old that has foundered, stranded, or wrecked and is presently lying on or embedded in the seafloor. This includes vessels that exist intact or as scattered components on or in the seafloor. BOEM and its predecessor agency Minerals Management Service have contracted studies in 1977, 1989, and again in 2003 that indicated the potential presence of over 3,000 historically reported shipwrecks in the GOM. This list should not be considered exhaustive; regular reporting of shipwrecks did not occur until late in the 19th century and losses of several classes of vessels, such as small coastal fishing boats were largely unreported in official records. Fifty-one confirmed historic vessels have been located in Federal waters in the GOM, two in the Western Planning Area, five in the Eastern Planning Area, and 44 in the Central Planning Area, nearly half of which have been found in deepwater blocks in Mississippi Canyon, Green Canyon, and Viosca Knoll. Nearly all of these have been discovered as a result of BOEM mandated oil industry conducted surveys. The discoveries include six early 19<sup>th</sup> century wooden sailing vessels, lying in depths between 823 m (2,700 ft.) and 1,310 m (4,300 ft.) of water, seven 19<sup>th</sup> or early 20<sup>th</sup> century sailing ships, and one 17<sup>th</sup> or 18<sup>th</sup> century wreck. There are also several World War II casualties located in deepwater off the mouth of the Mississippi River (e.g., *Alcoa Puritan*, *GulfPenn*, *GulfOil*, *Halo*, *Virginia*, *Robert E. Lee*, and the German submarine *U-166*). All of these wrecks have been investigated using a remotely operated vehicle from a surface vessel and are in an excellent state of preservation.

Activities associated with lease sales that have the potential to disturb offshore historic resources include: (1) use of bottom cables for seismic data collection; (2) anchoring, which may disturb host or overlying sediment; (3) emplacement and removal of bottom-founded structures; (4) exploratory drilling; and (5) trenching for and laying pipelines. The area of potential effect (APE) for these undertakings is the vertical and horizontal extent of the related seafloor disturbing activities. Historic property identification efforts under the leases issued from the proposed 2017-2022 GOM lease sales will occur in a phased approach as defined in 36 CFR 800.4.

The potential of an interaction between rig or platform emplacement and an historic property is greatly diminished by requisite site surveys. In certain circumstances, the Bureau of Safety and Environmental Enforcement Regional Director may require the preparation of an archaeological report to accompany pipeline applications under 30 CFR 250.1007(a)(5). The BOEM Regional Director has authority to require certain types of surveys before submission of an Exploration

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Plan, Development and Production Plan, or Development Operations Coordination Document under 30 CFR 550.194. As part of the environmental reviews conducted for post-lease activities within the GOM, available historical, geological, and survey information on each proposed action within the APE will be evaluated by BOEM's staff of marine archaeologists regarding the potential presence of archaeological resources to determine if additional archaeological resource surveys and mitigation are warranted. If potential historic properties (archaeological resources) are discovered and may be affected by the proposed undertaking, BOEM will develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties. BOEM usually requires lessees to modify their undertakings to avoid all impacts to the potential historic property. If avoidance is not practical, BOEM will consult with the State Historic Preservation Office to resolve adverse effects to the historic property and to determine the appropriate resolution of these adverse effects. Additionally, BOEM requires lessees to adhere to a chance finds/unanticipated discovery clause that requires a lessee to stop seafloor disturbing activities in the vicinity of the discovered potential resource and to report of any cultural material found during activities carried out on the lease.

Based on BOEM's reasonable and good faith identification efforts, and BOEM's proposed avoidance of adverse effects to any potential historic properties discovered during industry-required surveys, BOEM has determined that the proposed 2017-2022 GOM lease sales will have no effect upon historic properties. BOEM requests your concurrence with this finding. If you have any questions, please feel free to contact Mr. Douglas Jones at (504) 736-2859 or by email at [douglas.jones@boem.gov](mailto:douglas.jones@boem.gov).

Sincerely,

  
for Joseph A. Christopher  
Regional Supervisor  
Office of Environment

Enclosure



STATE OF ALABAMA  
ALABAMA HISTORICAL COMMISSION  
468 SOUTH PERRY STREET  
MONTGOMERY, ALABAMA 36130-0900

May 10, 2016

LISA D. JONES  
ACTING EXECUTIVE DIRECTOR  
STATE HISTORIC PRESERVATION OFFICER

TEL: 334-242-3184  
FAX: 334-240-3477

Mr. Gary D. Goeke  
Chief, Environmental Assessment Section  
Office of Environment (GM 623E)  
Bureau of Ocean Energy Management  
Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, Louisiana 70123-2394

Re: AHC 2016-0729  
Draft 2017-2022 GOM Multisale EIS  
Gulf of Mexico

Dear Mr. Goeke:

Upon review of the above referenced document, we request that a professional maritime archaeologist survey the project area(s) to identify any cultural resources that may be present. Please submit the resulting report to our office for review and determination prior to construction activities. Please note that the report should conform to Alabama state guidelines for maritime survey (enclosed).

We appreciate your commitment to helping us preserve Alabama's historic archaeological and architectural resources. Should you have any questions, please contact Amanda McBride at 334.230.2692 or [Amanda.McBride@preserveala.org](mailto:Amanda.McBride@preserveala.org). Have the AHC tracking number referenced above available and include it with any future correspondence.

Sincerely,

Lee Anne Wofford  
Deputy State Historic Preservation Officer

LAW/AMH/amh



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southeast Regional Office  
263 13<sup>th</sup> 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 Assessment 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 (NLTs), 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  
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



## 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 13<sup>th</sup> 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 statutes; 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 statutes 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 25<sup>th</sup>, 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](mailto:mariana.steen@boem.gov).

Sincerely,

AGATHA-  
MARIE KALLER

Digitally signed by AGATHA-MARIE KALLER  
DN: cn=US, o=U.S. Government,  
ou=Department of the Interior, ou=Bureau of  
Ocean Energy Management, cn=AGATHA-  
MARIE KALLER  
c:US, o:U.S. Government, ou=Department of the Interior, ou=Bureau of Ocean Energy Management, cn=AGATHA-MARIE KALLER  
Date: 2022.09.28 15:27:53 -0500

Dr. Agatha-Marie Kaller  
Regional Supervisor  
Office of Environment  
BOEM

In concurrence:

TOMMY  
BROUSSARD

Digitally signed by  
TOMMY BROUSSARD  
Date: 2022.09.27  
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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 13<sup>th</sup> Avenue, South  
Saint Petersburg, Florida 33701



## **APPENDIX C**

### **RESPONSES TO PUBLIC COMMENTS ON THE DRAFT SUPPLEMENTAL EIS**



## C RESPONSES TO PUBLIC COMMENTS ON THE DRAFT SUPPLEMENTAL EIS

Through November 21, 2022, the Bureau of Ocean Energy Management (BOEM) received a total of 75,904 comments. Of the 75,904 submissions, 324 were identified as unique and containing substantive content. Copies of form letters were counted as a single submission. Comments not accepted include 11 anonymous submissions.

The comments came from a variety of stakeholders including Federal, State, non-governmental associations, and individual commenters. Commenters are labeled by the Comment ID Number in the second column of **Table C-1**. The first column of **Table C-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 11 major categories, and responses are provided for each issue. The comments were reproduced verbatim as they were received. When similar issues were raised by several commenters, a single response has been provided for multiple comments. The comments and responses are presented in a matrix (**Table C-1**) and are organized by the following 11 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–Oil Spills; Topic 7–Mitigation; Topic 8–Regulations and Safety; Topic 9–Scenario; Topic 10–Inflation Reduction Act of 2022; and Topic 11–Out of Scope. Some topics include subtopics to further group similar comments. 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 20 subtopics (i.e., Climate Change, Greenhouse Gases, Well Stimulation, Renewable Energy and Alternative Uses of the OCS, Air Quality, Water Quality, Estuarine Systems (Wetlands and Seagrasses/Submerged Vegetation), Deepwater Benthic Communities, *Sargassum* and Associated Communities, Topographic Features, Fish and Invertebrates, Birds, Marine Mammals, Sea Turtles, Beach Mice, Commercial Fisheries, Archaeological Resources, Land Use and Coastal Infrastructure, Economic Factors, and Social Factors [Including Environmental Justice]) to separate the various environmental issues and concerns raised by commenters. Topic 11 includes general out-of-scope comments as well as energy policy and programs unrelated to the Draft Supplemental EIS for Lease Sales 259 and 261.

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 C-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 C-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 Supplemental EIS.

### **Topic 1 – NEPA Process and Public Involvement**

- NRDC et al.
- Earthjustice et al.
- Center for Biological Diversity

### **Topic 2 – NEPA Analysis**

#### ***Purpose and Need – Inflation Reduction Act***

- Form Letter 1
- Form Letter 2
- The Climate Reality Project

#### ***Purpose and Need – Climate Change/Emissions***

- Alexcia Best (Oceana)
- Zainab Mirza (Center for American Progress)
- Ian Giancarlo (Environment Florida)
- Kathleen Collins

#### ***NEPA Analysis – General***

- Earthjustice et al.
- Center for Biological Diversity
- NRDC et al.
- National Park Service
- Grant Bixby (Business Alliance for Protecting the Pacific Coast)
- Brady Bradshaw (Center for Biological Diversity)
- Tessa Grasswitz
- API/NOIA

**Topic 3 – Alternatives**

- Earthjustice et al.
- NRDC et al.
- Center for Biological Diversity
- Louisiana Mid-Continent Oil & Gas Association
- Chevron

***Stated Preference for Alternative E***

- John Weber
- Leo Scheibelhut
- Form Letter 1
- Scott Eustis (Healthy Gulf)
- Morgan Huette (Turtle Island Restoration Network)
- Alexcia Best (Oceana)
- Lilah W. Sanders
- Pete Stauffer (Ocean Protection Manager, Surfrider Foundation)
- Hunter Miller (Senior Florida Field Representative, Oceana)
- Chris Phelan
- Brady Bradshaw (Center for Biological Diversity)
- Kelsey Lamp (Protect Our Oceans Campaign Director, Environment America)
- Claudia Steiner (The Rachel Carson Council)
- Zainab Mirza (Center for American Progress)
- Luke Metzger (Executive Director, Environment Texas)
- Ian Giancarlo (Environment Florida)
- Dorothy Peña (Indigenous Peoples of the Coastal Bend)
- Brandon Larrabee
- Form Letter 2
- The Climate Reality Project
- Dallas-Ft. Worth Chapter of the Climate Reality Project
- David Esopi

- James Freedman
- Michael Sauber
- Judith Stone
- John Commerford
- Edward L. Simpson
- Karen Nagy
- Leda Beth Gray
- Cameron Stempel
- Bruce Hlodnicki
- Frances Walker
- Stephen Bailey
- Sarah McKee
- Mary Shesgreen
- William Schreier
- Joseph Edes
- Jean Naples
- Maggie Frazier
- Cheryl Gross
- Frederick Klein
- I Alexakos
- Sue Hayden
- Debra Dunson
- Sharon Burke
- Elizabeth Sexton
- Jeremy Ehrlich
- Shannon Faye
- Kathleen Gonzalez
- Friends of the Earth
- Earthjustice et al.

- NRDC et al.
- Leslie Edwards
- Lawrence Rosin
- Rona Fried
- Center for Biological Diversity Form Letter
- Don Lipmanson
- Coralie Pryde
- Angelle Bradford
- Cindy Gaver
- Mara Duncan

***Stated Preference for Alternatives A-D***

- American Petroleum Institute/National Ocean Industries Association (API/NOIA)
- Beacon Offshore Energy
- Louisiana Mid-Continent Oil & Gas Association
- Alex Schisel
- Barry Abbott
- Ping Wang
- Curtis Rueter
- Don Shelton
- Hank Tomlinson
- Lindsey Wilcox-Fillingim (Wilcox Oil Co, Inc)
- Tom Bondurant
- Katrina Soundy
- Laura Gamboa
- T Day
- Jeffery Thompson
- Ian Hall

**Topic 4 – Environmental Issues and Concerns*****Climate Change***

- Center for Biological Diversity
- Form Letter 1
- Pete Stauffer (Ocean Protection Manager, Surfrider Foundation)
- Leda Beth Gray
- Hunter Miller (Senior Florida Field Representative, Oceana)
- Richard Van Aken
- Susan ORourke
- Elizabeth Ann Dowds
- Stacey Eichner
- Michael Sauber
- Christina Ciano
- Debra Dunson
- Ronald Parry
- Gregory Nelson

***Greenhouse Gases******Greenhouse Gases – Baseline Modeling, IRA / Net-Zero***

- Center for Biological Diversity
- NRDC et al.
- USEPA

***Greenhouse Gases – Executive Orders and Inclusion of GHGs and SC-GHG Analysis***

- API/NOIA
- Chevron

***Greenhouse Gases – Other***

- Earthjustice et al.
- Center for Biological Diversity
- API/NOIA

- NRDC et al.
- USEPA

***Well Stimulation***

- Jeanne Gallahue

***Renewable Energy and Alternative Uses of the OCS***

- Scott Eustis (Healthy Gulf)
- NRDC et al.

***Air Quality***

- Center for Biological Diversity
- Kelsey Lamp (Protect Our Oceans Campaign Director, Environment America)
- USEPA
- NRDC et al.

***Water Quality***

- Center for Biological Diversity
- Diane Desenberg
- Kelsey Lamp (Protect Our Oceans Campaign Director, Environment America)

***Estuarine Systems (Wetlands and Seagrasses/Submerged Vegetation)***

- USEPA
- Ian Giancarlo (Environment Florida)
- Lesly Van Dame
- Center for Biological Diversity

***Deepwater Benthic Communities***

- NRDC et al.
- Center for Biological Diversity

***Sargassum and Associated Communities***

- Center for Biological Diversity

***Topographic Features***

- Center for Biological Diversity

***Fish and Invertebrate Resources***

- NRDC et al.
- Earthjustice et al.
- Center for Biological Diversity
- Sheryl Collins
- Linda S Barnes

***Birds***

- Earthjustice et al.
- Center for Biological Diversity
- Maria Balbuena
- API/NOIA

***Marine Mammals***

- Earthjustice et al.
- NRDC et al.
- Center for Biological Diversity
- John Webber
- Suzanne Blakeman
- Amelia Conley
- Bryce King
- Kathryn Lezenby
- Leo Scheibelhut
- Morgan Huette (Turtle Island Restoration Network)
- Edward L. Simpson
- Form Letter 1
- Bruce Hlodnicki
- Susan O'Rourke
- Leda Beth Gray
- Linda S. Barnes
- API/NOIA

***Sea Turtles***

- Earthjustice et al.
- Center for Biological Diversity
- Morgan Huette (Turtle Island Restoration Network)
- NPS
- API/NOIA

***Beach Mice***

- Center for Biological Diversity

***Commercial Fisheries***

- NRDC et al.
- Center for Biological Diversity

***Archaeological Resources***

- Dorothy Peña (Indigenous Peoples of the Coastal Bend)

***Land Use and Coastal Infrastructure***

- Morgan Huette (Turtle Island Restoration Network)
- Chris Phelan

***Economic Factors***

- NRDC et al.
- Center for Biological Diversity
- Alexcia Best (Oceana)
- Grant Bixby (Business Alliance for Protecting the Pacific Coast)
- Ian Giancarlo (Environment Florida)
- James Freedman
- Elizabeth Ann Dowds
- Claudia Steiner (The Rachel Carson Council)
- Scott Eustis (Healthy Gulf)
- Louisiana Mid-Continent Oil & Gas Association

**Social Factors (Including Environmental Justice)**

- USEPA
- Earthjustice et al.
- NRDC et al.
- Center for Biological Diversity
- Scott Eustis (Healthy Gulf)
- Pete Stauffer (Ocean Protection Manager, Surfrider Foundation)
- Brady Bradshaw (Center for Biological Diversity)
- Zainab Mirza (Center for American Progress)
- Chris Phelan
- Luke Metzger (Executive Director, Environment Texas)
- Morgan Huette (Turtle Island Restoration Network)
- Dorothy Peña (Indigenous Peoples of the Coastal Bend)
- Form Letter 2
- The Climate Reality Project
- Leda Beth Gray
- Friends of the Earth
- Maria Balbuena
- API/NOIA
- NRDC et al.
- Shannon Faye
- Coralie Pryde

**Topic 5 – Cumulative Analysis**

- Earthjustice et al.
- NRDC et al.
- Center for Biological Diversity
- Morgan Huette (Turtle Island Restoration Network)
- Robin Miller
- NPS

**Topic 6 – Oil Spills**

- Earthjustice et al.
- Center for Biological Diversity
- Brady Bradshaw (Center for Biological Diversity)
- Jo Ann Duman
- John Webber
- Karen Nagy
- Stacey Eichner
- RJ Harrington Jr.
- Alexcia Best (Oceana)
- Claudia Steiner (The Rachel Carson Council)
- Zainab Mirza (Center for American Progress)
- Morgan Huette (Turtle Island Restoration Network)
- Ian Giancarlo (Environment Florida)
- Michael Sauber
- Sandra Hoover
- Maggie Frazier
- Karen Nagy
- S. Smith
- Krissa Dutton-Schandelmaier
- Merrill Shea
- David Williams
- Linda S Barnes
- NRDC et al.
- Claudia Steiner (The Rachel Carson Council)
- Linda Lane
- Gaylene Vasaturo
- Leslie Edwards
- Betty Martin

- Coralie Pryde
- API/NOIA
- NRDC et al.

**Topic 7 – Mitigation**

- NRDC et al.

**Topic 8 – Regulations and Safety**

- Brady Bradshaw (Center for Biological Diversity)
- Earthjustice et al.
- Center for Biological Diversity

**Topic 9 – Scenario**

- Center for Biological Diversity

**Topic 10 – Inflation Reduction Act of 2022**

- Earthjustice et al.
- Center for Biological Diversity
- Form Letter 1
- Hunter Miller (Senior Florida Field Representative, Oceana)
- Dorothy Peña (Indigenous Peoples of the Coastal Bend)
- Zainab Mirza (Center for American Progress)
- Merrill Shea

**Topic 11 – Out of Scope*****Energy Policy and Programs Unrelated to the Draft Supplemental EIS for Lease Sales 259 and 261***

- API/NOIA
- Grant Bixby (Business Alliance for Protecting the Pacific Coast)
- Carolyn McCall

**Out of Scope: Other**

- Krissa Dutton-Schandelmaier
- Glen Anderson
- Mark Gillono

- Mike and Kathy Sherman
- Tara Wheeler
- Maria Balbuena
- Chris Phelan
- Alan Benford
- David Williams
- Center for Biological Diversity

Table C-1. Public Comments and BOEM's Response Matrix.

**TOPIC 1 – NEPA PROCESS AND PUBLIC INVOLVEMENT**

Commenter	ID Number	Comment	Response
Topic 1 – NEPA Process and Public Involvement			
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM must update its analysis to reflect the implications of current law and policies in the FSEIS. The DSEIS fails to account for the clean energy goals articulated in various recent Executive Orders issued by President Biden and enshrined in the Paris Agreement. President Biden directed the federal government in his Executive Order on Tackling the Climate Crisis at Home and Abroad. The U.S.' commitment under the Paris Agreement further requires it to strengthen its response to the threat of climate change by “[h]olding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above preindustrial levels.”</p> <p>Due to the implications that such federal policies will have on Lease Sales 259 and 261, BOEM must update its analysis in the FSEIS. BOEM must provide opportunity for the public to comment on the interaction between the Lease Sales and the IRA as well as the environmental and climate impacts that result from the law’s implementation.</p>	<p>Thank you for your comment. BOEM’s Supplemental EIS was prepared under our legal obligations under the National Environmental Policy Act (NEPA) to inform decisions pursuant to the Outer Continental Shelf Lands Act (OCSLA) and actions directed by the Inflation Reduction Act of 2022 (IRA) (Public Law No. 117-169, enacted August 16, 2022). BOEM is required to hold GOM Oil and Gas Lease Sales 259 and 261 by the end of March and September 2023, respectively, pursuant to the IRA. BOEM acknowledges the inherent tension created between the climate goals of the Administration, and the requirements of the IRA that not only must BOEM hold Lease Sales 259 and 261 but also that a minimum number of offshore acreage for oil and gas leasing must be offered for sale within the 12 months prior to issuance of a lease for offshore wind development. Thus, the IRA makes continued OCS oil and gas leasing over the next 10 years more likely in order to continue implementing OCS renewable energy leasing. Due to the level of interest in the IRA and how it relates to offshore oil and gas leasing, we have expanded the discussion of the IRA in <b>Chapter 1.3</b> of this Supplemental EIS.</p> <p>By analyzing the lease sales , 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. BOEM has added discussions addressing these priorities to this Supplemental EIS.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
Earthjustice et al.	BOEM-2022-0048-28951	<p>The SEIS indicates that BOEM is relying on the biological opinion (BiOp) and incidental take statement (ITS) issued by NMFS on March 13, 2020, to meet its obligation to ensure against jeopardy under section 7 of the ESA. However, an action agency is in violation of section 7 when it relies on an unlawful biological opinion. NMFS's 2020 biological opinion is unlawful for several reasons, so BOEM would violate ESA section 7 if it were to hold a lease sale in reliance on that BiOp...</p> <p>Specifically, the BiOp unlawfully: (1) underestimates the effects of the action from oil spills by arbitrarily disregarding the likelihood of a catastrophic oil spill and underestimating the amount and effects of the spills it anticipates will occur; (2) reaches arbitrary determinations that the action will not jeopardize the continued existence of species by a) failing to account for post-Deepwater Horizon population changes when assessing the effects of the action to threatened and endangered species, b) failing to incorporate anticipated changes to species' baselines from climate change when assessing the action's effects on species, and c) unlawfully ignoring effects to species' recovery; (3) fails to show that a proposed mitigation measure is sufficient to avoid jeopardizing the survival and recovery of the critically endangered Rice's whale; and (4) includes an incidental take statement that violates the ESA's requirements for certain expected take of whales and, for all species, from oil spills and vessel strikes. These errors are arbitrary and capricious, fail to use the best available science, and are contrary to the ESA. Because the BiOp is unlawful, Interior may not rely on it to comply with</p>	<p>This comment opportunity pertains to the NEPA document for GOM Lease Sales 259 and 261 and not to the National Oceanic and Atmospheric Administration's (NOAA's) Biological Opinion (BiOp). This Supplemental EIS is not analyzing the National Marine Fisheries Service's (NMFS') decision on the 2020 BiOp but is analyzing potential impacts that may result from a Gulf of Mexico (GOM) oil and gas lease sale. Offshore oil and gas lease sale actions were included in the consultation with NMFS that resulted in the 2020 BiOp as amended, which therefore makes the BiOp credible scientific information relevant to the impacts analysis conducted in this Supplemental EIS. The 2020 BiOp (as amended) remains in effect and BOEM continues to implement the terms and conditions and reasonable and prudent measures, as well as the reasonable and prudent alternative for the Rice's whale, when conducting lease sales or authorizing post-lease activities. On October 25, 2022, BOEM requested a reinitiation of the 2020 BiOp to (1) reevaluate the oil-spill analysis presented in the 2020 BiOp and acknowledgement of a new Oil-Spill Risk Analysis and (2) incorporate conditions of approval related to impact pile driving and potential transit through the Rice's whale area. During the reinitiation, the current 2020 BiOp remains in effect and BOEM will continue to satisfy the Endangered Species Act's (ESA's) requirements until the reinitiated consultation is completed and a new BiOp is issued, as appropriate.</p>

Commenter	ID Number	Comment	Response
		<p>its section 7 obligations for the proposed lease sales...</p> <p>The BiOp finds that activities caused by OCS leasing take threatened and endangered species. The 2020 BiOp lacks a valid ITS for the reasons described above. Accordingly, the proposed lease sales will cause unauthorized take, in violation of section 9.</p>	
Center for Biological Diversity	BOEM-2022-0048-28954	<p>In its 2017–2022 OCS Oil and Gas Leasing Program, BOEM stated that it was changing its approach to a system where it would begin offering region-wide sales that offer all available, unleased areas of the Gulf of Mexico OCS. In doing so, BOEM expressly noted that “any individual sale could be scaled back during the pre-lease sale process to conform more closely to the traditional separate planning area model should circumstances warrant.”</p> <p>Yet BOEM did not do so. Its region-wide lease sale approach is arbitrary and incompatible with OCSLA. Indeed, under this approach, BOEM is allowing the oil industry to determine which areas are explored and developed, thereby abdicating the agency’s responsibility under OCSLA to direct oil activities and assure that they do not cause environmental harm.</p> <p>BOEM’s region-wide lease sale approach is particularly troubling considering that this approach has been cited as one of the problems in the offshore oil regime that led to the devastating Deepwater Horizon oil spill. In response to that spill, President Obama established the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling as an independent, nonpartisan entity charged with providing a</p>	<p>Thank you for your comment. BOEM actively complies with NEPA, OCSLA, and other statutory and regulatory obligations in conducting its leasing program and authorizing activities. BOEM began areawide leasing in 1983, with a lease sale for the Central Planning Area in May 1983. On January 17, 2017, Secretary of the Interior Sally Jewell approved the 2017-2022 OCS Oil and Gas Leasing Program. Her decision called for the consideration of regionwide sales that include the Western, Central, and Eastern Gulf of Mexico. The NEPA documents prepared to consider the environmental impacts of the activities proposed in the 2017-2022 National OCS Oil and Gas Program, including this Supplemental EIS, included alternatives to the Proposed Action that exclude the Western Planning Area (Alternative B) and the Central and Eastern Planning Areas (Alternative C).</p> <p>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 Appendix B of the 2017-2022 GOM Multisale EIS and Pre-Lease Stipulations described in Appendix D (Secretarial approval also included the adoption of the application of the Protection of Biologically Sensitive Underwater Features in Gulf of Mexico).</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
		<p>thorough analysis of the causes of the disaster, assessing the oil industry's ability to respond to spills, and recommending reforms for making offshore drilling safer. The Commission issued its final report in January 2011, in which it highlighted the need for a fundamentally different approach to management of offshore drilling. The Commission noted that the area-wide approach favored industry at the cost of meaningful environmental analysis. According to the Commission, area-wide leasing meant that:</p> <p>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.</p> <p>This problem was made even worse in the 2017-2022 OCS Oil and Gas Leasing Program. Under this program—instead of offering lease sales based on the three separate planning areas, the Western Gulf, the Central Gulf, and the Eastern Gulf as had become the practice leading up to the Deepwater Horizon disaster—BOEM included all available acres throughout “the Gulf of Mexico,” leading to lease sales totaling between 75 to over 80 million acres.</p> <p>BOEM stated that it was changing its approach to a system where it would begin offering region-</p>	<p>BOEM's subject-matter experts analyzed each alternative for the Proposed Action, with and without these measures in the 2017-2022 GOM Multisale EIS. 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.</p> <p>BOEM's OCS Oil and Gas Program Planning and Decision Process is described in Chapter 1.3 of the 2017-2022 GOM Multisale EIS. Due to the staged decisionmaking process in the 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 an 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 cumulative impacts on GOM resources. This allows more time to include public involvement and to evaluate the potential environmental impacts of the proposed activities. It 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. Additionally, BOEM has incorporated many of the recommendations of the National Commission on the BP Deepwater Horizon Oil</p>

Commenter	ID Number	Comment	Response
		wide sales “to balance Agency workload and provide greater flexibility to industry,” including by “providing more frequent opportunities to bid on rejected, relinquished, or expired OCS lease blocks.” However, BOEM does not have “carte blanche to wholly disregard a statutory requirement out of convenience.” Nor can it abdicate its statutory duties under OCSLA or NEPA to appease industry. The designation lacks the precision required by the statute and is therefore unlawful.	Spill and Offshore Drilling. Consistent with the 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.
Center for Biological Diversity	BOEM-2022-0048-28954	In other word’s the Gulf’s size and variation clearly requires greater specificity in the size and location of lease sales. BOEM’s failure to do so is improper.	
Center for Biological Diversity	BOEM-2022-0048-28954	Simply tiering to prior NEPA analyses fails to address the core problems that none of those analyses constitute the hard look required by NEPA. NEPA regulations recognize that “tiering” from one environmental analysis to another may sometimes be appropriate where a broad environmental analysis has been conducted and the agency wishes to refer back to that assessment at a subsequent stage to avoid repetition. However, the process cannot be used to evade the thorough review required by NEPA. “[I]t is not better documents but better decisions that count. NEPA’s purpose is not to generate paperwork — even excellent paperwork — but to foster excellent action.”	
Center for Biological Diversity	BOEM-2022-0048-28954	BOEM’s purpose and need statement is improper. NEPA’s implementing regulations provide that an environmental document should specify the underlying purpose and need to which the agency is responding in proposing the alternative including the proposed action. This purpose and need inquiry is crucial for a sufficient environmental analysis because “[t]he stated goal of a project necessarily dictates the range of ‘reasonable’ alternatives.” Thus, “an agency cannot define its	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
		<p>objectives in unreasonably narrow terms” without violating NEPA.</p> <p>Yet that is just what BOEM did here. BOEM states that “[t]he purpose of and need for the proposed Federal action (i.e., a GOM lease sale) is to offer for lease those areas that may contain economically recoverable oil and gas resources in order to further the orderly development of OCS oil and gas resources in accordance with the OCSLA.”</p> <p>BOEM’s purpose and need is entirely inadequate because BOEM necessarily considered an unreasonably narrow range of alternatives. OCSLA charges BOEM with ensuring that “environmental safeguards” are in place for offshore oil development and ensuring the “balance [of] orderly energy resource development with protection of the human, marine, and coastal environments.” Accordingly, BOEM should have focused its purpose and need inquiry on objectives that comport with these statutory duties, rather than just promoting oil development, particularly considering the amount of OCS areas that are already under lease and producing oil and gas.</p> <p>The fact the sales are mandated by the Inflation Reduction Act does not change the agency’s obligation to properly consider the purpose and need of more oil leasing in light of the climate, biodiversity, and environmental justice crises facing our nation. Indeed, the Record of Decision for the 2017–2022 OCS Oil and Gas Program referenced in the Inflation Reduction Act specifically contemplated that BOEM would impose additional mitigation measures or alternatives at the lease sale stage, as explained above. This only</p>	<p>2017-2022 GOM Multisale EIS and 2017-2022 National OCS Oil and Gas Program. The Proposed Action under NEPA is a single Gulf of Mexico OCS oil and gas lease sale. This Supplemental EIS is expected to inform individual decisions on proposed GOM Lease Sales 259 and 261. Thus, the decisionmaker has the ability to choose one of the alternatives, or a combination of alternatives, after weighing possible benefits and adverse environmental impacts. The Secretary also has the discretion to include several environmental safeguards at the leasing stage through lease stipulations (described in <b>Table 2-1</b> and <b>Appendix A</b> of this Supplemental EIS). 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 mitigation by imposing conditions of approval on a plan, permit, or authorization (described in <b>Chapter 2</b> of this Supplemental EIS and Appendix B of the 2017-2022 GOM Multisale EIS).</p>

Commenter	ID Number	Comment	Response
		underscores BOEM's obligation to properly define the purpose and need of these oil and gas lease sales.	

## TOPIC 2 – NEPA ANALYSIS

Commenter	ID Number	Comment	Response
Topic 2 – NEPA Analysis			
Purpose and Need – Inflation Reduction Act			
Form Letter 1	BOEM-2022-0048-DRAFT-0433	There is simply no need for BOEM to continue with the large-scale lease sales we saw for four years under the Trump administration. Oil companies currently hold close to 1,900 leases covering more than 10 million acres of the Gulf of Mexico. Only about 500 of those leases are currently in production, meeting the current demand for offshore oil and gas and leaving more than 7.4 million leased acres (or 75% of current lease holdings) remaining to be developed to meet any near or mid-term national energy needs.	Per Section 18 of the OCSLA, BOEM is required to develop a schedule of oil and gas lease sales on the OCS for 5-year periods. Moreover, the IRA requires the Secretary of the Interior to conduct Lease Sales 259 and 261 in 2023; thus, the OCSLA and the IRA drive the purpose and require the Secretary of the Interior to propose an action. The need is to meet national energy needs as articulated by the OCSLA and discussed in the sources of energy consumption in the United States presented in the 2017-2022 GOM Multisale EIS and 2017-2022 National OCS Oil and Gas Program. The Proposed Action is a single GOM oil and gas lease sale. This Supplemental EIS is expected to be used to inform individual decisions on GOM Lease Sales 259 and 261.
Form Letter 2	BOEM-2022-0048-DRAFT-0045	An additional flaw in the SEIS is that it does not account for decreased demand for oil and natural gas energy that is likely to result from the passage of the Inflation Reduction Act. The SEIS states that the United States is expected to continue relying on oil and natural gas to meet energy needs, but the IRA is projected to significantly increase our capacity for clean energy and reduce the need for fossil fuel- based energy. If this is the case, then additional leases for offshore drilling will not be necessary nor relevant, which is also seen with the numerous leases that have not been auctioned off in years prior. Continuing to invest resources into new leasing for offshore drilling is wasteful and impedes a just transition to a green economy, holding the United States back from becoming a leader in this area.	In reference to considering the IRA in this Supplemental EIS, BOEM has provided additional information in <b>Chapter 1.3</b> that address the impacts of the IRA. If oil and gas were not produced from a lease sale, market forces dictate that most of this forgone energy would likely be procured from other sources to meet energy demand (refer to Table 3 of the <i>Gulf of Mexico OCS Oil and Gas Leasing Greenhouse Gas Emissions and Social Cost Analysis: Addendum to the Gulf of Mexico Lease Sales 259 and 261 Draft Supplemental EIS and Technical Report (2022 Gulf of Mexico GHG Analysis Addendum; BOEM 2022c)</i> ).

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
The Climate Reality Project	BOEM-2022-0048-25262	The SEIS also does not account for decreased demand for oil and natural gas energy that is likely to result from the newly passed Inflation Reduction Act. The SEIS states that the United States is expected to continue leaning on oil and natural gas to reach energy needs, but the IRA is projected to significantly increase our capacity for clean energy and reduce the need for fossil fuel-based energy. If this is the case, then additional leases for offshore drilling will not be necessary. Continuing to invest resources into leasing for offshore drilling is wasteful and holds the US back from its goal of a just transition to clean energy.	Further, in the short term, BOEM anticipates continued oil and gas leasing because the IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres" (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.
<b>Purpose and Need – Climate Change/Emissions</b>			
Alexcia Best (Oceana)	10.26.22 Virtual Public Hearing Comments	We know that climate change is the challenge of our lifetime, and developing more offshore oil and gas will worsen climate change, increasing temperatures, extreme weather, and rising sea levels that are already impacting frontline communities. And if the Bureau of Ocean Energy Management continues the status quo, these changes in our climate will continue to wreak havoc on coastal communities, and put marine life at risk. According to the International Energy Agency, nations must stop developing new oil and gas fields if global warming is to stay within relatively safe limits. Permanent offshore drilling protections for all unleased Federal waters could prevent over 19 billion tons of greenhouse gas emissions. That is the equivalent of taking every car in the United States off the road for the next fifteen years. The analysis also found that permanent protections in all unleased Federal waters could prevent more than \$720 billion dollars in damages to people, property, and the environment.	<p>BOEM discusses the relationship between greenhouse gas (GHG) emissions and climate throughout this Supplemental EIS. BOEM also provides estimates of the Proposed Action's incremental GHG emissions and their social costs in this Supplemental EIS.</p> <p>Further, on August 16, 2022, President Biden signed the Inflation Reduction Act of 2022, which requires BOEM to hold GOM Lease Sale 259 by March 31, 2023, and GOM Lease Sale 261 by September 30, 2023.</p> <p>The need for the Proposed Action is to meet the requirements of the OCSLA, as amended (43 U.S.C. §§ 1331 <i>et seq.</i>). The OCSLA states "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, in a manner which is consistent with the maintenance of</p>

Commenter	ID Number	Comment	Response
Zainab Mirza (Center for American Progress)	10.26.22 Virtual Public Hearing Comments	Internationally, climate scientists have warned us that maintaining global warming below 1.5 degrees Celsius requires immediate and robust action to halt fossil fuels investments. The Biden-Harris Administration has committed to a 50% reduction in us emissions by 2030, and net zero emissions by 2050. Business as usual will prevent the U.S. from achieving this critical goal.	competition and other national needs” (43 U.S.C. §1332(3)).  If oil and gas were not produced from Lease Sales 259 and 261, market forces dictate this energy would be procured from other sources to meet energy demands ( <b>Table 4-1</b> of this Supplemental EIS).
Ian Giancarlo (Environment Florida)	10.26.22 Virtual Public Hearing Comments	New oil leases support and fuel the industries that produce much of the greenhouse gases that are driving climate change, and it must stop.	Issues related to national and international energy and climate policies are beyond the scope of this analysis, except to the extent they directly pertain to regulatory requirements associated with the Proposed Action.
Kathleen Collins	BOEM-2022-0048-0988	Furthermore, in order to stay below a 2-degree increase in temperature, we must cut off all oil and gas use by 2030. We are already going to pass the 1.5-degree increase promised by our government by 2050. More oil drilling only feeds into the outrageously high CO2 levels.	
<b>NEPA Analysis – General</b>			
Earthjustice et al.	BOEM-2022-0048-28951	For several resources, the SEIS anticipates the different action alternatives will have the same levels of effects despite having very different levels of exploration, development, and production activities. If one alternative will result in a higher level of activity than another alternative, the effects of that activity also will be higher. It is arbitrary and capricious for BOEM to assume the effect levels are the same across alternatives. This error skews the decisionmaking process by implying that the amount of acreage leased—whether one planning area, two planning areas, or even a subset of a planning area—makes no difference for environmental effects. It prevents BOEM from making a rational comparison of alternatives, in violation of NEPA...	This Supplemental EIS tiers from the 2017-2022 GOM Multisale EIS, which provides detailed analysis and rationale for the conclusions reached for each alternative in each resource chapter. The impact conclusions in each resource area in <b>Chapter 4</b> considers the geographic area and the forecasted range of activities of each alternative. In this Supplemental EIS for Lease Sales 259 and 261, BOEM reexamined the analysis for each resource area presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS and provided a summary of the impact conclusions described in those earlier documents.  BOEM analyzes impact-producing factors and potential effects at scales appropriate to the Proposed Action and resources considered, including ESA-listed

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
		<p>Despite the disparate activity levels between alternatives, BOEM irrationally assumes the effect levels will be approximately equal between alternatives for several resources, including: air quality, water quality, fish and invertebrate resources, birds, marine mammals, sea turtles, commercial fisheries, recreational fishing, recreational resources, archaeological resources, land use and coastal infrastructure, and social factors (including environmental justice). For most of those resources, BOEM offers no explanation for its assumption that effect levels will be the same for each of the action alternatives, leaving an unexplained inconsistency between the activity levels and effect levels.</p> <p>Relatedly, BOEM generally makes no effort to recognize that effects will be different depending on where leasing is offered. It assumes effects would be the same whether leasing occurs in the western Gulf, central Gulf, or both, despite the fundamental fact that biota, habitats, human uses, and other resources are not spread in a uniform distribution across the entire Gulf of Mexico.</p> <p>Resources will be affected differently depending on the degree to which the lease area spatially overlaps with the resources...</p> <p>Marine species do not indiscriminately distribute themselves throughout the ocean. They use different habitats in different areas for different purposes. This is precisely why the Endangered Species Act (ESA) provides for designation of critical habitat and the Magnuson-Stevens Act (MSA) provides for designation of essential fish habitat (EFH). They reflect the reality that species depend on specific areas for essential functions</p>	<p>species. Population-level impacts and their contribution to the overall impact determinations were considered in both this Supplemental EIS and 2017-2022 GOM Multisale EIS. Pre- and post-lease mitigations, including those related to required compliance with the ESA and Marine Mammal Protection Act (MMPA), were also considered in the analyses for all protected species.</p> <p>The analyses in this Supplemental EIS were conducted in accordance with current NEPA regulations and the Council on Environmental Quality (CEQ) guidance. As such, cumulative impacts consider the contribution of the potential impacts of the Proposed Action to the past, present, and reasonably foreseeable future activities in the action area. In the highly developed Gulf of Mexico basin, it is difficult to calculate the incremental contribution of a single lease sale from ongoing activities.</p>

Commenter	ID Number	Comment	Response
		<p>like feeding, breeding, raising young, taking shelter, and migrating. The SEIS's effects assessment disregards that reality.</p> <p>Why would BOEM need to launch such an ambitious effort if all impacts, regardless of location, extent, or species, were the same? BOEM's statements in the SEIS to this effect conflict with its own evidence and display a gross disregard for reasoned, science-based decision-making and good government...</p>	
Earthjustice et al.	BOEM-2022-0048-28951	<p>Furthermore, BOEM's apparent assumption that it does not need to examine impacts on a species-specific basis is contrary to NEPA, the best available science, and common sense. For instance, an oil spill that kills 40 individual animals may have negligible impacts if the species it kills is extremely abundant, but would have devastating impacts on a species like the Rice's whale with a population of approximately just 50 whales. Likewise, an action that kills 10,000 sea turtles a year would have very different population-level effects depending on whether the species is the critically endangered Kemp's ridley or a more abundant species like green sea turtles.</p> <p>To say that all impacts are equivalent— regardless of geographic location or extent, regardless of the type of habitat affected, regardless of species—is patently absurd.</p> <p>Not only are the equal effect level assumptions irrational and without support, but they conflict with BOEM's assessments of certain other resources where it expressly acknowledges that different activity levels and locations between alternatives will translate to different effect levels. For example, the SEIS finds there would be greater impacts to</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
		<p>coastal habitats under Alternatives A and B than C or D because the former will result in higher activity levels. And BOEM's analysis of impacts to protected birds explains how Alternatives A, B, and C each would have different impacts due to the overlap of the respective lease areas with affected species. BOEM offers no rational explanation for its inconsistency in finding that different activity levels and areas result in different impacts for some resources but identical impacts for others. The agency should conduct a similar analysis for all resources that takes into account both the alternatives' differing impact levels and the spatial overlap between the alternatives and resources or species at issue.</p> <p>This flawed analysis prevents BOEM from making a reasoned choice between alternatives. BOEM wrongly assumes environmental impacts are the same regardless of whether a lease sale offers just one planning area (Alternatives B or C), both planning areas (Alternative A), or reduced acreage in the two planning areas to mitigate impacts (Alternative D). But an alternative that will result in higher levels of activity will result in higher levels of impacts. Likewise, leasing across a broader area will have impacts on resources across a broader area than if leasing were limited to a smaller area: if BOEM does not lease in an area, then resources in that area will not be directly affected by activities on those leases. Without acknowledging that there are differences in the impacts between these alternatives, BOEM cannot make an informed choice considering the environmental impacts. This can result in regionwide leasing rather than an alternative that would have significantly lower environmental impacts by limiting the area leased.</p>	

Commenter	ID Number	Comment	Response
Center for Biological Diversity	BOEM-2022-0048-28954	Two overarching issues plague BOEM's analysis of wildlife and fisheries species impacted by Lease Sales 259 and 261. First, BOEM repeatedly insists that the impacts of the lease sales will be "negligible" because of the sales' "incremental" effects compared to the "cumulative effects" experienced by Gulf marine communities from oil and gas and non-oil and gas related activities. This evasive rationalization allows the agency to avoid considering the myriad ways that oil and gas leasing harms the many species that call the Gulf of Mexico home. If applied to every Environmental Impact Statement issued for offshore oil and gas leases, it would allow the agency to avoid ever having to analyze the effects of oil and gas leasing on marine communities. Such maneuvering is inappropriate given the outsized impacts of offshore oil and gas development on marine wildlife, fisheries, and ecosystems.	
NRDC et al.	BOEM-2022-0048-28948	For the reasons stated below, the DSEIS for Lease Sales 259 and 261 is legally and technically flawed because BOEM failed to adequately consider the lease sale's direct, indirect, and cumulative impacts, failed to analyze adequately new and significant information and circumstances relevant to the impacts of the proposed action, did not adequately propose or analyze appropriate mitigation measures, and failed to consider a reasonable range of alternatives.	
Center for Biological Diversity	BOEM-2022-0048-28954	Furthermore, there are no defensible legal rationales for ignoring climate-threatened species that are harmed by the emissions that will result from a proposed agency action. Since 2008, federal agencies have taken cover behind a cursory, three-page memorandum issued by David Bernhardt—then Department of the Interior Solicitor during the George W. Bush administration—which asserted, without any	Discussions of biological resources, including climate-threatened species are summarized in <b>Chapters 4.4-4.10</b> of this Supplemental EIS, and full descriptions are in Chapters 4.3-4.9 of the 2017-2022 GOM Multisale EIS. Despite increasing knowledge, BOEM remains unable to determine a direct causal relationship for specific effects that may result from a lease sale and effects on threatened or endangered species. BOEM continues to follow CEQ guidance

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
		<p>citation or acknowledgement of the scientific literature, that the “best scientific data available today do not allow us to draw a causal connection between greenhouse gas emissions from a given facility and effects posed to listed species or their habitats, nor are there sufficient data to establish that such impacts are reasonably certain to occur.” Even if this memorandum were correct at the time—and it was not—the memorandum also stated that:</p> <p>“as new information and knowledge about emissions and specific impacts to species and their habitats is develop[s], we will adapt our framework for consultations accordingly.... This is particularly important as more regionally-based models are developed and refined to the level of specificity and reliability needed for the Service to execute its implementation of the Act’s provisions ensuring consistency with the statute’s best available information standard.”</p> <p>Thus, the Bernhardt Memorandum was never intended to provide a permanent shield to avoid consultations, and any reliance on it today would simply be arbitrary and capricious. Accordingly, all federal agencies must assess whether the emissions that result from their activities harm climate-threatened species.</p>	<p>regarding the analysis and quantification of emissions, where possible, to analyze potential impacts from the Proposed Action and in comparison to other alternatives under consideration.</p> <p>In response to the final statement, this comment opportunity pertains to the NEPA document for GOM Lease Sales 259 and 261 and not to the NOAA’s Biological Opinion. This Supplemental EIS is not analyzing NMFS’ decision on the 2020 BiOp but is analyzing potential impacts that may result from a GOM oil and gas lease sale. As noted in Chapter 5, BOEM continues to implement the reasonable and prudent alternative and reasonable and prudent measures with the 2020 BiOp as amended and continues to conduct step-down reviews and routinely works with NMFS staff to ensure compliance with Section 7 of the ESA. BOEM has requested reinitiation of consultation, but the 2020 BiOp remains in effect and BOEM continues to comply with the requirements of the ESA.</p>
NRDC et al.	BOEM-2022-0048-28948	An EIS must include a “full and fair discussion” of direct and indirect environmental impacts, which includes consideration of “all foreseeable direct and indirect impacts.” NEPA also requires consideration of reasonably foreseeable cumulative impacts in combination with the proposed action. First, deepwater drilling impacts are a reasonably foreseeable consequence of pursuing leasing in the GOM. However, BOEM	This Supplemental EIS tiers from the 2017-2022 GOM Multisale EIS, which includes detailed discussions of direct and indirect environmental impacts. The analysis in the Supplemental EIS is based on the offshore scenario activities presented in Table 3-1 of this Supplemental EIS, which is also presented in the 2017-2022 GOM Multisale EIS. That table presents wells drilled, structures installed and removed, pipelines installed, vessel and helicopter trips by water

Commenter	ID Number	Comment	Response
		<p>fails to acknowledge the environmental impacts of extraction on the marine environment. Second, BOEM's cumulative impacts analysis is particularly deficient as it neglects to consider available information on the long-term environmental effects of Deepwater Horizon.</p>	<p>depth ranging from 0 to 60 meters (m) (0 to 197 feet [ft]) up to depths greater than 2,400 m (7,874 ft). In Chapter 1.7 of the 2017-2022 GOM Multisale EIS, BOEM included the Deepwater Horizon Natural Resource Trustees' Natural Resource Damage Assessment Final Programmatic EIS (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016). During the preparation of this Supplement EIS, each resource was reexamined and an exhaustive search of relevant literature and government information for new information was conducted. Any information that was relevant was incorporated into the supplemental analysis. BOEM completed several studies related to the Deepwater Horizon. These studies are found in BOEM's Environmental Studies Program Information System (ESPIS) and generated many journal articles that BOEM used in this Supplemental EIS.</p>
National Park Service	BOEM-2022-0048-22806	<p>NPS remains concerned about the potential effects of Lease Sales 259 and 261 and subsequent exploration and development plans on GOM National Park System units, particularly Gulf Islands National Seashore.</p> <p>The NPS continues to be highly concerned that potential lease sales could allow offshore oil and gas development on OCS blocks located as close as three miles from Horn and Petit Bois Islands, which are designated NPS wilderness and treasured destinations for park visitors. As discussed above, while we greatly appreciate BOEM's development of an Information to Lessees (ITL) and assurances that development on the OCS near Gulf Islands National Seashore is unlikely in the 2012-2017 lease sales SEIS, it does not alleviate our concern that such development may still occur. As stated in previous letters, we strongly encourage BOEM to exclude unleased</p>	<p>Thank you for your comment. As described in your comment, the National Park Service (NPS) requested an alternative that considered a no-leasing buffer within 15 miles (24 kilometers) of the Gulf Islands National Seashore. In the 2017-2022 GOM Multisale EIS, BOEM analyzed this alternative. In that analysis, BOEM considered the potential environmental impacts of leasing the blocks within 15 miles (24 kilometers) of the Gulf Islands National Seashore and the mitigating measures in place. BOEM determined that because of the environmental protection measures already implemented by BOEM and the Bureau of Safety and Environmental Enforcement (BSEE), including the established ITL for the subject area, not to analyze this alternative in further detail. However, in this Final Supplemental EIS, BOEM considered space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind activities, and OCS significant sediment resources. BOEM has provided additional analysis in <b>Chapter 2.3.4</b> of this Final Supplemental</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
		blocks within 15 miles of Gulf Islands National Seashore. Specifically, we request that Central Planning Area lease blocks numbered: 810 through 825; 854 through 869; and 899 through 913 be removed from consideration for future leasing under the 2017-2022 program.	EIS for the decisionmaker to consider in her determination of the final lease sale area. Should the Secretary decide to remove the Significant Sediment Resource Area (SSRA) blocks, the blocks identified by NPS would be removed, as the NPS blocks are among those that may contain SSRAs, with the exception of Block 825. Block 824 is located in State waters and, therefore, BOEM would not offer that block for leasing.
Grant Bixby (Business Alliance for Protecting the Pacific Coast)	10.26.22 Virtual Public Hearing Comments	To address the current Draft EIS, the projected effects of these lease areas are rated in your words "minimal to moderate", but that's until they are severe. And drilling is spilling. We know that spills happen, and when they happen, they're immediate, and they're often catastrophic. And this EIS also analyzes the impact of a single lease, or two leases in this case, but we cannot, and we must not ignore the cumulative effects, and these impacts of offshore oil and gas development.	<p>BOEM used an impact scale in <b>Chapter 4</b> of this Supplemental EIS to define impact levels for each resource as a result of the Proposed Action. The impact definitions are generally detailed in Chapter 4.0.2 of the 2017-2022 GOM Multisale EIS. For example, negligible impacts may or may not cause observable changes to natural conditions; regardless, they do not reduce the integrity of the resource. Specific definitions for each resource are described further in the impact analysis for each resource in Chapter 4 of the 2017-2022 GOM Multisale EIS.</p> <p>BOEM is concerned about the potential impacts of oil spills on the environment. In this Supplemental EIS, OCS oil- and gas-related oil spills are analyzed under "Accidental Events," and other spills (e.g., in State waters or from other sources on the OCS) are analyzed under "Cumulative Impacts" for all relevant resources.</p> <p>In reference to the cumulative analysis in this Supplemental EIS, this Supplemental EIS does not only consider two leases, it considers the potential impacts to two lease sales, under several alternatives. The alternatives are either planning areawide or regionwide. This Supplemental EIS includes analysis of both the incremental impact of a single lease sale and the cumulative impacts of the National OCS Oil and Gas Program, as well as the cumulative impacts of non-OCS oil- and gas-related activities in the Gulf of Mexico. Refer to each resource summary in <b>Chapter 4</b></p>

Commenter	ID Number	Comment	Response
			of this Supplemental EIS for impact analyses. For a full analysis on each resource, refer to Chapter 4 of the 2017-2022 GOM Multisale EIS and a summary in the 2018 GOM Supplemental EIS.
Brady Bradshaw (Center for Biological Diversity)	10.26.22 Virtual Public Hearing Comments	We also see several problems with the Draft EIS, including the area-wide leases described in the Draft EIS are not required by the IRA, and any alternative analyzed by BOEM should include the smallest amount of acreage possible.	<p>The IRA requires the Secretary of the Interior to conduct Lease Sales 259 and 261 in 2023. Due to the level of interest in the IRA and how it relates to OCS oil and gas leasing, we have expanded the discussion of the IRA in <b>Chapter 1.3</b> of this Supplemental EIS.</p> <p>BOEM has been conducting areawide lease sales since 1983 and regionwide lease sales since 2017. In this time, our environmental analyses have not identified justifiable reasons to restrict the lease sale area and believe that our stipulations and mitigations provide adequate environmental protection while at the same time supporting offshore oil and gas industry. As described in the 2017-2022 GOM Multisale EIS, any individual lease sale could be scaled back during the prelease sale process to offer a smaller area should circumstances warrant.</p>
Tessa Grasswitz	BOEM-2022-0048-21770	The self-declared Mission of the Bureau of Ocean Energy Management is to 'manage development of U.S. Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way'. These proposed lease sales act in direct opposition to that mission... This is not acceptable, acting as it does in complete opposition to the Bureau's own stated mission of proceeding 'in an environmentally and economically responsible way'... Hence I urge you to NOT sell-off millions of acres of Gulf leases and to use your authority instead to accelerate the rapid transition to the clean energy future that this country - and the entire world - needs so urgently to avert ever-worsening impacts on our shared environment.	<p>Thank you for your comment. BOEM's mission is guided by the requirements of the OCSLA, as amended (43 U.S.C. §§ 1331 <i>et seq.</i>). The OCSLA states "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, in a manner which is consistent with the maintenance of competition and other national needs" (43 U.S.C. §§ 1332(3)).</p> <p>As described in <b>Chapter 1.1</b> of this Supplemental EIS, the purpose of and need for the proposed Federal action (i.e., a GOM lease sale) is to offer for lease those areas that may contain economically recoverable oil and gas resources in order to further the orderly</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Commenter	ID Number	Comment	Response
			<p>development of OCS oil and gas resources in accordance with the OCSLA.</p> <p>While BOEM does not have any discretion in holding either of these two lease sales, BOEM prepared a draft and final Supplemental EIS to follow its normal leasing process to the fullest extent practicable and to inform the lease sale processes for GOM oil and gas Lease Sales 259 and 261.</p>
API/NOIA	BOEM-2022-0048-28953	<p>As noted above, even prior to its current DSEIS, BOEM has exhaustively studied potential environmental impacts from conducting Leases Sales 259 and 261. Now that the IRA has unquestionably rendered these lease sales non-discretionary, these actions do not warrant further NEPA review. Nevertheless, BOEM now has prepared hundreds of additional pages of NEPA analysis in its current DSEIS, only to ultimately reach the very same sound conclusions as BOEM's prior voluminous NEPA analyses.</p> <p>Moreover, BOEM should not delay action on Lease Sale 261 based on yet more NEPA review. The DSEIS, despite covering both Lease Sales 259 and 261, states (at 1-4) "but the analyses may be supplemented as appropriate prior to GOM Lease Sale 261." BOEM should afford greater certainty to potential bidders than this open-ended statement and should rely on this SEIS and prior NEPA documents when it conducts Lease Sale 261 as well.</p>	<p>Pursuant to the OCSLA staged leasing process, for each lease sale proposed in a National OCS Oil and Gas Program, BOEM makes individual decisions on whether and how to proceed with a proposed lease sale. BOEM prepared a single programmatic EIS to support the 10 proposed GOM lease sales scheduled in the 2017-2022 National OCS Oil and Gas Program. An additional NEPA review (e.g., a Determination of NEPA Adequacy, an environmental assessment [EA] or, if determined necessary, a Supplemental EIS) is conducted prior to the decision on an individual proposed GOM lease sale to address any relevant new information. This Supplemental EIS was prepared to address any relevant significant new information, methodologies, and/or issues since publication of the 2018 GOM Supplemental EIS. It also includes the expanded 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c) and, in accordance with recent Executive Orders, BOEM also provides an analysis of monetized impacts from these estimated GHG emissions.</p>

**TOPIC 3 – ALTERNATIVES**

Topic 3 – Alternatives			
<p>Earthjustice et al.</p>	<p>BOEM-2022-0048-28951</p>	<p>BOEM apparently developed another alternative for this SEIS “to analyze a potential reduction in impacts to the environment,” but eliminated it from consideration based on the faulty assumption that the IRA bars its consideration. Because the IRA does not present such a bar, BOEM should analyze and consider that alternative in the final SEIS.</p> <p>BOEM must consider an alternative that would exclude blocks from leasing in Rice’s whale habitat in De Soto Canyon and the 100–400m isobath in the western and central Gulf. The agency previously rejected an alternative to exclude blocks within the De Soto Canyon area to protect Rice’s whales, on the basis that the species’ “biologically important area” is further to the east and BOEM believed vessel mitigation would sufficiently reduce threats. BOEM states that it “reexamined” previously rejected alternatives during preparation of this SEIS, and found no new information to change its previous conclusions...</p> <p>BOEM should also consider an alternative that reflects the same conflict avoidance considerations BOEM employed when identifying potential wind energy areas (WEAs) in the Gulf. BOEM opted to exclude from wind leasing those blocks that overlapped with data layers including areas of moderate-high shrimp fishing, Rice’s whale habitat, significant sediment resources, menhaden fishing, unexploded ordinances, and others, and created a buffer around other features such as artificial reefs. BOEM should consider a lease sale alternative here that excludes blocks with the same resources. Again, if BOEM is excluding certain areas from</p>	<p>As noted in the Draft Supplemental EIS, Section 50264 of the IRA requires GOM Lease Sales 259 and 261 in 2023. Due to the level of interest in the IRA and how it relates to offshore oil and gas leasing, we have expanded the discussion of the IRA in <b>Chapter 1.3</b> of this Supplemental EIS.</p> <p>BOEM has considered a reasonable range of alternatives in this Supplemental EIS. BOEM considered four action alternatives and the No Action Alternative in this Supplemental EIS. These alternatives considered different geographic areas and range of activities for each area.</p> <p>Please note that this is not a decision document, and no decision has been made as to how the lease sales are to be held. The Secretary of the Interior retains full authority to decide how the lease sales should be conducted and that decision will be documented in the Record of Decision at a later time.</p> <p>BOEM has been conducting areawide lease sales since 1983 and regionwide sales since 2017. In this time, our environmental analyses have not identified justifiable reasons to restrict the lease sale area, and we believe that our stipulations and mitigations provide adequate environmental protection while at the same time supporting the offshore oil and gas industry. As described in the 2017-2022 GOM Multisale EIS, any individual lease sale could be scaled back during the prelease sale process to offer a smaller area should circumstances warrant.</p> <p>BOEM is studying space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>wind leasing due to unacceptable effects or conflicts, it should do the same for oil and gas leasing and not apply a double standard. BOEM should also develop and consider alternatives based on other resource values that reduced lease block suitability for wind leasing...</p> <p>BOEM also should consider alternatives that reduce the scale of impacts from leasing. For example, insofar as BOEM is trying to meet the IRA's 60-million-acre threshold for wind leasing, it should consider alternatives that offer only 60 million acres for sale in either Lease Sale 259 or 261; it is unnecessary to offer 80 million acres or more in either of those sales to meet a wind leasing goal. Similarly, BOEM should consider an alternative that would offer 30- million acres in each sale, because that still meets the IRA's threshold of offering 60 million acres over a one-year period to allow wind leasing.</p> <p>Finally, if BOEM is serious about offshore wind development in the Gulf of Mexico, it should consider an oil and gas leasing alternative that excludes all areas where offshore wind might be developed. This is necessary because BOEM has taken the position that wind leasing cannot occur where oil and gas leases have already been issued.</p>	<p>activities, and OCS significant sediment resources, and has added <b>Chapter 2.3.4</b>, Issues Identified, to the Supplemental EIS to address these issues for the Secretary to consider in her determination of the final lease sale area.</p> <p>In addition, as summarized in <b>Chapter 2.3.2.1</b>, BOEM considered a reduced lease sale alternative for GOM Lease Sales 259 and 261 based on sensitive biological habitat and reduced leasing activity. Such an alternative was eliminated from further consideration because this alternative had no additional benefits over Alternative D and because it would also not meet the IRA's 60 million acre requirement for an offshore oil and gas lease sale necessary to offer an offshore wind lease within the following year. Refer to <b>Chapter 2.3.2.1</b> for more detail on why this alternative was eliminated from detailed analysis.</p> <p>As described in <b>Chapter 2.3.3</b>, BOEM considers the use of mitigation, including measures to reduce vessel strikes and overall avoidance, at all phases of energy development and planning. BOEM 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 core habitat. At this time, critical habitat has not been identified for the Rice's whale. 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.</p>
NRDC et al	BOEM-2022-0048-28948	<p>The purpose of the proposed action is to offer areas of the OCS for lease in accordance with OCSLA, and multiple sections of OCSLA call for BOEM to consider the environment when managing OCS leasing. The statute also calls for BOEM to consider other uses of the OCS. Consequently, the FSEIS must consider alternatives that fulfill the purposes of OCSLA, including through establishment of environmental safeguards, and considering the potential impacts</p>	<p>Finally, it is in BOEM's regulations that oil and gas leases do not preclude other types of energy production</p>

		<p>of oil and gas activities on the environment and other uses in the GOM OCS.</p> <p>BOEM Must Consider an Alternative that Removes Rice’s Whale Habitat from Leasing</p> <p>BOEM Must Consider an Alternative that Uses a Spatial Suitability Model to Determine the Optimal Areas to Offer for Lease</p> <p>BOEM Must Consider an Alternative that Removes Priority Areas for Offshore Wind Development from Leasing</p>	<p>from those same areas; however, BOEM’s renewable energy leases do.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM failed to examine a reasonable range of alternatives. NEPA requires a “detailed statement” of “alternatives to the proposed action.”</p> <p>In the alternatives analysis, the agency must “provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.” The analysis must “rigorously explore and objectively evaluate all reasonable alternatives.” While an agency is not obliged to consider every alternative to every aspect of a proposed action, the agency must “consider such alternatives to the proposed action as may partially or completely meet the proposals goal.”</p> <p>In its DSEIS, BOEM considered only five alternatives, which include: (A) an OCS oil and gas lease sale that would offer nearly all available unleased blocks in the Gulf; (B) an OCS oil and gas lease sale excluding unleased blocks in the Western Planning Area; (C) an OCS oil and gas lease sale excluding unleased blocks in the Central Planning Area/Eastern Planning Area;</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>(D) alternative A, B, or C, excluding the unleased blocks subject to the Topographic Features, Live Bottom (Pinnacle Trend), and Blocks South of Baldwin County, Alabama, Stipulations; (E) the no action alternative, cancellation of a single lease sale.</p> <p>Even if BOEM properly limited its purpose and need statement (which it did not), BOEM unreasonably ruled out alternatives that would restrict oil and gas development under the sale, even if they would have met the “need” of holding lease sales and furthering the development of OCS oil and gas resources. As such, BOEM fails to “rigorously explore” and “objectively evaluate” all reasonable alternatives.</p> <p>BOEM also failed to examine alternatives that would limit development and production activities under the lease sale, such as an alternative that would limit the number of wells that could be drilled or the amount of oil that could be developed. BOEM also failed to consider an alternative that would prohibit the use of particularly dangerous drilling activities such as offshore fracking and acidizing.</p> <p>BOEM also failed to consider an alternative that would prohibit oil and gas activity in key habitat for threatened and endangered species, such as prohibiting lease sales in the region from the Mississippi Canyon to De Soto Canyon which is an important habitat for leatherback sea turtles, particularly near the shelf edge; and prohibiting lease sales in all areas where Rice's whales have been detected.</p> <p>BOEM also failed to consider an alternative that would prohibit oil and gas leasing and activity in</p>	
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Louisiana Mid-Continent Oil & Gas Association	BOEM-2022-0048-28918	<p>Alternative A calls for the greatest acreage possible to be offered in Lease Sales 259 and 261. This includes all areas of the western, central and eastern planning areas that are legally available for leasing. The Inflation Reduction Act calls for at least 60 million acres to be offered for leasing and we believe the proposed action will achieve that goal. As outlined in the draft analysis, Alternative A will also yield the greatest volume of domestic energy production.</p>	<p>Thank you for your comment. BOEM has selected Alternative D as the Preferred Alternative for this Final Supplemental EIS. The Preferred Alternative consists of Alternative A, with the Topographic Features Stipulation Blocks, the Live Bottom (Pinnacle Trend) Stipulation Blocks, and the Blocks South of Baldwin County, Alabama, Stipulation Blocks excluded from leasing.</p> <p>A slight reduction in production is possible with Alternative D; however, we assume leasing activity would be redistributed to the available blocks and will fall within the forecasted activity range presented for Alternative A in <b>Table 3-1</b> of this Supplemental EIS.</p>
Chevron	BOEM-2022-0048-27400	<p>Chevron urges BOEM to conduct Sales 259 and 261 as they were originally proposed and consistent with Alternative A in the Draft SEIS, which includes offering all available unleased acreage not subject to Congressional moratorium or otherwise unavailable in the combined Western, Central, and Eastern GOM Planning Areas.</p>	<p>BOEM will comply with all statutory and regulatory requirements, including, but not limited to, the IRA, in conducting an OCS oil and gas lease sale, such as Lease Sales 259 and 261.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>Additionally, any BOEM changes to the scope of the sales would circumvent Congress's intent by transforming the lease sales Congress ratified. An agency may only make a substantial change if the change is "in character with the original scheme" and "a logical outgrowth" from the previous action. See <i>Nat. Res. Def. Council, Inc. v. EPA</i>, 824 F.2d 1258, 1283 (1st Cir. 1987). If BOEM changed the Lease Sales after Congress's express command to proceed, its action would fail both of these standards.</p> <p>Beyond conflicting with the IRA, any material changes to these lease sales would be arbitrary and capricious. The Administrative Procedures Act ("APA") demands that "the agency decision itself must be reasonable and reasonably explained." (<i>ANR Storage Co. v. FERC</i>, 904 F.3d 1020, 1024 (D.C. Cir. 2018)). Accordingly, it must "articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made." <i>Susquehanna Int'l Grp., LLP v. SEC</i>, 866 F.3d 442, 445 (D.C. Cir. 2017). If an agency "offer[s] an explanation for its decision that runs counter to the evidence before [it]," the agency's rule is "arbitrary and capricious." (<i>Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.</i>, 463 U.S. 29, 43 (1983)).</p> <p>Further, when an agency "chang[es] its course," it "must supply a reasoned analysis." (<i>Lone Mountain Processing, Inc. v. Sec'y of Labor</i>, 709 F.3d 1161, 1164 (D.C. Cir. 2013)). It also must "be cognizant that longstanding policies may have engendered serious reliance interests that must be taken into account." (<i>Encino Motorcars, LLC v. Navarro</i>, 579 U.S. 211, 222 (2016)). Implementing one of Interior's proposed alternatives that narrows the scope of the lease sales would clearly qualify as</p>	
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		<p>"chang[ing] course." See Lone Mountain, 709 F.3d at 1164. Accordingly, Interior must supply "reasoned analysis," see id., while considering how its proposed changes would affect industry, see Encino Motocars, 597 U.S. at 222.</p> <p>Any attempt by BOEM to materially alter or diminish Lease Sale 259 or 261 would fall short of these obligations.</p>	
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### Stated Preference for Alternative E

Stated Preference for Alternative E			
John Weber	BOEM-2022-0048-0003	I am against any new oil and gas lease sales for the Gulf of Mexico. My reasoning includes that the peer review science shows that climate change is a clear and present threat and that it is caused by the burning of fossil fuels. To combat the worst effects of the climate crisis we must stop the burning of fossil fuels as soon as possible. New oil and gas lease sales are the opposite of what the peer review science tells us to do.	Thank you for your comment. We note that your preferred alternative is Alternative E. Comments that express general opinions about oil and gas development or recommend specific decisions to be made by the Secretary of the Interior will be incorporated into the administrative record and available to the decisionmaker during the deliberative process for Lease Sales 259 and 261. BOEM does not provide specific responses to such comments in this document.
Leo Scheibelhut	BOEM-2022-0048-0002	I strongly oppose granting, auctioning, or releasing and further Oil and Gas Leases in the Gulf of Mexico. Past oil spill disasters in the Gulf of Mexico prove that petroleum companies are not good stewards of America's natural resources. Furthermore, as citizens of the world, we need to immediately and permanently quickly reduce fossil fuel use to reduce global warming. Given the oncoming dangers of climate change, only selfish idiots put short-term profits over the future of humanity.	The Secretary of the Interior oversees the National OCS Oil and Gas Program and is required to balance orderly resource development with protection of the human, marine, and coastal environments while simultaneously ensuring that the public receives an equitable return for these resources and that free-market competition is maintained. It is usually the Secretary of the Interior's decision whether, or not, to proceed with a lease sale; however, IRA requires BOEM to hold Lease Sale 259 by the end of March 2023 and Lease Sale 261 by the end of September 2023. Only Congressional action would allow for the choice of the No Action Alternative at this time; however, the No Action Alternative is provided for analysis purposes and to comply with regulations
Form Letter 1	BOEM-2022-0048-0422	I am writing to you today to express my opposition to Gulf-wide leasing in the oil and gas lease sales 259 and 261.	
Scott Eustis (Healthy Gulf)	10.24.22 Virtual Public	Thank you very much. My name is Scott Eustis, commenting on behalf of Healthy Gulf. You know, I'm someone born and raised in New Orleans,	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

	Hearing Comments	Louisiana, the grandson of, you know, someone who drilled offshore. My grandfather was 72 when the safety regulations kicked them off the rigs. He was not happy about that and you know, obviously, I think you know oil and gas plays a big role in my being here to comment. But that's why I must stand here and comment and object to this lease sale. Especially the way it's been done as precluding a future for those of us to continue, who want to continue to live in coastal Louisiana and across the Gulf Coast. I'll submit written comments for the record of particularly tracing the flow of oil and gas, spatial and temporal analysis, environmental justice, because Louisiana published environmental justice.	implementing NEPA. While BOEM or the Secretary has no discretion on whether to hold these lease sales, BOEM has prepared this Supplemental EIS to follow its normal leasing process to the fullest extent possible and to inform the lease sale processes for GOM oil and gas Lease Sales 259 and 261. Due to the level of interest in the IRA and how it relates to OCS oil and gas leasing, we have expanded the discussion of the IRA in <b>Chapter 1.3</b> of this Supplemental EIS.  BOEM's announcement on the first GOM lease sale, i.e., GOM lease Sale 259, will be made following completion of this analysis and will be disclosed in the Record of Decision following publication of this Final Supplemental EIS. BOEM's announcement on GOM Lease Sale 261 will be made in the normal course and may be based on additional NEPA review that may update this Supplemental EIS, as appropriate. Although BOEM has no discretion on whether to hold Lease Sales 259 and 261, the Secretary of the Interior can choose the alternative, and the information in this Supplemental EIS, as well as input from the public, will be weighed in that decision.  The need for the Proposed Action is to develop OCS resources in accordance with the OCSLA), as amended (43 U.S.C. §§ 1331 <i>et seq.</i> ). The Secretary of the Interior 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 GOM Lease Sale 259 was included in the 2017-2022 OCS Oil and Gas Leasing Proposed Final Program as approved by the Secretary of the Interior on January 17, 2017. Based on this, alternatives or comments regarding possible use of renewable energy
Morgan Huetter (Turtle Island Restoration Network)	10.26.22 Virtual Public Hearing Comments	I am here today to oppose lease sales 259 and 261... The number of active leases alone is already outrageous, and we should not be approving more new leases... I ask for no new leases.	
Alexcia Best (Oceana)	10.26.22 Virtual Public Hearing Comments	Oceana has more than 1.2 million supporters in the United States, and we're committed to ending new leasing for dirty and dangerous offshore drilling... Despite the risk to Gulf lives and livelihoods, BOEM continues to treat the Gulf community as a sacrifice zone contrary to the principles set out in the Outer Continental Shelf Lands Act. Gulf frontline communities should not bear the brunt of the risk offshore drilling poses, their health and economic vitality. The Gulf must never be seen as a sacrifice zone. For these, and many additional reasons, I oppose lease sales 259 and 261 and urge BOEM to adopt the no leasing alternative.	
Lilah W. Sanders	BOEM-2022-0048-0043	Release leases	
Pete Stauffer (Ocean Protection Manager,	10.26.22 Virtual Public Hearing Comments	Surfrider's align with frontline communities in expressing our adamant opposition to new oil and gas leasing in U.S. waters. This includes our opposition to proposed lease sales in the Gulf of Mexico and Alaska in the next 5-year OCS drilling	

Surfrider Foundation)		<p>plan. This also includes our opposition to lease sales 259 and 261 in the Gulf of Mexico... Instead of approving new oil and gas leases, we should be investing in justly sourced renewable energy. Surfrider's proud to stand with local communities, groups and native nations in the Gulf of Mexico and Alaska, and we urge BOEM and the Biden Administration to listen to the voice of the public by ending new offshore drilling in U.S. waters. Thank you again for the opportunity to comment.</p>	<p>in lieu of oil and gas did not meet the purpose and need and were not considered further.</p> <p>In reference to market forces on oil and gas leases, if oil and gas were not produced from Lease Sales 259 and 261, market forces dictate this energy would be procured from other sources to meet energy demands (<b>Table 4-1</b> of this Supplemental EIS). BOEM has been conducting areawide lease sales since 1983 and nationwide lease sales since 2017. In this time, our environmental analyses have not identified justifiable environmental reasons to restrict the lease sale area and believe that our stipulations and mitigations provide adequate environmental protection while at the same time supporting offshore oil and gas industry. As described in the 2017-2022 GOM Multisale EIS, any individual lease sale could be scaled back during the prelease sale process to offer a smaller area should circumstances warrant.</p>
Hunter Miller (Senior Florida Field Representative , Oceana)	10.26.22 Virtual Public Hearing Comments	<p>First, we oppose lease sales 259 and 261... We're urging President Biden to uphold his campaign pledge and offer no new leases in his 5-year plan.... Offering millions of additional acres in the Gulf to oil and gas leasing and drilling poses an unacceptable risk to our communities, our health, and our climate from negative health impacts, from toxic air, pollution to catastrophic oil spills like the BP disaster, to fueling extreme weather events, expanded offshore drilling in the Gulf is a misguided venture. As a sixth generation Floridian, I can tell you that my family and I have a deep connection to this place in our way of life. This way a life is connected to the land, rivers, bays, and oceans along with the life that it supports... The many communities hit hardest have been on the record, opposing expanded offshore drilling. Cities of Naples, Sanibel, Fort Myers Beach, Punta Gorda, Collier Count, all have passed resolutions opposing expanded drilling. They fully recognize that Florida's clean coast economy and a stable climate far outweigh the purported benefits to expanded drilling.</p>	<p>BOEM has considered the long-term environmental impacts of OCS oil-and gas-related activities as a result of a single lease sale and on-going lease sale activity in the Gulf of Mexico OCS. In <b>Chapter 3</b>, BOEM analyzes impact-producing factors and potential effects at scales appropriate to the Proposed Action and resources considered. In reference to the comment that oil and gas industries could severely harm the environment, BOEM has identified various ways that potential impacts could be reduced in developing this Supplemental EIS. These potential mitigating measures are identified and analyzed in <b>Chapter 2.3.3</b> of this Supplemental EIS. BOEM also considered all relevant and reasonable mitigating measures identified in public comments on the Draft Supplemental EIS. Based on the requirements in applicable laws and regulations, mitigation can be implemented through binding and enforceable measures known as lease stipulations. Decisions on whether to adopt specific</p>
Chris Phelan	10.26.22 Virtual Public Hearing Comments	<p>And so I'm going to urge BOEM to not let these leases go, to let no more leasing in the Gulf of Mexico... So I urge BOEM to not release any new leases in the Gulf of Mexico. But if you're going to, then you need to let it loose. Let the entire Gulf, because you're putting too much on one</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		community when you pick and you choose, so either open it all up or not. But you should not open any of it up. President Biden should honor his commitment to our communities and follow through with his Presidential executive orders on climate and on its strategic complications to DOD.	mitigating measures will be made in the Record of Decision. BOEM may require additional mitigation as part of the environmental review and approval of proposed plans.
Brady Bradshaw (Center for Biological Diversity)	10.26.22 Virtual Public Hearing Comments	First, we stand with Gulf frontline communities opposing these lease sales that, once again, sacrifice the Gulf for the profits of the fossil fuel industry... we oppose all new lease sales outright and reject the premise that any new leasing is in the national interest. We therefore expect Interior and BOEM to intervene as strongly as possible to counteract the impact of any mandated leasing... Once again, we stand with Gulf communities demanding that BOEM finalize a 5-year plan with no new leases, and we urge the Department of Interior to use all of its power to quickly phase out production on new and existing leases, prohibit fracking, and plan for a just transition to clean energy.	<p>Potential impacts of the Proposed Action on environmental, social, cultural, and economic resources are analyzed in <b>Chapter 4</b> of this Supplemental EIS. BOEM strives to use best practices and best available information during review and analysis of environmental impacts. Where appropriate, BOEM recognizes assumptions, uncertainties, and limitations of data used. BOEM has determined that the analysis in this Supplemental EIS is adequate and appropriate for evaluation and associated determination of effects.</p> <p>In reference to the Rice's whale, BOEM has employed the best available information regarding existing or baseline conditions and potential impacts to the Rice's whale in the GOM and has added new information, when possible, to thoroughly consider the possible effects and to determine the likelihood of adverse impacts to the Rice's whale. In addition, the effects of climate change are included in the cumulative analysis for marine mammals in Chapter 4.9.1 of the 2017-2022 GOM Multisale EIS and incorporated by reference in this Supplemental EIS.</p> <p>In reference to fish and invertebrate resources, direct, indirect, and cumulative impacts from routine activities (i.e., anthropogenic sound, bottom-disturbance, and habitat modification) and accidental events (e.g., reasonably foreseeable oil spills) associated with the proposed Lease Sales 259 and 261 are discussed in Chapter 4.7 of the 2017-2022 GOM Multisale EIS and <b>Chapter 4.8</b> of this Supplemental EIS. BOEM analyzed the Proposed Action and a full range of</p>
Kelsey Lamp (Protect Our Oceans Campaign Director, Environment America)	10.26.22 Virtual Public Hearing Comments	I'm here today to oppose lease sales 259 and 261 and urge you to include no new leases in the 2023 to 2028 National Oil and Gas Leasing Program, because even when we avoid catastrophic oil spills, offshore drilling takes a toll on our coastal ecosystems and communities... Our oceans and our coastal communities deserve a sustainable future, and for that reason I urge you to prioritize the health of Gulf ecosystems and communities, and issue no new leasing in our oceans.	
Claudia Steiner (The Rachel Carson Council)	10.26.22 Virtual Public Hearing Comments	I'm here in solidarity with frontline Gulf of Mexico communities urging BOEM to include no new leases or a no action recommendation in the 2023 to 2028 National Outer Continental Shelf Oil and Gas Leasing Program... I oppose lease sales 259 and 261 and all oil and gas lease sales in the 2023 to 2028 plan.	

Zainab Mirza (Center for American Progress)	10.26.22 Virtual Public Hearing Comments	Minimizing leasing is in line with the Administration's priorities to protect environmental justice communities, turbocharge clean energy development, and create safe good-paying jobs. Lease sales 259 and 261 directly stand in the way of that... I hope the Department of Interior and the Bureau of Ocean Energy Management will not consider moving with lease forward with lease sales 259 and 261 and instead prioritize people over profit.	alternatives for potential effects on commercial fisheries, recreational fisheries, and recreational resources in <b>Chapters 4.11, 4.12, and 4.13</b> , respectively.  In reference to social impacts and environmental justice issues, BOEM has analyzed the impacts of an OCS oil and gas lease sale on them in <b>Chapter 4.15.3</b> , as well as in Chapter 4.14.3 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.
Luke Metzger (Executive Director, Environment Texas)	10.26.22 Virtual Public Hearing Comments	I'm here to oppose lease sales 259 and 261, and support a 5-year plan with no new leases... I oppose these lease sales, and I urge you to include no new leases in the final 5-year plan.	In reference to storms and hurricanes, impacts of coastal storms, hurricanes, sea-level rise, and subsidence are addressed in the cumulative portion of the land use/coastal infrastructure chapter ( <b>Chapter 4.15.1</b> , as well as Chapter 4.14.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS), the social factors chapter ( <b>Chapter 4.15.3</b> , as well as Chapter 4.14.3 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS), and <b>Chapter 3.4.2</b> , as well as Chapter 3.3.2 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, based on existing peer-reviewed research. An environmental justice determination can be found in <b>Chapter 4.15.3.2</b> of this Supplemental EIS, as well as Chapter 4.14.3.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.
Ian Giancarlo (Environment Florida)	10.26.22 Virtual Public Hearing Comments	I am here to oppose these lease sales and to urge you to include no new leases in the 2023 to 2028 National Oil and Gas Leasing Program... We need to usher in the beginning of the end of offshore drilling in our oceans so we may have a sustainable future. One that has clean beaches free from oil, clean air free from smog, and a thriving global environment free from fossil fuels. I urge you to make that future possible and schedule no new leasing in our oceans.	In reference to climate change, BOEM analyzes and considers many facets of the potential effects of climate change in its decisionmaking with respect to oil and gas leasing, whether in the National OCS Oil and Gas Program or lease sale analyses. This Supplemental EIS tiers from the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, which tiers from the 2017-2022 National OCS Oil and Gas Program EIS. It incorporates by reference a summary of the
Dorothy Peña (Indigenous Peoples of the Coastal Bend)	10.26.22 Virtual Public Hearing Comments	We oppose these lease sales and urge you to include no new leases in the 2023 through 2028 National Oil and Gas Leasing Program... We want to see a just transition away from oil and gas and a system which centers the rights and health of the workers. We need green energy and offshore wind turbines... And the Gulf of Mexico should not be for sale.	
Brandon Larrabee	BOEM-2022-0048-0018	How many more Katrinas, Harveys, and Idas are we going to have before we start doing something meaningful to combat climate change. How many Oceans do we need to see literally on fire? Stop issuing gas and oil leases.	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Form Letter 2	BOEM-2022-0048-0035	<p>I am writing to encourage the BOEM to choose No New Leases for offshore oil and gas drilling in the Gulf of Mexico. If this is not an option, then I am expecting the BOEM to leverage all its power to choose the smallest area and least number of sites (in other words, the least invasive option) available for lease sales in the Gulf of Mexico. I understand that the Inflation Reduction Act requires the BOEM to hold these lease sales; however, the Draft Supplemental Environmental Impact Statement (SEIS) has flaws that need to be addressed prior to allowing for any sales... Finally, the SEIS itself points to problems in allowing for new leases in the Gulf of Mexico. Language in the report describes the potential for “catastrophic” oil spills, “unavoidable impacts” to climate change and air and water quality, and “irreversible loss” of habitats and protected species. As the world continues to warm, habitats continue to be destroyed, and people’s health continues to be harmed, we need less fossil fuel production – not more of it. Therefore, the best option for everyone and everything is no new leases. If this is not possible, then the least worst option is choosing the bare minimum of allowances for new leases, with smaller areas and less sites. Frontline residents are asking the BOEM to protect their communities and their health, so please listen to what they have to say and do everything within your entity’s power to do this. Thank you.</p>	<p>greenhouse gas and downstream emissions information that may result from a Gulf of Mexico oil and gas lease sale discussed in Chapter 4.0 of the 2017-2022 GOM Multisale EIS. That analysis has been updated in 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c), which is incorporated by reference.</p> <p>In reference to cumulative impacts of OCS oil and gas leasing, this Supplemental EIS includes analysis of both the incremental impact of a single lease sale and the cumulative impacts of the National OCS Oil and Gas Program, as well as the cumulative impacts of non-OCS oil- and gas-related activities in the Gulf of Mexico. Refer to each resource summary in <b>Chapter 4</b> of this Supplemental EIS for impact analyses. For a full analysis on each resource, refer to Chapter 4 of the 2017-2022 GOM Multisale EIS from which this Supplemental EIS tiers. Cumulative analyses are included in order to put the incremental contribution of a Proposed Action in context considering all of the other types of activities (past, present, and reasonably foreseeable) that have the potential to cause impacts similar to those analyzed for a Proposed Action, including impacts from the overall OCS Program.</p> <p>In reference to catastrophic oil spills, BOEM has analyzed a low-probability catastrophic event (BOEM 2021d) 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.</p>
The Climate Reality Project	BOEM-2022-0048-25262	<p>I am writing to urge the Bureau of Ocean Energy Management (BOEM) to minimize offshore drilling damage in the Gulf of Mexico by choosing the smallest area and least number of sites available for lease sales....Finally, the SEIS itself points to problems in allowing for new leases in the Gulf of Mexico. Language in the report describes the potential for “catastrophic” oil spills, “unavoidable impacts” to climate change and air and water</p>	<p>In reference to the “Unavoidable Adverse Impacts of the Proposed Action” (<b>Chapter 4.16</b>) and “Irreversible and Irretrievable Commitment of Resources” (<b>Chapter 4.17</b>), BOEM must inform the public and the</p>

		quality, and “irreversible loss” of habitats and protected species.	decisionmaker about these impacts so that they may be weighed in the final decision on the lease sale.
Dallas-Ft. Worth Chapter of the Climate Reality Project	BOEM-2022-0048-28541	The Dallas-Ft. Worth Chapter of the Climate Reality Project opposes all proposed new leases in the Gulf of Mexico. The repercussions for climate change would be severe, as every new lease sale for oil and gas drilling continues to accelerate down a path of increased warming and climate disaster. We additionally stand with frontline communities who are tired of their health being sacrificed, and ask the BOEM to do everything within its power to choose No New Leases. We recognize that this is complicated by the terms imposed by the Inflation Reduction Act, but understand the BOEM still has the ability to make some decisions, including the size of the areas proposed for leasing, etc. Therefore, we encourage the BOEM to listen to what frontline communities are asking and pursue the plan of No New Leases.	In reference to the 2023-2028 National OCS Oil and Gas Program, BOEM is currently working expeditiously to finalize the next National OCS Oil and Gas Leasing Program. The 90-day public comment period on the Proposed Program and associated Draft Programmatic EIS ended on October 6, 2022, and BOEM is currently conducting the next phase of analysis. After consideration of all comments received, as well as BOEM's analysis, the Secretary will decide which areas to include in the Proposed Final Program. Once the Proposed Final Program and Final Programmatic EIS are submitted to Congress and the President, a 60-day presidential and Congressional waiting period is observed. Afterward, the Secretary may then approve the Final Program and issue the decision memo and Record of Decision. Just because a potential lease sale is listed in an approved National OCS Oil and Gas Program does not indicate that it will be held, as more decision points remain before each individual lease sale is held.
David Esopi	BOEM-2022-0048-0282	Booooo to new oil/gas leasing in the Gulf of Mexico! The Gulf should be for partying, not fossil fuel poison.	
James Freedman	BOEM-2022-0048-9500	I lived on Pensacola Beach in Florida from 2004 until 2020. I lived through the hell of oil and tar washing up on my beach (along with the birds and fish that were killed). I went months without being able to be outside much due to the stench in the air and the harmful air quality. I watched people in hazmat suits scraping up the contaminated sand. I watched the totally inadequate compensation go to special interests in the area with none going to a homeowner like me.  I've watched the ocean levels rise and went through 2 beach renourishments. I lost my house to Hurricane Ivan, watched Katrina with horror, and sat on top of our limited dunes as Ike pushed by to Texas (and got soaked when Ike pushed waves over the top of the dunes).	Under BOEM's renewable energy regulations at 30 CFR § 585.231, an applicant may request a commercial or limited renewable energy lease. BOEM considers unsolicited requests for a lease on a case-by-case basis. The Energy Policy Act of 2005 requires that BOEM issue leases and grants on a competitive basis, unless it determines that there is no competitive interest in the proposed lease or grant. When only one developer has indicated interest in developing a given site, BOEM may issue a lease or grant noncompetitively.

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>We do not need to sell more leases in the Gulf of Mexico, the oil companies are just adding leases to their reserves. There are well over a thousand leases that have not been developed. They know they will never get around to developing all these leases, they are just padding their assets to justify a high stock price as the world moves forward and fossil fuels become a decreasing piece of our energy usage.</p>	
Michael Sauber	BOEM-2022-0048-11087	I say no to Oil and Gas lease sales 259 and 261	
Judith Stone	BOEM-2022-0048-12214	I am writing to you today to express my opposition to Gulf-wide leasing in the oil and gas lease sales 259 and 261. We do not need more fossil fuels, and we do need to protect life on earth.	
John Commerford	BOEM-2022-0048-4807	The brass tacks reality is this: Fossil fuel assets have to be stranded. This has been true for decades, and the Federal government must stop pandering to the public on gas prices. Leaders have to make tough calls. Even with Russia, China, and a resurgent fascistic impulse in various countries, AGW is the greatest threat to society. Please perform a full analysis of environmental effects of further FF leasing in the Gulf. Then refuse to issue leases based on the towering threat that is anthropogenic global warming.	
Edward L. Simpson	BOEM-2022-0048-12514	<p>We oppose more oil and gas leases 259 and 261. At a time when everyone with a brain the in the world knows global warming is here, destruction of natural habitats is on going, why more leases? No protections are here. BOEM has the obligation to make those decisions based on a full evaluation of the environmental effects that leasing will cause – including climate pollution, oil spills, and harms to the critically endangered Rice's whale. Oil companies have nearly 1900 leases for TEN MILLION ACRES in the Gulf of Mexico! TEN</p>	

		MILLION! The voters want less oil and gas drilling. The voters want more sustainable CLEAN energy... Please do not sell off millions of acres of Gulf leases. Make more headway with clean energy.	
Karen Nagy	BOEM-2022-0048-13497	I am writing to you today to express my opposition to Gulf-wide leasing in the oil and gas lease sales 259 and 261. These leases only exacerbate our dependence on oil and gas... Protect these public waters. Do not approve the sale of these leases.	
Leda Beth Gray	BOEM-2022-0048-6486	I am strongly opposed to the oil and gas lease sales 259 and 261 in the Gulf of Mexico. There is nothing the Inflation Reduction Act that requires leasing everything in the entire Western and Central Gulf. The Interior Department has the power to determine the size, locations, and conditions for offshore leasing sales and even whether or not to issue a lease. The Bureau of Ocean Energy Management must make those decisions based on a full evaluation of the environmental effects that leasing will cause – including climate pollution, oil spills, and harms to sensitive species including the critically endangered Rice's whale.	
Cameron Stempel	BOEM-2022-0048-11092	Since off-shore oil can be exported, these leases do nothing to benefit me and only put me at risk here in Florida. These lease sales go against what Biden promised on climate change. These leases are not part of the clean energy future that my generation and future generations need. BOEM please stand up for us and block these leases.	
Bruce Hlodnicki	BOEM-2022-0048-9483	I OPPOSE any and all additional leasing in the Gulf of Mexico. That includes opposing the oil and gas lease sales 259 and 261. The Inflation Reduction Act does NOT require the Biden administration to lease the entire Western and Central Gulf. Nor does it mandate any particular results from those sales. And BOEM has the duty to make those decisions based on the environmental damage the	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		leasing will do. This damage assessment must include the heating of our planet with megatons of climate pollution, toxic oil spills, and killing off the critically endangered Rice's whales as well as other marine residents of the Gulf of Mexico.	
Frances Walker	BOEM-2022-0048-9049	Please do not continue the egregious practice of selling our public waters to the fossil fuel industry. The Gulf is saturated with leases covering 10 million acres. The Gulf and shore areas, wildlife, and communities have already suffered consequential harm. It must stop now.	
Stephen Bailey	BOEM-2022-0048-0915	SO DEEP HORIZON WAS N O T A LESSON TO YOU??? YOU OBVIOUSLY DON'T LIVE ON THE GULF COAST! E N O U G H !!! S T O P T H E P O I S O N S !!! S T O P K I L L I N G O U R W O R L D !!! E C O C I D E !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!	
Sarah McKee	BOEM-2022-0048-0971	I oppose Gulf-wide leasing in the oil and gas lease sales 259 and 261. This is because I want my grandchildren - and everyone's grandchildren - to have a planet that still supports human life.	
Mary Shesgreen	BOEM-2022-0048-1300	I am horrified that any more leases for oil and gas are even being considered. The climate crisis is happening now, causing massive loss of homes in Pakistan and other countries along with massive human suffering, destruction and death. We should have stopped all exploration for oil and gas ten years ago. Also, the communities of the Gulf of Mexico have suffered way too much. Stop any more oil and gas leases anywhere.	
William Schreier	BOEM-2022-0048-1942	I realize we still need fossil fuels and oil; however, we don't need to destroy our oceans finding it Big Oil always spills and does nothing after it happens. If we pollute and destroy our ocean our planet will not survive. Think about that as you move forward on this issue. Searching for oil is fine but do it on the continents not in the oceans.	
Joseph Edes	BOEM-2022-0048-16512	By sliding the map of the Western and Central Planning Areas to the north, thus overlaying the	

		<p>adjacent US coastal states, the scope of the affected area is clear. The area available for lease is 84 to 94 million acres. Only California, Texas, and Alaska are larger than this in land area.</p> <p>I advocate Alternative E cancellation of the lease sale would guarantee avoidance of harms.</p>	
Jean Naples	BOEM-2022-0048-11778	<p>I am writing as a survivor of Superstorm Sandy, who has witnessed the massive destruction due to the ever worsening climate change disaster crisis and only use renewable energy to power everything in my apartment. As we are all aware, our country and the world are facing an existential climate crisis and we, all must move quickly to convert our infrastructure to support low-carbon energy. It is crucial to understand that this clean energy transition cannot be supported by the continuation of dirty fossil fuel drilling and mining.</p>	
Maggie Frazier	BOEM-2022-0048-1198	<p>I absolutely oppose these lease sales in the Gulf...  If indeed we are to turn away from fossil fuels - this is not the way to do it! I realize there are many downsides to our alternative energy sources but the time &amp; money would be better spent investigating and researching ways to change in an intelligent manner rather than compounding our past extractive mistakes.  I OPPOSE these lease sales!</p>	
Cheryl Gross	BOEM-2022-0048-1647	<p>New leasing would encourage fossil fuel use for decades, slowing the vital transition to a sustainable energy economy.  We neither need nor want new leases that benefit the industry at the expense of the planet. Rather than inflict more damage on our wildlife, aquatic food sources, communities, and climate, I urge you to use your authority to accelerate the transition from fossil fuels to a clean energy future.</p>	
Frederick Klein	BOEM-2022-0048-8406	<p>Leaks, spills, pollution, environmental degradation, threats to wildlife and our ecosystem accompany</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		the process of drilling for fossil fuel. You know transition to renewable sources is necessary and has begun. These leases are nothing more than a delaying tactic by oil and gas companies in order to continue to profit for as long as possible.	
I Alexakos	BOEM-2022-0048-13991	My family is strongly opposed to Gulf-wide leasing in the oil & gas lease sales 259 and 261. It is utterly insane to continue on the fossil fuel path given the climate crisis our planet faces. Global warming is a crisis! Our country, indeed the world, needs clean energy! Rapidly. Stop selling Gulf leases.	
Sue Hayden	BOEM-2022-0048-14256	Far more important is the fact that we are killing our planet and killing ourselves with the continued use of fossil fuels... We can no longer afford fossil fuels and have cleaner, cheaper alternatives... Don't sell off millions of acres of Gulf leases. Use your authority and ample discretion to instead accelerate the rapid transition to the clean energy future we all need.	
Debra Dunson	BOEM-2022-0048-14418	<p>I am a scientist, and I concur the findings of my fellow scientists indicating the need for immediate reductions in greenhouse gas emissions to mitigate climate change.</p> <p>I am writing to let you know that I am adamantly opposed to these proposed lease sales. The Gulf communities and environment have already been severely damaged by fossil fuel extraction in the Gulf... The remaining untapped areas consist of 7.4 million leased acres (or 75% of current lease holdings) that are currently held in reserve until such time as our nation runs low on fossil fuel energy resources. With all this reserve, it makes no sense to offer additional lease sales in the Gulf...</p>	
Sharon Burke	BOEM-2022-0048-20584	I am writing to oppose the oil and gas lease sales 259 and 261 in the Gulf of Mexico. Every decision you make at this point should be made in the framework of global warming caused by fossil fuels. We have little time left to meet our climate	

		<p>goals and approving new fossil projects is going in the wrong direction. Even without considering climate change, offshore drilling should be banned. The Deep Horizon disaster should have been a wakeup call on how damaging these kinds of projects can be. The Gulf of Mexico and its important coastal communities deserve to be protected. Marine life in the Gulf of Mexico, including endangered species, deserves to be protected. What we don't deserve is toxic pollution from petrochemical plants, oil spills, dead fish and other wildlife, human illnesses and a future of climate chaos.</p>	
Elizabeth Sexton	BOEM-2022-0048-20859	<p>I oppose Gulf-wide leasing in the oil and gas lease sales 259 and 261. The Interior Department has been tasked with determining the conditions for oil and gas leases. Since millions of acres are already lease by oil companies the question becomes why is more needed? This is especially important since the BOEM has the obligation to make these lease decisions based on a full evaluation of the environmental effects that leasing will cause . It is clear this has not been done!!!!</p> <p>This decision is clearly not in alignment with our country's goals for climate change and environmental protection. Additionally, this wide scale leasing is also not in alignment with a clean energy future. Please stop this sale.</p>	
Jeremy Ehrlich	BOEM-2022-0048-21170	<p>Climate change and environmental protection are the major issue of our time, and perhaps of all human history. It is up to every decision-maker to make wise decisions to provide a future for human life on this planet. I am strongly opposed to lease sales 259 and 261 and hope you will become part of the climate change solution by denying these.</p>	
Shannon Faye	BOEM-2022-0048-21248	<p>I am writing to you today to express my opposition to Gulf-wide leasing in the oil and gas lease sales 259 and 261. Not only do I live right on the Gulf of Mexico, but my community and all the</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		others like it are dependent more on the value of the seafood and tourism industries than oil and gas. Oil and gas only puts everything we live by and for at risk.	
Shannon Faye	BOEM-2022-0048-26647	I live right on the Gulf of Mexico and am strongly opposed to the oil and gas lease sales 259 and 261. As the rest of the world pushes toward more sustainable energy, and as most Americans express a desire to at least keep up with that, locking in these superfluous leases only cripples our nation's efforts toward a more secure energy future.	
Kathleen Gonzalez	BOEM-2022-0048-21369	I encourage you to consider rejecting Gulf lease sales 259 and 261. The Biden administration has committed to creating a more sustainable future. Considering that the current leases provide more than enough oil production to meet demands, there is no reason to open up more leases. Instead, we should be protecting our coasts and oceans in every way we can. You can be a leader to inspire others to make this choice if they see that they can follow your lead. Besides, wouldn't you rather be remembered for helping to protect the endangered Rice's whale? You can encourage more sustainable energy practices. Please choose well!	
Friends of the Earth	BOEM-2022-0048-28862	Attached, please find the signatures of 19,850 Friends of the Earth supporters. Dear Secretary of the Interior Haaland, I'm writing to ask that you cancel all remaining offshore sales, including Lease Sales 259 and 261, pursuant to the Inflation Reduction Act (IRA)... I look forward to seeing you take action that truly combats the long and fraught history of domestic environmental racism by canceling all sales and living up to Biden's promise of no more drilling. Please do the right thing and prioritize Gulf communities over fossil fuel industry profits. Thank you for considering my opinion	

Earthjustice et al.	BOEM-2022-0048-28951	<p>Our organizations and members believe it is imperative to minimize further oil and gas leasing and development in the Gulf of Mexico to protect the wellbeing of Gulf Coast communities and abide by our nation's climate commitments. Gulf communities in particular have been burdened with immense environmental, health, and social harms from Outer Continental Shelf (OCS) development for decades. Expansive federal OCS leasing is also wholly incompatible with any reasonable attempt to address the climate crisis and would be directly counter to meeting our climate goals...</p> <p>We appreciate this opportunity to comment on BOEM's draft SEIS and urge the agency to adopt a minimal-leasing option that adequately considers and accounts for the significant harm that OCS leasing has on the Gulf's communities and environment, as well as perform the necessary analyses to correct the omissions and deficiencies described above.</p>	
NRDC et al.	BOEM-2022-0048-28948	<p>Alternative E, cancellation of Lease Sale 259 and/or 261, is the environmentally preferable alternative for the proposed action. Lease sale cancellation would avoid the serious risks and impacts of increased offshore oil and gas development described in these comments and in the DSEIS. Further, as demonstrated below, cancelling Lease Sales 259 and/or 261 would have negligible impacts on oil production, jobs, and consumers.</p> <p>While the Inflation Reduction Act directs BOEM hold Lease Sales 259 and 261 in 2023, the agency retains discretion to alter the parameters of those lease sales. If BOEM chooses to proceed with leasing, the agency should limit the areas offered for lease in order to minimize environmental effects and conflicts with optimal areas for renewable</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		energy development of the OCS. We therefore urge BOEM to select a preferred alternative that offers a minimal area for lease, including by excluding Rice's whale habitat.	
Leslie Edwards	BOEM-2022-0048-9181	There is already plenty of drilling in the Gulf. It's difficult to buy this oil. If the US is going to develop our resources, then we need to stop importing oil from other countries and exporting domestic oil. It's ridiculous. The Biden Administration pledged to be on the side of the people, not Big Oil. This is far too much in favor of the petroleum industry and not to benefit this country. Our nation's national resources should be used judiciously, as they are irreplaceable. These resources should benefit the nation's human citizens, not corporations. As it stands, that isn't happening. You can help change that practice... Locking in new leases at this time is unnecessary and short term thinking. The US needs to use our natural resources to benefit this nation. Domestic oil needs to be used to stop our dependence on foreign oil. I have been trying to buy US oil, and only one firm, Speedway (which purchased Hess) offers domestic oil. The rest is mostly imported- some from Russia even, which is a terrible policy.	
Lawrence Rosin	BOEM-2022-0048-10178	Don't lease the Gulf of Mexico to the oil and gas industries. They may end up using it in ways that have drastic effects to the environment. With things such as the Keystone Pipeline. They have also wanted to drill in the Arctic. Who's to say they wouldn't do something similar if given access to the Gulf of Mexico? People who care so little about the environment shouldn't be given rights they could end up using in ways that severely harming the environment.	
Rona Fried	BOEM-2022-0048-20318	I strongly oppose more oil and gas leasing sales in the Gulf of Mexico (sales 259 and 261) FOR OBVIOUS REASONS. The question is not why I oppose this, but why are you doing it when it is so	

		<p>crystal clear WRONG? Under the Inflation Reduction Act (IRA), there is no requirement to lease the entire Western and Central Gulf!!!! And it doesn't require any specific results from those sales. Through the IRA and Outer Continental Shelf Lands Act, Congress empowers Interior to decide WHETHER to conduct lease sales and on the size, location, and conditions of such a sale. Further, BOEM must make such decisions based on a full environmental impact analysis that includes potential harms associated with leasing: greenhouse gas emissions, oil spills, and harms to wildlife. It is SICKENING that at this stage in the Climate Emergency that BOEM would even consider large scale fossil sales!! Additionally, fossil companies already have 1900 leases in the Gulf, covering over 10 million acres!! About 500 of those are currently producing. Leasing all the rest of the Gulf won't have any effect on current or near-term energy needs because as you know, it takes about 19 years to produce oil from a new lease. This will HOPEFULLY be long after the US ends its addiction to oil. It's time for you to turn your attention to encouraging renewable energy and stop this insanity of endlessly supporting and propping up some the richest and most destructive corporations in the world. Use your authority to do the right thing, RIGHT NOW.</p>	
Center for Biological Diversity Form Letter	BOEM-2022-0048-28832	<p>The Biden administration has two years left in its current term to deliver on its promises of securing a livable climate and a living planet. I urge you to do everything in your power to ratchet down offshore drilling. Regrettably, the Inflation Reduction Act requires millions of acres of U.S. waters to be available for dirty and dangerous drilling, specifically offshore lease sales 259 and 261 in the Gulf of Mexico and sale 258 in Alaska. But there's still plenty this administration can do to protect the climate and wildlife. The Department of the</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>Interior has the legal authority to set the terms of these leases. It should do the following: 1. Require any production under the leases to cease by 2035. 2. Prohibit the use of fracking under the leases. 3. Exclude from leasing availability all areas where Rice's whales and Cook Inlet belugas are known to occur. The world's scientists have warned that global warming will exceed 1.5 degrees Celsius without immediate, deep reductions in carbon dioxide and other greenhouse gas emissions. Fossil fuel production must fall to zero as quickly as possible to avoid the catastrophic global impacts of the climate crisis. We've seen far too many massive oil spills, climate catastrophes and extinctions. The losses sustained to wildlife and our climate are already unbearable. We need to protect the ocean's biodiversity from more oil spills by phasing out offshore drilling starting today.</p>	
<p>Don Lipmanson</p>	<p>BOEM-2022-0048-27869</p>	<p>Now that very rapid and radical climate change has become undeniable, I write to strongly oppose oil and gas lease sales 259 and 261. Congress, through the Inflation Reduction Act and the Outer Continental Shelf Lands Act, designated DOI as responsible for 1) deciding whether to grant offshore oil leases; and 2) determining size, location and conditions for offshore leasing sales. BOEM has an obligation to make all those decisions based on full and unbiased evaluation of the environmental effects that leasing predictably will cause that cannot be adequately mitigated. Please do not further jeopardize plunging populations among wild birds, amphibians and undomesticated mammals by granting oil leases that inevitably end in spills and megatons of carbon production. BOEM did more than enough large-scale lease sales under the Trump administration. Enough already. Produce electricity though wind farms. Bad lease decisions made today would lock</p>	

		<p>the country into production that have no effect on current or even mid-term energy needs given how new leases typically take years to produce any oil. By then, demand for fossil fuel will have slumped thanks to market demand for renewable solar and wind power. Granting new leases today and going forward would be bad economics and bad environmental ethics.</p>	
Coralie Pryde	BOEM-2022-0048-28949	<p>I am writing to oppose additional lease sales in the Gulf of Mexico. Oil and gas companies are already leasing more than 10 million acres in the Gulf. Only a fourth of those acres are currently under development. There is clearly no current need to increase the area leased to oil/gas exploration and development and BOEHM is under no obligation to allow more leases... These leases are also fundamentally incompatible with the Biden administration's commitments to fight climate change. Leasing now locks in investments in fossil fuels for decades to come, long after the time when the United States and the world must transition to a clean energy economy if we are to avoid the worst impacts of climate change. I urge you not to sell off millions of acres of Gulf leases. Use your authority to accelerate the rapid transition to the clean energy future that Gulf residents – and the rest of us—are so anxiously awaiting.</p>	
Angelle Bradford	BOEM-2022-0048-28965	<p>Hello, my name is Angelle Bradford and I oppose Lease Sales 259 and 261 and support a five-year plan with no new leases.</p> <p>I oppose these lease sales because much of the justification around offshore drilling and expansion thereof hinges on the concept that gas prices will be lowered. This is a lie. Oil and gas companies have been allowed to rake in record profits without much oversight or accountability. The storms are worse than ever; the climate more unpredictable than ever before. This is unnecessary. The Trump administration said in its 2018-2023 Draft Proposed</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>Program that production from any new leases would not occur for a decade or more and new leasing “cannot provide resources to quickly mitigate the effects of a national energy emergency, such as a large portion of the world’s oil supply being taken offline.” If this is the case, we need to be regarding what makes sense at this crucial, existential moment... Finally, Oceana’s analysis found that permanently protecting all federal waters from new offshore drilling could prevent more than 19 billion tons of greenhouse gas emissions — nearly three times the total annual emissions of the U.S. This would be equivalent to taking every car in the nation off the road for 15 years. Please say no to these leases and to new leases, period. Please say no to these leases and to new leases, period.</p>	
Cindy Gaver	Center for Biological Diversity Form Letter Comments	<p>Boozhoo and Greetings from Gichigamiwininiwag, I would like to voice my support for the non-renewal of all current off-shore gas and oil drilling releases and my support for winding down and end of any and all potential new off-shore gas and oil drilling leases. We are in dangerous waters now with drought, deforestation, ocean acidification, and climate-change driven disasters, as well as with the toxification and plastification of our land and waters. If we are to survive, we must scale down and back and pivot to a more sustainable approach and way, one that is more reverent of the biome we call home and one that leaves a better legacy that landfills, 'forever chemicals,' and dead or dying ecosystems. Miigwech for your time and consideration of my note.</p>	
Mara Duncan	BOEM-2022-0048-17286	<p>BOEM's obligation is to look at the long term environmental effects that leasing will cause, including the effects on other countries. I am opposed to Gulf-wide leasing in the oil and gas lease sales 259 and 261. We the people are not stupid. We understand this is about profit, not</p>	<p>Thank you for your comment. As a result of stakeholder input, BOEM considered the discontinuation of lease sales for the Gulf of Mexico OCS in the 2017-2022 National OCS Oil and Gas Program EIS, which is incorporated by reference into this Supplemental EIS. The alternative to stop issuing</p>

		<p>about the Inflation Reduction Act...There is ..." no need for BOEM to continue with the large-scale lease sales we saw for four years under the Trump administration." You have claimed you will fight climate change. Here is a huge opportunity to do so. Anything less than discontinuing massive leases and sales is criminal and should be considered in the category of a war crime against the planet. It is time to phase-out of fossil fuel from the nation's energy portfolio. Do not sell off millions of acres of Gulf leases. Take this opportunity to shore up your legacy for generations to come.</p>	<p>leases in the Gulf of Mexico is in <b>Chapter 2.4</b>, "Reduced Proposed Action (Alternative C)," and <b>Chapter 2.5</b>, "No Action (Alternative D)". These alternatives evaluated the environmental effects of having reduced areas of leasing or no new lease sales during the 2017-2022 National OCS Oil and Gas Program. The impacts of these alternatives are discussed in Chapter 4.4.3.4, "C(4): Exclusion of the Gulf of Mexico Program Area," and Chapter 4.4.4, "Alternative D – The No Action Alternative," of the 2017-2022 National OCS Oil and Gas Program EIS.</p> <p>While halting future lease sales, there would not be an immediate cessation of oil-and-gas activity. Active leases from previous lease sales would still be allowed to continue exploration and development of oil-and gas resources for the length of the awarded lease. BOEM does anticipate a decline in activity as leases reach the end of their lifespan.</p>
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**Stated Preference for Alternatives A-D**

Stated Preference for Alternatives A-D			
API/NOIA	BOEM-2022-0048-28953	<p>Further, the Associations urge BOEM to promptly proceed to hold Gulf of Mexico Region-wide Lease Sales 259 and 261 as directed by Congress, which is reflected in Alternative A in the DSEIS and BOEM's recently released Proposed Notice of Sale for Lease Sale 259. BOEM has undertaken multiple NEPA reviews encompassing the areas included in these lease sales, comprising thousands of pages over several years, all of which support the safe and responsible leasing and development of OCS energy sources subject to existing robust environmental safeguards. In light of those extensive prior efforts, and because the DSEIS repeatedly (e.g., at 1-3) admits that "BOEM has no discretion on whether to hold these sales," additional NEPA review is unnecessary. In any event, as the DSEIS confirms, no available new</p>	<p>Thank you for your comment. We note that your preferred alternative is one of the action alternatives. Comments that express general opinions about oil and gas development or recommend specific decisions to be made by the Secretary of the Interior will be incorporated into the administrative record and available to the decisionmaker during the deliberative process for Lease Sales 259 and 261. BOEM does not provide specific responses to such comments in this document.</p> <p>The Secretary of the Interior oversees the National OCS Oil and Gas Program and is required to balance orderly resource development with protection of the human, marine, and coastal environments while simultaneously ensuring that the public receives an</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>information alters BOEM's prior findings or otherwise reveals new significant impacts from these two lease sales. Thus, it would be both arbitrary and inconsistent with the IRA to exclude any of the Western, Central, or Eastern Planning Areas otherwise available for leasing in a Gulf of Mexico Region-wide sale.</p> <p>Though the DSEIS presents a reasonable range of alternatives for purposes of NEPA review, only Alternative A satisfies the mandates of the IRA and is supported by the record. The Associations commend BOEM for issuing the Lease Sale 259 Proposed Notice of Sale on a "Region-wide" basis. 87 Fed. Reg. at 64,246. The Final Notice of Sale for Lease Sale 259 should retain this same approach, as should Lease Sale 261.</p>	<p>equitable return for these resources and that free-market competition is maintained. The decision on the alternative chosen for each lease sale is under the authority of the Assistant Secretary for Land and Minerals Management and will be disclosed in the Record of Decision following publication of this Supplemental EIS.</p> <p>BOEM has selected Alternative D as the Preferred Alternative for this Supplemental EIS. The Preferred Alternative consists of Alternative A, with the Topographic Features Stipulation Blocks, the Live Bottom (Pinnacle Trend) Stipulation Blocks, and the Blocks South of Baldwin County, Alabama, Stipulation Blocks excluded from leasing.</p> <p>BOEM will comply with all statutory and regulatory requirements, including, but not limited to, the Inflation Reduction Act of 2022, in conducting Lease Sales 259 and 261.</p> <p>In reference to the International Energy Agency, McKinsey Energy Insights, and Stanford University data on emissions, BOEM's analysis in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c) includes similar findings. Section 2.2 of the 2022 Gulf of Mexico GHG Analysis Addendum provides a description and comparison of BOEM's greenhouse gas intensities and those estimated by Rystad.</p>
Beacon Offshore Energy	BOEM-2022-0048-28916	<p>Beacon appreciates your agency's efforts to identify potential environmental impacts of oil and gas leasing, exploration, development, and production in the Gulf of Mexico. Further, Beacon understands and supports EIS use in assisting agency officials in making informed decisions regarding the approval of exploration, development, and production operations and future lease administration. Beacon supports the comments jointly provided for consideration by the American Petroleum Institute (API), National Ocean Industries Association (NOIA), and other trade organizations. Beacon is a member company of the above-referenced organizations, is aware of the joint trade organization comments prepared to support EIS preparation and future planned lease sales, and will not reiterate those comments here.</p>	
Louisiana Mid-Continent Oil & Gas Association	BOEM-2022-0048-28918	<p>As Louisiana's longest standing trade association, that exclusively represents all aspects of the oil and gas industry, not only in the Pelican State but also throughout the Gulf Region, we strongly support the proposed action, Alternative A, in the</p>	

		<p>DSEIS and urge you to hold Lease Sale 259 and 261 as expeditiously as possible. Implementing Lease Sale 259 and 261 and offering the greatest acreage possible, as proposed in Alternative A, would indeed benefit all facets of our membership, the entire Gulf Coast region, and, importantly, help the Biden Administration meet both environmental goals and energy demand while reducing energy prices for consumers... Meanwhile, global energy demand continues to rise, especially in the wake of the crisis in Ukraine, and these energy needs are met with foreign oil that is produced under less stringent environmental rules and higher in carbon intensity by composition. We were pleased to see Lease Sales 259 and 261 mandated in the Inflation Reduction Act of 2022. Oil and gas lease sales must resume as soon as possible in the Gulf of Mexico... Lease Sale 259 and Lease Sale 261 are critically important to ensuring our energy supply and our workforce here in Louisiana remain stable as our state and our country undergo this important energy transition. LMOGA supports the comment letter from the American Petroleum Institute ("API") dated November 21, 2022, submitted to the federal docket in support of Alternative A of the DSEIS for Lease Sales 259 and 261 and as such, hereby incorporates by reference the API recommendations into these comments. As specifically noticed in the API letter, only Alternative A satisfies the mandates of the IRA and is supported by the record...</p>	
Alex Schisel	BOEM-2022-0048-0037	I support continued offshore leasing.	
Barry Abbott	BOEM-2022-0048-0047	I support lease sales 259 and 261. We need energy security.	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Ping Wang	BOEM-2022-0048-0038	I support more GOM lease sales. Industry operations in the Gulf of Mexico release less than half of the emissions per barrel compared with other major basins globally, according to data from the International Energy Agency, McKinsey Energy Insights, and Stanford University.	
Curtis Rueter	BOEM-2022-0048-0041	I am writing to support continued offshore leasing, specifically in support of the Gulf of Mexico lease sales 259 and 261 and in asking that the associated Supplemental Environmental Impact Statement allows the sales to move forward. Oil & gas industry operations in the Gulf of Mexico release less than half of the emissions per barrel compared with other major basins globally, according to data from the International Energy Agency, McKinsey Energy Insights, and Stanford University. Operators in the Gulf of Mexico also adhere to strict environmental and safety rules. Shifting away from Gulf of Mexico oil and gas production not only sacrifices jobs, federal revenue, and affordable, reliable, domestically produced energy, but it would also allow for more carbon-intensive operations around the world to fill the gap in supply. This is why it's critical that we enable Gulf of Mexico production during the energy transition.	
Don Shelton	BOEM-2022-0048-0040	I encourage offshore leasing. Sales 259 and 260	
Hank Tomlinson	BOEM-2022-0048-0045	I fully support Gulf of Mexico (GOM) Lease Sales 259 and 261. Keep the energy flowing for the USA!	
Lindsey Wilcox-Fillingim (Wilcox Oil Co, Inc)	BOEM-2022-0048-0042	I support Gulf of Mexico Lease Sales 259 and 261 Supplemental Environmental Impact for continued offshore leasing.	
Tom Bondurant	BOEM-2022-0048-0039	Drill baby drill!	

Katrina Soundy	BOEM-2022-0048-0046	<p>I am support of continued leasing in the Gulf of Mexico. I think the Lease Sales 259 and 261 in this coming year need to occur to help keep gas prices low, and continue to allow us to have energy independence. Additionally, oil produced from the Gulf of Mexico has one of the smallest GHG footprints in the world. It is more environmentally friendly to use oil produced from Gulf of Mexico than from other fields with poorer environmental regulation. I think it is an incredibly short-sighted decision to try and cut domestic production when we still have energy reliance on fossil fuels. It makes us vulnerable to political instability (see Russia and Ukraine destabilizing Europe) in addition to causing us to lose control over the integrity in how our resources are produced. I am completely AGAINST the mindset of forcing other countries to produce our resources for us - out of sight, out of mind and ignoring the environmental impact of that decision just because it's not in our backyard.</p>	
Laura Gamboa	BOEM-2022-0048-12675	<p>I support and request your action to help with continued offshore leasing and ensure that my voice is heard by Department of the Interior on this important issue. Industry operations in the Gulf of Mexico release less than half of the emissions per barrel compared with other major basins globally, according to data from the International Energy Agency, McKinsey Energy Insights, and Stanford University. Operators in the Gulf of Mexico also adhere to strict environmental and safety rules.</p> <p>Shifting away from Gulf of Mexico oil and gas production not only sacrifices jobs, federal revenue, and affordable, reliable, domestically produced energy, but it would also allow for more carbon-intensive operations around the world to fill the gap in supply. This is why it's critical that we</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		enable Gulf of Mexico production during the energy transition.	
T Day	BOEM-2022-0048-23486	I am writing to you today to express my SUPPORT to Gulf-wide leasing in the oil and gas lease sales 259 and 261. If this administration truly cared for the country they would regain working on our shut down pipelines! And allow Alaska to crank up production!... I leave you with this, the earth makes these fossil fuels, they continue being made if we stop depressurization of earth wouldn't it at some point combust. Everything we use, wear, drive, watch, power up, ALL use fossil fuels! Cutting USA production ONLY harms AMERICANS while fueling our Enemy giving them power they are unable to control!	
Jeffery Thompson	Center for Biological Diversity Form Letter Comments	The Biden administration has two years left in its current term to reverse course on its disastrous policy against the use of fossil fuels, which are essential for a modern economy and will remain so for the foreseeable future. Fortunately, the Inflation Reduction Act requires millions of acres of U.S. waters to be available for drilling, specifically offshore lease sales 259 and 261 in the Gulf of Mexico and sale 258 in Alaska. The Department of the Interior has the legal authority to set the terms of these leases. It should do the following: 1. Ensure any production under the leases is permitted for the foreseeable future. 2. Permit the use of fracking under the leases. The world's scientists acknowledge that carbon dioxide is essential for plants to live, and the earth is currently at an historically low level of this essential gas. Fossil fuel production must continue in order to support our technology and avoid rationing and loss of quality of life, as Europe will experience this winter from their foolish self-imposed over-reliance on wind and solar power generation. We need to EXPAND offshore drilling starting today.	

Ian Hall	Center for Biological Diversity Form Letter Comments	Drill baby drill! We need diversity in our energy sources.	
T Day	BOEM-2022-0048-23486	In order to save our country we must regain our energy independence! Become world leaders again and refill our reserves of fossil fuels as well as our military and its armory's! We must be able to defend our Nation at all times! Empty out our defenses does not seem like a good strategic movement, feels more like retreating and that is simply UnAmerican.	

**TOPIC 4 – ENVIRONMENTAL ISSUES AND CONCERNS**

**Climate Change**

Topic 4 – Environmental Issues and Concerns			
Climate Change			
Center for Biological Diversity	BOEM-2022-0048-28954	<p>The vast majority of all CO2 pollution—86 percent—in the U.S. and globally comes from oil, gas, and coal. The science is clear that limiting global temperature rise to 1.5°C ... requires governments to immediately halt approval of all new fossil fuel production and infrastructure and rapidly phase out existing fossil fuel production and infrastructure in many developed fields and mines. The committed carbon emissions from existing fossil fuel infrastructure in the energy and industrial sectors exceed the carbon budget for limiting warming to 1.5°C, meaning that no new fossil infrastructure can be built and much existing infrastructure must be retired early to avoid catastrophic climate harms.</p> <p>BOEM must consider and disclose how proposing massive amounts of new oil and gas leasing will inevitably contribute to consuming the remaining</p>	<p>We acknowledged recent IPCC AR6 findings on climate change as discussed in <b>Chapter 4.0.2.1</b> of this Supplemental EIS and Chapter 4.2.1 of the 2017-2022 National OCS Oil and Gas Program EIS. Furthermore, Chapter 3 of the 2017-2022 GOM Multisale EIS discusses coastal environments and hurricanes among other related topics.</p> <p>This Supplemental EIS tiers from the 2017-2022 National OCS Oil and Gas Program EIS and has included a summary of the greenhouse gas and downstream emissions information that may result from a Gulf of Mexico oil and gas lease sale in <b>Chapter 4.1</b>. That summary references the full analysis contained in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c). Chapter 2.4 of that addendum presents BOEM's estimates of the incremental impacts to the carbon budget from leasing analyzed in this Supplemental EIS.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		carbon budget for the United States and is fundamentally inconsistent with the national need to stem the climate emergency, the extinction crisis, and environmental injustice.	BOEM routinely updates the agency's analysis on climate change and expects to continue to do so as relevant scientific information becomes available.
Center for Biological Diversity	BOEM-2022-0048-28954	<p>Second, BOEM omits any meaningful analysis of how the climate change impacts flowing from development of the lease sales will impact wildlife and fisheries species. The fossil fuels extracted from the OCS under these leases, the fossil fuels required for exploration and development activities, and fossil fuels required for transport of extracted fuels all will contribute to the climate crisis. The escalating climate crisis, in turn, will make oil and gas development activities themselves more risky for the marine environment. As the National Academies of Science, Engineering, and Medicine explain,</p> <p>"The potential for future spillage related to storm damage of offshore structures, pipelines, and coastal facilities, particularly in light of increased intensity and frequency of severe storms and hurricanes related to climate change, represents a considerable risk of future oil inputs into the marine environment."</p> <p>Yet in the DSEIS BOEM repeatedly suggests that "shifting baseline conditions related to climate change" are somehow unrelated to oil and gas development, stating that they are a "[n]on-OCS oil and gas-related activit[y]." This confused, contorted attempt to rationalize the omission of climate change analysis from the DSEIS renders the agency's analysis incomplete and improper.</p>	<p>If oil and gas were not produced from Lease Sales 259 and 261, market forces dictate this energy would be procured from other sources to meet energy demands (<b>Table 4-1</b> of this Supplemental EIS).</p> <p>Climate change is discussed in <b>Chapter 4.0.2.1</b> of this Supplemental EIS and Chapter 4.2.1 of the 2017-2022 National OCS Oil and Gas Program EIS. Furthermore, Chapter 3 of the 2017-2022 GOM Multisale EIS discusses coastal environments and hurricanes among other related topics. The potential impacts of climate change to Gulf of Mexico wildlife and fisheries species are discussed in relevant sections of <b>Chapter 4</b> of the Supplemental EIS and Chapter 4 of the 2017-2022 GOM Multisale EIS. These analyses cannot make attributions to the source(s) of climate change nor parse out the specific impacts attributable domestic vs foreign fossil fuel production and consumption. To do so is out of scope of this Supplemental EIS. However, while these emissions, by themselves, would not produce a noticeable impact on climate, BOEM acknowledges within the analysis that they are part of a larger pattern of anthropogenic GHG emissions that changes the climate. And BOEM further acknowledges that this new lease sale will contribute to it.</p> <p>Oil spills are discussed in <b>Chapter 3.3.1</b> of this Supplemental EIS as well as in Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference.</p>
Form Letter 1	BOEM-2022-0048-0422	Moreover, massive area-wide lease sales are fundamentally incompatible with the Biden administration's commitments to fight climate change. Decisions we make now about additional leases have no effect on current or even near-term	Per Section 18 of the OCSLA, BOEM is required to develop a schedule of oil and gas lease sales on the OCS for 5-year periods. Moreover, the IRA requires the Secretary of the Interior to conduct Lease Sales 259 and 261 in 2023; thus, the OCSLA and IRA

		<p>energy needs because new leases typically take a decade to produce any oil. And because of the long-term nature of oil and gas development, leasing now locks in investments in fossil fuels for decades to come, long after the time when the United States and the world must transition to a clean energy economy if we are to avoid the more catastrophic impacts of climate change.</p> <p>Finally, continuing with massive leases sales increases the already dire harm to Gulf wildlife – like the 50 remaining critically endangered Rice’s whale – and to Gulf communities, which have disproportionately borne the brunt of the country’s fossil fuel addiction for far too long. Locking in new leases means locking in continued harm for decades to come and will only slow the needed rapid phase-out of fossil fuel from the nation’s energy portfolio.</p> <p>I urge you to not sell off millions of acres of Gulf leases and to use your authority and ample discretion to instead accelerate the rapid transition to the clean energy future the country needs!</p>	<p>drive the purpose and require the Secretary of the Interior to propose an action. The need is to meet national energy needs as articulated by the OCSLA and discussed in the sources of energy consumption in the United States presented in the 2017-2022 GOM Multisale EIS and 2017-2022 National OCS Oil and Gas Program EIS. The Proposed Action is a single GOM oil and gas lease sale. This Supplemental EIS is expected to be used to inform the decisionmaker on impacts from a representative lease sale, mitigations, and other action alternatives.</p> <p>If oil and gas were not produced from the proposed lease sale, market forces dictate that most of this forgone energy would likely be procured from other sources to meet energy demand (refer to Table 3 of the GOM GHG Analysis Addendum;BOEM 2022c).</p> <p>Further, in the short term, BOEM anticipates continued oil and gas leasing because of the passage of the IRA and its requirement that, as conditions for issuing any “lease for offshore wind development,” the Department hold “an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development” and “the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres” (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.</p> <p>In reference to the Rice’s whale, BOEM has employed the best available information regarding existing or baseline conditions and potential impacts to the Rice’s whale in the GOM and has added new information, when possible, to thoroughly consider the possible</p>
<p>Pete Stauffer (Ocean Protection Manager, Surfrider Foundation)</p>	<p>10.26.22 Virtual Public Hearing Comments</p>	<p>Finally, new leases would contribute additional carbon emissions to our atmosphere and exacerbate climate change.</p>	
<p>Leda Beth Gray</p>	<p>BOEM-2022-0048-6486</p>	<p>BOEM should not continue with large-scale lease sales. Climate change should be the biggest concern right now-- and preventing it from getting worse the number one effort across the whole federal government. Current leases are meeting the current demand for offshore oil and gas.</p> <p>Large scale lease sales are fundamentally incompatible with the Biden administration’s</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>commitments to fight climate change. New leases usually take on the order of a decade to produce any oil, so you would be locking in investments in fossil fuels for decades to come, long after the time when the United States and the world must transition to a clean energy economy if we are to avoid the more catastrophic impacts of climate change. This is crazy!... We have got to transition to other types of energy for future generations and the planet. I cannot emphasize too much the distress I am feeling at the prospect of these leases going ahead. Please do not sell off millions of acres of Gulf leases! And please do everything in your power to accelerate the country's transition to the clean energy. The nation is depending on you to do the right thing and invest in our future, not destroy it.</p>	<p>effects and to determine the likelihood of adverse impacts to the Rice's whale. In addition, the effects of climate change are included in the cumulative analysis for marine mammals in Chapter 4.9.1 of the 2017-2022 GOM Multisale EIS and incorporated by reference in this Supplemental EIS.</p> <p>In reference to GOM communities, environmental justice communities in the region are supported by several interconnected resources, including Land Use and Coastal Infrastructure (<b>Chapter 4.15.1</b>), Economic Factors (<b>Chapter 4.15.2</b>), Social Factors (<b>Chapter 4.15.3</b>), Commercial Fisheries (<b>Chapter 4.11</b>), Recreational Fishing (<b>Chapter 4.12</b>), and Recreational Resources (<b>Chapter 4.13</b>). Cumulative impacts to these resources are discussed in the 2017-2022 GOM Multisale EIS and incorporated by reference in this Supplemental EIS, and could translate into impacts in environmental justice communities through changes in economic opportunities, population, health, and community character and identity.</p> <p>In reference to carbon emissions, these are discussed in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c).</p> <p>In reference to clean energy, BOEM also has a Renewable Energy Program that facilitates the responsible development of renewable energy resources on the OCS as noted in <b>Chapter 4.0.2.1</b> of this Supplemental EIS. In that way the agency is transitioning to clean energy in the Gulf of Mexico. In addition, the IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore</p>
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			[oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres” (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.
Hunter Miller (Senior Florida Field Representative, Oceana)	10.26.22 Virtual Public Hearing Comments	When I think about the future of my daughter, and the opportunities for her to raise a family here, it's difficult not to consider the challenges that climate change will present to her should she want to continue to call Florida home. Sea level rise, uninsurable housing, and coastal cities shifting, or collapsing fisheries, and major and more frequent hurricanes are just a few examples of what's in store for her, particularly as we consider expanding the very thing that's making this phenomenon worse: fossil fuel extraction in the Gulf of Mexico. As you know, late last month Hurricane Ian wreaked havoc on our State. This powerful storm took the lives of over 120 Floridians. It destroyed communities, displaced thousands, and has left families and neighbors in financial ruin. It's estimated that the financial losses from floods and storm surges have amounted to well over \$67 billion, an unimaginable figure. What links this story to these proposed leases is not only the correlation between the continued extraction of burning fossil fuels and extreme weather events like Hurricane Ian...	Storms, hurricanes, and sea-level rise, and impacts of coastal storms, hurricanes, sea-level rise, and subsidence are addressed in the cumulative portion of the land use/coastal infrastructure chapter ( <b>Chapter 4.15.1</b> , as well as Chapters 4.14.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS), the social factors chapter ( <b>Chapter 4.15.3</b> , as well as Chapters 4.14.3 of the 2017-2022 GOM Multisale EIS and the 2018 GOM Supplemental EIS), and <b>Chapter 3.4.2</b> , as well as Chapter 3.3.2 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, based on existing peer-reviewed research. An environmental justice determination can be found in <b>Chapter 4.15.3.2</b> , as well as Chapter 4.14.3.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.
Richard Van Aken	BOEM-2022-0048-1016	Time is short just look at the number of extreme disasters occurring annually and those now ongoing for decades such as the western drought. If you want to see more of the same from fires, tornadoes, hurricanes, droughts to biodiversity loss then by all means support the insanity of expanding fossil fuel development the primary reason the planet's in big trouble.	Climate change is discussed in <b>Chapter 4.0.2.1</b> of this Supplemental EIS and Chapter 4.2.1 of the 2017-2022 National OCS Oil and Gas Program EIS. Furthermore, Chapter 3 of the 2017-2022 GOM Multisale EIS discusses coastal environments and hurricanes among other related topics.

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Susan ORourke	BOEM-2022-0048-15192	Living in Florida the past 42-43 years I've seen the changes and felt the destruction through our worsening hurricanes and the sheer devastation much of this climate related. Other states have their disasters costing billions, losing homes and schools and lives.	<p>The severity of storms and their impacts on states bordering the Gulf of Mexico is evident; however, connecting such impacts to climate change is out of scope for this Supplemental EIS.</p> <p>Oil spills are discussed in Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS. Furthermore, information on oil spills is summarized and updated in <b>Chapter 3.3.1</b> of this Supplemental EIS.</p> <p>On October 20, 2022, BOEM sent a consistency determination (CD) for Gulf of Mexico Lease Sale 259 to the appropriate Florida Coastal Management Program (CMP). Pursuant to the Coastal Zone Management Act (CZMA), BOEM performs a consistency review and prepares a CD for each coastal State along the Gulf of Mexico with a federally approved CMP prior to each lease sale. The CZMA requires 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 CMP (15 CFR part 930 subpart C). More information on how BOEM prepares CDs and how State CMPs review CDs submitted by BOEM is described in <b>Chapter 5.2</b> of this Supplemental EIS.</p> <p>We acknowledged recent IPCC AR6 findings on climate change as discussed in <b>Chapter 4.0.2.1</b> of this Supplemental EIS and Chapter 4.2.1 of the 2017-2022 National OCS Oil and Gas Program EIS. Furthermore, Chapter 3 of the 2017-2022 GOM Multisale EIS discusses coastal environments and hurricanes among other related topics.</p>
Elizabeth Ann Dowds	BOEM-2022-0048-23217	Hurricanes that are severe and make land in Florida has greatly increased. The shoreline on the west coast of Florida has changed due to Ian, and the east coast of Florida has the same issues, most recently St. Augustine, FL from the most recent Hurricane Nicole... Fossil fuels need to be left in the past in order to fight a Climate change disaster.	
Martha Cottle	BOEM-2022-0048-2295	Climate change, which is largely due to Big Oil's disinformation campaign & greed, makes all fossil fuel extraction in the gulf more problematic than ever. The hurricanes that often target the gulf do more damage, due to the warmer waters. This makes these extraction sites are more likely to be damaged, and cause more oil spills.	
Stacey Eichner	BOEM-2022-0048-22849	Of course the impact of harvesting, refining, transporting, oil cannot be overlooked particularly when it comes to climate change/global warming. From catastrophic hurricanes pummeling coastal regions, wildfires consuming millions of acres & threatening our ancient Sequoia trees, flash-floods, to food & water shortages across the globe	

			BOEM routinely updates the agency's analysis on climate change and expects to continue to do so as relevant scientific information becomes available.
Michael Sauber	BOEM-2022-0048-11087	History does have a way of repeating itself and to lease even more sales of oil and gas rigs in the Gulf is playing Russian Roulette with the fishing and tourism industries, not to mention the emissions from the burning (and leaks) of these fuels contributing to climate disasters which could actually affect the rigs themselves.	BOEM acknowledges the impacts of climate change to the OCS, including oil and gas infrastructure, as well as impacts onshore and elsewhere throughout this Supplemental EIS. In addition, BOEM analyzed the Proposed Action and a full range of alternatives for potential effects on commercial fisheries, recreational fisheries, and recreational resources in <b>Chapters 4.11, 4.12, and 4.13</b> , respectively.
Christina Ciano	BOEM-2022-0048-10733	Our climate and our communities cannot afford more oil and gas drilling in our waters. This is not the direction that our nation should be heading when people around the world are suffering the destructive effects of climate change.	Thank you for your comment. BOEM also has a Renewable Energy Program that facilitates the responsible development of renewable energy resources on the OCS as noted in <b>Chapter 4.0.2.1</b> of this Supplemental EIS. In that way the agency is transitioning to clean energy in the Gulf of Mexico. In addition, the IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres" (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.
Debra Dunson	BOEM-2022-0048-14418	<p>Furthermore, the climate devastation caused by burning fossil fuels sourced from the Gulf is harmful to all of us.</p> <p>The Biden administration has proclaimed specific climate goals. Offering additional offshore leasing would violate and undermine these goals. Fighting climate change must be the primary objective of our government leadership, despite partisan affiliation. If our federal government allows more industrial investments in fossil fuels, it is sealing our climate doom in the interests of corporate greed. The United States and the world must transition to a clean energy economy if we are to avoid the further catastrophic impacts of climate change. It is time steer our industrial giants to utilize current science, engineering, and technology to build and operate infrastructure for generating clean, renewable energy. The profits that can be obtained from the change from a polluting business to a beneficial one would be immense. Not only would the economy benefit, but humankind would</p>	<p>Climate change is discussed in <b>Chapter 4.0.2.1</b> of this Supplemental EIS and Chapter 4.2.1 of the 2017-2022 National OCS Oil and Gas Program EIS. Furthermore, Chapter 3 of the 2017-2022 GOM Multisale EIS discusses coastal environments and hurricanes among other related topics.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>avoid catastrophic weather events, extinctions, crop failures and environmental collapse.</p> <p>Furthermore, if reserves are tapped in the future, the fossil fuels generated will further endanger our climate by increasing greenhouse gas emissions.</p>	<p>If oil and gas were not produced from Lease Sales 259 and 261, market forces dictate this energy would be procured from other sources to meet energy demands (<b>Table 4-1</b> of this Supplemental EIS).</p>
Ronald Parry	BOEM-2022-0048-15073	<p>Climate change is an existential threat to global civilization. Scientific data on climate change indicates that we must keep the average global temperature rise due to climate change at 1.5 degrees or less if we expect to avoid the most serious consequences of climate alteration. If we cross the 1.5 degree line, we increase the likelihood that the world will cross one or more dangerous, climate change tipping points. Thus far, the US and the world have not taken the aggressive actions needed to ensure that we don't cross the 1.5 degree mark. In order to remain below 1.5 degrees, fossil fuel use must be drastically decreased over a short time frame. The aggressive actions needed include no new fossil fuel leases!</p>	
Gregory Nelson	BOEM-2022-0048-13531	<p>The latest IPCC report on climate change finds that emissions must peak by 2025 to keep global warming well below the 2°C limit set by the Paris agreement, which we have rejoined. Gulf-wide leasing in the oil and gas lease sales 259 and 261 is completely contrary to decarbonization efforts and our pledges. You have a legal, moral and ethical obligation to prevent any further oil and gas leasing. If these leases are developed they will be stranded assets in a few years, giving fodder to the fossil fuel industry to prolong its harmful business, and the taxpayers, consumers, and rate-payers will end up subsidizing their imprudent investments and costly cleanup, as well as having to suffer the disastrous consequences of climate disruption.</p>	

**Greenhouse Gases**

Greenhouse Gases			
Greenhouse Gases – Baseline/Modeling, IRA/Net-Zero			
<p>Center for Biological Diversity</p>	<p>BOEM-2022-0048-28954</p>	<p>BOEM in its Gulf of Mexico OCS Oil and Gas Leasing Greenhouse Gas Emissions and Social Cost Analysis (“Greenhouse Gas Analysis”) significantly underestimates the greenhouse gas emissions reductions that would come from the no action alternative through several key errors.</p> <p>First, BOEM’s Greenhouse Gas Analysis assumes that U.S. oil and gas production, consumption, and greenhouse gas (“GHG”) emissions will stay near constant over the 40-year analysis period which is inconsistent with current U.S. law and policy, relies on outdated and unreasonable assumptions, would lead to catastrophic climate damages, and results in BOEM underestimating the GHG emissions reductions from the No Leasing scenario.</p> <p>BOEM’s MarketSim analysis uses the U.S. Energy Information Administration’s (“EIA”) 2020 Annual Energy Outlook reference case to evaluate the GHG emissions from the Leasing and No Leasing scenarios. This 2020 EIA reference case is completely outdated as it does not include significant new law and policy, including the Infrastructure Investment and Jobs Act (2021) and the Inflation Reduction Act (2022), that affect domestic and international energy markets, supply and demand. Both these laws have been widely touted by the federal government and energy economics modeling groups as incentivizing clean energy and electric vehicles and shifting the U.S. away from fossil fuels and towards renewable energy. The Inflation Reduction Act is projected to trigger a substantial decrease in U.S. demand for and consumption of fossil fuels including petroleum</p>	<p>BOEM’s MarketSim uses the Energy Information Administration’s reference case <i>Annual Energy Outlook</i> (AEO) as its baseline energy supply, demand, and price projection. The AEO projections of energy supply, demand, and prices are based on laws and policies set before the passage of the IRA. The Energy Information Administration has not updated the AEO reference based on the passage of the Inflation Reduction Act. BOEM expects this to be completed in 2023. BOEM will evaluate the Energy Information Administration projections in the context of its when published.</p> <p>To address limitations in the baseline and model assumptions that do not account for expected shifts in energy markets, BOEM has acknowledged in Chapter 5.3 of the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c) that the results would shift along different pathways to net-zero. However, currently BOEM is unable to provide a quantitative analysis, and thus provides a qualitative analysis. The limitations of the baseline and modeling associated with both the IRA and net-zero goals are addressed in this Supplemental EIS.</p> <p>More specific to this Supplemental EIS and the Proposed Action, the Inflation Reduction Act of 2022 requires BOEM to hold GOM Lease Sale 259 by March 31, 2023, and GOM Lease Sale 261 by September 30, 2023. In addition, the IRA requires that, as conditions for issuing any “lease for offshore wind development,” the Department hold “an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development” and “the sum total of acres offered for</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

	<p>products and fossil gas. However, instead of reflecting the substantial projected decreases in U.S. oil and gas consumption, the outdated 2020 EIA reference case projects only a minor decrease in U.S. petroleum consumption through ~2035 followed by an increase between 2035–2050. The EIA reference case for fossil gas projects no change in U.S. fossil gas consumption through 2030 followed by a steady increase in consumption between 2030–2050. The EIA further projects that the U.S. “continues to produce historically high levels of crude oil and natural gas.”</p> <p>The 2020 EIA reference case also fails to reflect the decreases in U.S. GHG emissions projected under current law and policy, and unreasonably assumes that the U.S. completely fails to meet its climate commitments under the Paris Agreement. Under the EIA reference case, U.S. GHG emissions fall only slightly by 2030 whereas the federal government projects that U.S. GHG emissions will decline by a much larger ~40 percent by 2030 under current law and policy, including the effects of the Inflation Reduction Act. Additionally, the U.S. has pledged to make deeper cuts—reducing U.S. GHG emissions by 50–52 percent below 2005 levels by 2030 as the commitment under the Paris Agreement, achieving a 100 percent carbon pollution-free power sector by 2035, and a net-zero emissions economy by 2050—whereas the EIA projects that U.S. GHG emissions will only be only 4 percent lower than 2019 levels by 2050. In short, the EIA’s super-polluting reference scenario would lead to catastrophic climate damages and is inconsistent with current U.S. climate law and policy, U.S. and international climate commitments under the Paris Agreement, and growing policy action to phase out fossil fuels.</p>	<p>lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres” (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.</p> <p>Neither the U.S. Department of Energy report (DOE 2022a) nor the appendix (DOE 2022b) that the USEPA (CEQ) cites in their comment provide a detailed projection of supply and demand as a result of the IRA or other recent legislation. BOEM would welcome such projections and is interested in hearing from CEQ if they are able to provide specific projections that BOEM is able to use in its MarketSim baseline for modeling energy market substitutions that result in response to OCS leasing (or forgone leasing). Please also see the discussion of available and forthcoming information on impacts of the IRA on energy markets and demand in <b>Chapter 4.1</b>.</p>
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		<p>Specifically, the assumption of near-constant oil and gas production, consumption, and emissions through 2050 ignores the reality that the U.S. and most of the world's nations have committed to the climate change limit of holding the long-term global average temperature "to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels" under the Paris Agreement. The Paris Agreement established the 1.5°C climate limit given the evidence that 2°C of warming would lead to catastrophic climate harms. The 2018 IPCC report on Global Warming of 1.5°C concluded that limiting warming to 1.5°C requires cutting global CO2 emissions by 45 percent below 2010 levels by 2030 and reaching near zero emissions around 2050. Because fossil fuels are the primary driver of the climate crisis, numerous studies have established that limiting warming to 1.5°C requires governments to immediately begin a managed decline of fossil fuel production that halts the approval of new fossil fuel production and infrastructure and phases out production in many existing fields and mines before their reserves are fully depleted. According to the United Nations Production Gap Report, governments must make steep reductions of roughly 6 percent per year in fossil fuel production between 2020 and 2030 to limit warming to 1.5°C, including average global declines of 9.5 percent per year for coal, 8.5 percent for oil, and 3.5 percent for gas. Consistent with these imperatives, the IPCC has mapped out multiple pathways that achieve the 1.5°C climate limit through immediate, transformative action to end new fossil fuel projects, phase-out existing fossil fuel production and use, and rapidly build up new clean and renewable energy technologies</p>	
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>alongside new storage, efficiency, and grid technologies.</p> <p>Importantly, BOEM's unrealistic assumption of near-constant oil and gas production and consumption over the 40-year analysis period is inconsistent with its obligation under NEPA to make assumptions that are reasonable and based on the best available information. In practice, these assumptions significantly inflate the estimates of how much avoided oil and gas production under the No Leasing scenario would be substituted by fossil fuels, rather than by clean, renewable energy and energy efficiency. As a result of inflating the amount of fossil fuel substitution that would occur, BOEM underestimates the net greenhouse gas reductions that would result from the No Leasing scenario. BOEM should instead use reference scenarios that account for the effects of current U.S. law and policy, and in which the U.S. meets its commitments under the Paris Agreement and transitions to clean, renewable energy.</p>	
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM also fails to accurately analyze the demand for petroleum products, further skewing its emission analysis. BOEM's analysis of demand for petroleum products over time is flawed, contributing to further inaccuracies in the agency's GHG modeling. BOEM's failure to accurately analyze the decline in petroleum demand ignores an important aspect of the problem and requires revision of BOEM's analysis.</p>	
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM's GHG analysis and social cost analysis modeling is outdated and flawed given the passage of IRA and the nation's commitment to achieving net-zero emissions.</p>	
USEPA	CEQ No. 20220144	<p>BOEM should discuss how the IRA may impact energy consumption patterns and GHG emissions. The Department of Energy has estimated the impacts of the IRA on clean energy and</p>	

		greenhouse gas emissions. That report and its appendix contain several resources on future energy consumption patterns and forecasts. We recommend the No Action Alternative use 4 current trajectories (consistent with Paris 2030 and net-zero 2050 goals) for energy production and demand over the next 40-70 years to represent the baseline. EPA would welcome further discussion with BOEM to assist in responding to its questions regarding alternative data sources or methodologies for quantitatively estimating the effect of national policies and legislation on future OCS oil and gas demand.	
USEPA	CEQ No. 20220144	<p>The current analysis uses several energy models that could easily be adapted to produce the accurate No Action Alternative, e.g., the foreign emissions estimates. The current hypothetical no leasing scenario assumes that more foreign oil is imported to increase production. These imports do not represent reasonably foreseeable actions in an accurate no action scenario, so there should not be foreign emissions in the No Action Alternative.</p> <p>In BOEM's <i>Addendum: Oil and Gas Leasing Greenhouse Gas Emissions and Social Cost Analysis</i>, there are discrepancies in and between Tables that BOEM could clarify or resolve within the final SEIS. EPA stands ready to assist with these.</p>	<p>The commenter does not accurately portray BOEM's modeling of foreign emissions or its substitution analysis of the No Action Alternative. BOEM's substitution analysis and estimates of foreign emissions are described in detail in Chapters 2 and 4 of the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c) and in the model documentation.</p> <p>BOEM has reviewed the tables within the 2022 Gulf of Mexico GHG Analysis Addendum and finds no discrepancies. BOEM welcomes any specifics that USEPA would like to share on discrepancies it has found in the tables within the Addendum.</p>
<b>Greenhouse Gases – Executive Orders and Inclusion of GHGs/SC-GHG Analysis</b>			
API/NOIA	BOEM-2022-0048-28953	But the SC-GHG was never designed for use in environmental reviews under NEPA, and it is ill-suited to that purpose. The DSEIS (at vii) recognizes that NEPA does not require the monetization of costs and benefits but undertakes that exercise anyway. This “new and evolving approach” thus is not in fact a “useful measure of the benefits of GHG emissions reductions to inform agency decisionmaking” on Lease Sales 259 and 261. See DSEIS at xii. Moreover, BOEM not only	While the SC-GHG was not created by the Interagency Working Group (IWG) for NEPA analyses, that fact does not preclude it from being a valuable addition to the information available to the decisionmaker, including through this NEPA analysis. The SC-GHG is well-suited to the Department of the Interior's NEPA analysis because it allows DOI decisionmakers a way to consider the social benefits of reducing emissions of greenhouse gases, or the social costs of increasing

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>has overstepped the requirements under applicable law, but also has improperly assumed that future NEPA analysis will require the use of the SC-GHG estimates.</p> <p>Given that BOEM is nevertheless reporting monetized impacts using the SC-GHG estimates, it is important to consider whether this application supports or impedes decision-making. Although BOEM claims that the monetized estimates are not being used for decision-making, the inclusion of such estimates can affect the perceptions and consequently the public comments about the importance of some projected impacts relative to others and could indirectly affect decision-making. This is particularly true if only a small subset of projected impacts is monetized. An asymmetrical treatment of an OCS lease sale's impacts may skew decision-making in ways that are unintended. For these reasons, we urge BOEM to reconsider its discussion of the SC-GHG estimates in the DSEIS. These issues—as well as the other issues identified above on this topic—also underscore the need for a thoughtful discussion about proper application of the SC-GHG estimates.</p>	<p>such emissions, in analyses related to oil and gas leasing by determining a monetary value of the net harm to society from adding 1 metric ton of a GHG to the atmosphere in a given year. The NEPA requires that BOEM provide the decisionmaker with the relevant information to make an informed decision, although it does not require a cost-benefit analysis in all situations. Both Executive Order 13990 and Secretarial Order 3399 define the social cost of greenhouse gases as a relevant piece of information for the decisionmaker to compare impacts from GHG emissions across alternatives. By incorporating the SC-GHG analysis in this Supplemental EIS. BOEM is exceeding the standards of a NEPA analyses and, while not required to provide a full cost-benefit analysis for this lease sale, is providing the SC-GHG for informational purposes for both the decisionmaker and public.</p>
API/NOIA	BOEM-2022-0048-28953	<p>The DSEIS's overstatement of GHG emissions differences stemming from Alternative A compared to the No Action Alternative is compounded by the DSEIS's subsequent assignment of SC-GHG values to those differences.</p>	
Chevron	BOEM-2022-0048-27400	<p>The Draft SEIS explains that BOEM has included "an expanded [GHG] analysis and, in accordance with recent Executive Orders, BOEM also provides an analysis of monetized impacts from these estimated GHG emissions (even though the [NEPA] does not require such an analysis in the absence of a cost-benefit analysis)" (Executive Summary, Draft SEIS at vii, xii). This analysis appears to be similar to the one included in the</p>	

		<p>Draft Programmatic Environmental Impact Statement for the Proposed Program for Outer Continental Shelf oil and gas natural gas lease sales between 2023 and 2028. Chevron thus reiterates its concerns with the chosen methodology. If BOEM chooses to retain estimates of social costs associated with GHG emissions in the final SEIS, it is important that it does so in a way that presents the most accurate picture possible.</p> <p>The use of the SC-GHG in the Draft SEIS is misguided and inappropriate. The SC-GHG was developed as a means to monetize the social value of reduced GHG emissions for use in regulatory cost-benefit analysis as part of the Regulatory Impact Analysis (R1A) associated with economically significant regulations under Executive Order 12,866. When used appropriately and with necessary caveats, SC-GHG can provide informative context for regulators and the public in assessing the costs and benefits of agency action. But SC-GHG was never designed for use in environmental reviews under NEPA, and it is ill suited to that purpose. Because there is no established value against which the SC-GHG can be objectively evaluated, the application of SC-GHG estimates is only valuable in situations where all costs and benefits can be monetized and compared with one another. As BOEM is aware and points out in the Draft SEIS, NEPA does not require the monetization of costs and benefits; therefore, there is no cause to include SC-GHG in the Draft SEIS.</p>	
Greenhouse Gasses – Other			
Earthjustice et al.	BOEM-2022-0048-28951	Simply stating the emissions are “slight” fails to acknowledge that they are incompatible with national climate policies and meeting the country’s GHG reduction goals. BOEM must assess the	BOEM provides analysis of the Proposed Action’s impact on U.S. emissions targets. The analysis shows that leasing has a smaller impact on the domestic GHG budget when compared to energy substitutes in the

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>degree to which additional emissions resulting from a lease sale—including foreign oil consumption GHG emissions—will make it harder to meet the carbon budget when added to the emissions from fossil fuels produced on already leased federal lands and waters.</p> <p>The comparison of GHG emissions to U.S. emissions targets in the Greenhouse Gas Emissions Addendum is insufficient. It does not provide information on the degree to which emissions from leasing would impact the remaining carbon budget—that is, the target net emissions minus the emissions that are essentially already locked in from existing federal fossil fuel leases.</p> <p>There is evidence that the U.S. climate budget is already full. For example, a 2020 report concluded:</p> <ul style="list-style-type: none"> <li>• “Federal crude oil already leased will continue producing for 34 years beyond the 1.5°C threshold and 19 years beyond the 2°C;” and</li> <li>• “Federal natural gas already leased will continue producing 23 years beyond the 1.5°C threshold and 8 years beyond the 2°C.”</li> </ul> <p>A meaningful analysis of an offshore lease sale's GHG emissions would require BOEM to assess how adding these emissions to other contributors of GHGs in the coming years affects the country's ability to meet emissions targets. Given the minimal room left in the carbon budget, if any, the additional GHG emissions from a lease sale are unlikely to be “slight” in that context.</p>	<p>absence of leasing. The U.S. emissions targets by design ignore impacts on foreign emissions, so the impact of anticipated production from the lease sales on foreign oil consumption and associated emissions is not accounted for in the GHG emissions' budget discussion. Currently, there is insufficient data and capabilities necessary to analyze the Proposed Action's potential impacts to the budget and pathways to achieve the 1.5 °C goal, nor did any commenters provide a peer-reviewed tool to do so.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>Second, BOEM's estimates for the substitution of avoided oil and gas production, reductions in oil and gas consumption, and leakage rates under the No Leasing scenario are unreasonable, inconsistent with published research and best-</p>	<p>The two studies cited by the Center for Biological Diversity regarding leakage and substitution rates evaluated a leasing ban on both offshore and onshore Federal lands and are not directly comparable to a decision for the No Action Alternative. Further, BOEM</p>

	<p>available information, and result in a significant underestimate of the emissions benefits of the No Leasing scenario.</p> <p>However, published research has found much lower rates of substitution and higher decreases in consumption under no leasing scenarios. For example, Erickson and Lazarus (2018), which evaluated the effects of ending new leases for fossil fuel extraction on U.S. federal lands and waters, estimated that ~69 percent of foregone oil production would be replaced by other energy sources, including oil production in the U.S. and abroad, as well as by electricity and non-fossil fuel sources. This study also estimated larger declines in energy consumption of ~30 percent under a no leasing scenario, where every unit of oil left undeveloped resulted in 0.30 unit of reduced energy consumption.</p> <p>BOEM’s estimate that renewable energy sources will only substitute for 2 percent of foregone oil and gas production is also unreasonably low and inconsistent with current energy trends, law and policy. ....Current law and policy has incentivized renewables, including the Inflation Reduction Act and President Biden’s target of 50 percent EV sales by 2030. In short, current trends, law and policy clearly indicate that forgone oil and gas production is increasingly likely to be replaced by renewable energy sources—certainly much more than the 2 percent projected by BOEM—which would lead to larger emissions reductions under a No Leasing scenario than BOEM estimated.</p> <p>BOEM also models an unreasonably high leakage rate for the No Leasing scenario that is not consistent with published studies. Although BOEM does not calculate the leakage rate in its</p>	<p>acknowledges that the underlying assumptions, particularly elasticities, are different between MarketSim and the two studies resulting in differences in substitution and leakage rates. With regard to the IRA and renewable substitution rates, BOEM’s baseline scenario uses the Energy Information Administration’s AEO reference case. This is based on laws and policies set before the passage of the IRA. The Energy Information Administration has not updated the AEO reference case that incorporates the IRA. BOEM expects this to be completed in 2023. BOEM will evaluate the Energy Information Administration projections in the context of its 2022 Gulf of Mexico GHG Analysis Addendum when published. Please refer to <b>Chapter 1.3</b> and <b>Chapter 4.1</b> for more detail, and refer to MarketSim documentation for detailed sources of elasticities available at <a href="https://www.boem.gov/marketsim-model-documentation">https://www.boem.gov/marketsim-model-documentation</a>.</p> <p>In addition, the IRA requires that, as conditions for issuing any “lease for offshore wind development,” the Department hold “an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development” and “the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres” (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>Greenhouse Gas Analysis, the leakage rate appears to be around 77 percent based on BOEM's analogous analysis for the OCS program for 2023-2028. This leakage rate is much higher than published estimates. For example, Erickson and Lazarus (2018) estimated a leakage rate of ~65 percent under a no new fossil fuel leasing scenario for federal lands and waters. Prest (2022), which also evaluated the effects of ending new federal fossil fuel leases, estimated a leakage rate of between 52 percent and 72 percent....</p>	
<p>Center for Biological Diversity</p>	<p>BOEM-2022-0048-28954</p>	<p>Third, BOEM assumes that a large percentage of avoided oil and gas production under the No Leasing scenario would be replaced by foreign oil imported into the U.S. which does not reflect the significantly decreasing trend in oil imports, and results in an underestimate of the GHG emissions reductions resulting from the No Leasing scenario.</p> <p>BOEM's MarketSim analysis estimates that 44 percent of the avoided oil production under the No Leasing scenario would be replaced by foreign oil imports into the U.S., totaling up to 499 million barrels of oil equivalent ("MMBOE") of the 1,133.6 MMBOE that BOEM anticipates will be produced under the Leasing scenario. However, this appears to ignore the consistent, significantly decreasing trend in foreign oil imports since ~2005 as a result of increasing U.S. crude oil production. According to the EIA, crude oil imports decreased by 36 percent over the past decade, declining from 3.5 billion barrels in 2010 to 2.2 billion barrels in 2021. Over the same time period, U.S. crude oil production increased by 205 percent, from 2 billion barrels in 2010 to 4.1 billion barrels in 2021. After Congress lifted the 40-year old crude oil export ban in 2015, crude oil exports skyrocketed, increasing by ~750 percent, totaling 1.1 billion barrels exported in 2021—about a quarter of all U.S.</p>	<p>BOEM's baseline includes the Energy Information Administration's projections, including imports and exports and expected domestic demand. If domestic production is curtailed (such as through the cancellation of a Gulf of Mexico OCS lease sale), imports or onshore production will necessarily increase absent fundamental changes in demand. BOEM's modeling indicates that OCS oil production is more likely to be replaced with imports rather than onshore production given elasticities.</p> <p>The limitations of the baseline and modeling associated with both the IRA and net-zero goals are addressed in this Supplemental EIS in <b>Chapter 3.2.2.1</b> and <b>Chapter 4.1</b>.</p>

		<p>production. As a result, in 2020 the U.S. became a net exporter of crude oil and petroleum products. Therefore, BOEM's estimation that the U.S. will substitute 44 percent of avoided oil production with oil imports under the No Leasing scenario is not consistent with the steadily declining trend in crude imports.</p> <p>This is significant because BOEM's modeling estimates that the production and transport of foreign oil results in higher greenhouse gas emissions per barrel than the domestic supply. For example, CO2 emissions emitted from OCS production are estimated at 0.007759 metric tons per barrel of oil equivalent ("boe") versus overseas production, which is estimated at 0.036522 metric tons per boe. Therefore, by assuming that a high proportion of avoided production in the No Leasing scenario is replaced by more-greenhouse-gas intensive foreign imports rather than less-greenhouse-gas-intensive domestic supply leads to an overestimate of the net GHG emissions resulting from the No Leasing scenario. BOEM should use a substitution scenario that is aligned with current and projected trends in fossil fuel imports and exports.</p>	
Center for Biological Diversity	BOEM-2022-0048-28954	<p>Fourth, BOEM significantly underestimates the upstream methane emissions from GOM oil and gas production. BOEM estimates that the upstream emissions from a No Leasing scenario are more than double that of the Leasing scenario based largely on the assumption that onshore oil substitutes (and imported oil substitutes) have much higher upstream emissions than GOM oil. This result is driven in large part by the assumption that methane emissions from GOM production are much lower than production onshore, as summarized in Table 4 in the Greenhouse Gas Analysis. However, published studies show that</p>	<p>The Center for Biological Diversity states that BOEM underestimates methane leakage and cites a study that used remote sensing of shallow-water platforms. There are several issues with using such a study to assign long-term methane leakage rates to new GOM anticipated production. First, the study looks primarily at shallow-water facilities. This is an issue because shallow-water facilities are generally the oldest facilities in the GOM and have higher rates of emissions relative to rates of production. Also, most new, production anticipated from Lease Sales 259 and 261 are trending toward deeper water, use newer technology, and have lower emissions profiles. Second, the study uses</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>offshore oil and gas operations in the Gulf of Mexico release much more methane emissions than most U.S. onshore oil and gas operations. A 2022 study used remote sensing with imaging spectrometers to survey 151 shallow water oil and gas platforms in the Gulf of Mexico and found that 62 pieces of infrastructure had an observable methane plume, with satellite wells, tanks, pipelines, and vents being particularly significant sources of methane leakage. Importantly, in federal waters, the study reported methane loss rates (i.e., methane leakage relative to reported extraction) of 24% to 28% which are significantly higher than loss rates observe for onshore oil and gas basins. For example, typical methane loss rates in the Permian Basin are 3.3 percent to 3.7 percent. Earlier studies have similarly found methane emissions from offshore oil and gas operation in the GOM are vastly underestimated and exceed those of many onshore basins. BOEM must update its outdated estimates for upstream emissions for GOM oil and gas production based on the best- available information reflected in these studies.</p>	<p>“snapshots” of facilities rather than long-term observations, which would be needed to build emissions factors for use in models used to estimate GHGs.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>Fifth, BOEM’s modeling uses a limited set of demand and supply elasticities and fails to conduct sensitivity analyses to determine the effects of these uncertain elasticities on its results. Other analyses have found that using a more robust set of elasticities and related parameters shows that the Leasing scenario results in much greater GHG emissions than BOEM currently projects.</p>	<p>BOEM periodically updates its modeling assumptions, including elasticities. The most recent updates to MarketSim were made in 2021. BOEM plans to incorporate sensitivity analysis in the future, as additional information becomes available. However, until such time that BOEM is able to construct an appropriate set of sensitivity tests to quantify areas of uncertainty, the discussion surrounding uncertainty will remain qualitative as acknowledged in this Supplemental EIS. The MarketSim documentation can be found at <a href="https://www.boem.gov/marketsim-model-documentation">https://www.boem.gov/marketsim-model-documentation</a>.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>Sixth, BOEM uses an outdated estimate for the global warming potential (“GWP”) of fossil methane that significantly underestimates its heating impacts on the atmosphere. Additionally, BOEM only uses</p>	<p>BOEM uses the 100-year Global Warming Potential (GWP) primarily because it is sourced from the same USEPA recommended factors as the emissions factors used in GLEEM. This document, produced by the</p>

		<p>the 100-year GWP rather than the more policy-relevant 20-year time frame for GWP. BOEM must use the updated GWP from the authoritative IPCC over a 20-year time frame that is most policy-relevant for accurately assessing the impacts of the methane pollution from the Leasing scenario.</p> <p>In its Greenhouse Gas Analysis, BOEM uses an outdated GWP for methane of 25. However, the 2013 IPCC Fifth Assessment Report reported a much higher GWP for fossil fuel sources of methane of 87 over a 20-year time period and 36 over a 100-year time period. The 2021 IPCC Sixth Assessment Report updated the GWP for fossil methane to 83 over a 20-year time period and 30 over a 100-year time period, also much higher than BOEM's GWP of 25. The IPCC GWP values make clear that methane is a super-pollutant 83 to 87 times more powerful than CO<sub>2</sub> at warming the atmosphere over a 20-year period, second only to CO<sub>2</sub> in driving climate change.</p> <p>Using the policy-relevant time frame of 20 years for methane GWP, rather than just the 100-year GWP, is critical for evaluating the near-term harms of methane pollution at a time when methane emissions must be halved by 2030 to achieve the Paris Agreement's 1.5°C climate limit and prevent the worst damages from the climate crisis.</p>	<p>USEPA, the authority on GWP, is intended for inventories and can be found at <a href="https://www.epa.gov/ghg-emission-factors">GHG Emission Factors Hub (April 2021) (epa.gov)</a>. The use of this GWP does not affect any of the SC-GHG calculations, as the GWP in our documents is only calculated for convenience and for a few graphics. BOEM will continue to consider using other GWP, besides GWP-100, in the future, in particular if the USEPA changes their recommendation for GWP in their recommendations for GHG inventories.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>Finally, BOEM's social cost analysis should incorporate the updated estimates of the social cost of greenhouse gases ("SC-GHG") published by the U.S. Environmental Protection Agency that provide higher climate-damage valuations and use lower discount rates, as recommended by published research and the Interagency Working Group on Social Cost of Greenhouse Gases, to more accurately reflect the true costs of OCS leasing. In its social cost analysis, BOEM uses the average</p>	<p>BOEM is aware and acknowledges the USEPA's proposed SC-GHG values that are different from the IWG values. However, as outlined and directed per Executive Order 13990, BOEM utilizes the interim IWG estimates for this analysis. As the IWG's estimates are refined and revised, BOEM may update the analysis as necessary. BOEM acknowledges that there are additional sources of uncertainty that are not, at this time, quantified in the IWG estimates. For example, the damages associated with ocean acidification are</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>interim climate-damage valuations and range of discount rates for SC-GHG estimated by Interagency Working Group. However, the Working Group has recommended that agencies also apply higher climate-damage valuations based on lower discount rates. This is because, as acknowledged by the Working Group, the full 28948range of interim SC-GHG estimates, taken as a whole, “likely underestimate societal damages from [greenhouse gas] emissions.” First, the models used to estimate the interim SC-GHG values fail to include the costs of many important physical, ecological, and economic impacts of GHG emissions and resulting climate change recognized in the literature, effectively valuing these harms at zero. In addition, “the latest scientific and economic understanding of discount rates” indicates that the interim estimates undervalue the climate damages that will be borne by future generations, and therefore the Working Group concludes that using discount rates of “2 percent and lower” is warranted.</p> <p>Specifically, BOEM must incorporate updated SC-GHG estimates published by the U.S. Environmental Protection Agency (“EPA”) and published research that represent the best-available information into its social cost analysis. The U.S. EPA recently published updated, much higher estimates of the social cost of carbon (“SC-CO2”), social cost of methane (“SC- CH4”), and social cost of nitrous oxide (“SC-N2O”) that reflect “recent advances in the scientific literature on climate change and its economic impacts and incorporate recommendations made by the National Academies of Science, Engineering, and Medicine.” Consistent with the scientific and economic evidence, these draft climate-damage valuations are substantially higher—raising the</p>	<p>not included in any of the three climate models. Uncertainty around those impacts is thus not captured quantitatively within the SC-GHG but are captured qualitatively within BOEM's analysis.</p>
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		<p>central value for the SC-CO2 from \$51 per metric ton on average for a 3 percent discount rate to \$190 per metric ton using a 2 percent discount rate and \$340 per metric ton using a 1.5 percent discount rate for emissions in 2020, as shown in the table below.</p> <p>A recent comprehensive study similarly estimated that the SC-CO2 should be at least \$185 per metric ton of CO2 at a discount rate of 2 percent. This study used “improved probabilistic socioeconomic projections, climate models, damage functions, and discounting methods.” These updated estimates of ~\$190 per ton of CO2 are 3.7 times higher than the average value of \$51 per ton CO2 used by BOEM in its GHG analysis. BOEM must conduct updated cost analyses using these higher SC-GHG values at discount rates of 0 to 2 percent, based on the best-available information, to help correct the current under-estimation of the true costs of OCS leasing.</p>	
<p>Center for Biological Diversity</p>	<p>BOEM-2022-0048-28954</p>	<p>BOEM’s analysis fails to account for the significant methane emissions that result from drilling in the Gulf of Mexico. One recent study using methane imaging of oil and gas platforms in shallow areas of the Gulf of Mexico, determined these operations have a “methane loss rate”—a calculation of methane pollution relative to reported extraction—of 23 to 66 percent. This is a far greater level of emissions than operations on land, as described above.</p> <p>Methane emissions are particularly alarming. Immediate, deep reductions in methane emissions are critical for lowering the rate of global warming in the near-term, preventing the crossing of irreversible planetary tipping points, and avoiding harms to species and ecosystems from methane’s intensive near-term heating effects and ground-</p>	<p>Thank you for your comment. BOEM has updated this Final Supplemental EIS to include the two references Yacovitch et al. (2020) and Gorchoy Negron et al. (2020) that discuss methane emission estimates in the Gulf of Mexico. These new methane emissions estimates are an important step forward in observational methane emission estimates; however, these estimates were gathered close to the coast (in Louisiana and Texas) and were gathered over a limited time period (in January or February 2018); monthly, regional average levels would be preferred for climate change and air quality discussions. However, the research required to get this information will require multiple agencies dedicating long-term efforts and support to gather this information. The efforts will involve a combination of observational methods (vessels, airplane, remote sensing) and modeling (data assimilation). BOEM experts are following the scientific</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>level ozone production. Methane is a super-pollutant 87 times more powerful than CO<sub>2</sub> at warming the atmosphere over a 20-year period, 178 and is second only to CO<sub>2</sub> in driving climate change during the industrial era. Methane also leads to the formation of ground-level ozone, a dangerous air pollutant, that harms ecosystems and species by suppressing plant growth and reducing plant productivity and carbon uptake.</p> <p>Because methane is so climate-damaging but also comparatively short-lived with an atmospheric lifetime of roughly a decade, cutting methane has a relatively immediate effect in slowing the rate of temperature rise in the near-term. Critically, deep cuts in methane emissions of ~45 percent by 2030 would avoid 0.3°C of warming by 2040 and are considered necessary to achieve the Paris Agreement's 1.5°C climate limit and prevent the worst damages from the climate crisis. Deep cuts in methane emissions that reduce near-term temperature rise are also critical for avoiding the crossing of planetary tipping points—abrupt and irreversible changes in Earth systems to states wholly outside human experience, resulting in severe physical, ecological and socioeconomic harms.</p>	<p>literature, proposing studies through our environmental studies program, and making continual improvements to our emission inventories (reported every 3 years) in an effort to enhance our impact analysis discussion in climate change at a regional level, but BOEM has included the currently available and most relevant information in its analysis for a proposed Gulf of Mexico OCS lease sale, which is more likely to result in activities in deep water using new technology. The current information is sufficient to inform the decisionmaker on the impacts of the Proposed Action and alternatives at this time.</p>
API/NOIA	BOEM-2022-0048-28953	<p>Moreover, while the DSEIS more than fulfills any applicable NEPA obligation, the “expanded greenhouse gas (GHG) analysis” (DSEIS at vii) in the DSEIS and its October 2022 Addendum—including attempts to quantify the “No Action Alternative” foreign oil consumption effects and the social cost of greenhouse gases (“SC-GHG”)—may not provide a balanced evaluation of impacts. As the DSEIS acknowledges (at xii), “[a]lthough NEPA requires consideration of ‘effects’ that include ‘economic’ and ‘social’ effects, NEPA does not require an economic cost-benefit analysis.” The</p>	<p>BOEM's inclusion of an analysis of the foreign GHG emissions from an increase in foreign oil consumption aligns with the opinion in <i>Center for Biological Diversity v. Bernhardt</i>, Case No. 18-73400 (9th Cir. 2020) and, issues raised by plaintiffs in the <i>Friends of the Earth v. Haaland</i>, Case No. 1:21-cv-02317-RC (D.D.C. 2022); currently on appeal to the D.C. Circuit. The Center for Biological Diversity court stated, in part, that BOEM must provide a quantitative assessment of GHG emissions resulting from shifts in foreign consumption attributable to the Proposed Action or explain why such quantitative assessment could not be done. As a</p>

		<p>DSEIS (at vii) also fails to identify any “recent Executive Orders” or any other authority directing a SC-GHG analysis for either lease sale covered by the DSEIS. And the DSEIS (at xii) further concedes that its new approach, which fails to monetize all relevant costs and benefits for a meaningful comparison of alternatives, does “not constitute a complete cost-benefit analysis nor does the cost of GHG numbers present a direct comparison with other impacts analyzed in this Supplemental EIS.” Indeed, BOEM’s admittedly “emerging methodology” (DSEIS at 2-18) generates results which risk appearing arbitrary, lack record support, and would likely change based on different (and essential) economic elasticity assumptions. The Associations are particularly concerned by the DSEIS’s further suggestion (at 2-18) that “BOEM is looking to refine and expand [it] for future NEPA analyses.”</p>	<p>result, BOEM updated its analysis to consider the potential impacts of GHG emissions from the change in foreign oil consumption, including a quantitative analysis where feasible and explaining for other portions of the analysis where BOEM was relying on a qualitative approach because a quantitative approach could not be reliably attempted and may in fact introduce additional uncertainty.</p> <p>While the SC-GHG was not created by the IWG for NEPA analyses, that fact does not preclude it from being a valuable addition to the available information for the decisionmaker to consider. The SC-GHG is well-suited to the Department of the Interior’s NEPA analysis because it allows DOI decisionmakers a way to consider the social benefits of reducing emissions of greenhouse gases, or the social costs of increasing such emissions, in analyses related to oil and gas leasing by determining a monetary value of the net harm to society from adding 1 metric ton of a GHG to the atmosphere in a given year. The NEPA requires that BOEM provide the decisionmaker with the relevant information to make an informed decision, although it does not require a full cost-benefit analysis in most situations. Both Executive Order 13990 and Secretarial Order 3399 define the social cost of greenhouse gases as a relevant piece of information for the decisionmaker to compare impacts from GHG emissions across alternatives. By incorporating the SC-GHG analysis in this Supplemental EIS, BOEM is exceeding the standards of a NEPA analyses and, while not required to provide a full cost-benefit analysis for this lease sale, is providing the SC-GHG for informational purposes for both the decisionmaker and public.</p>
<p>API/NOIA</p>	<p>BOEM-2022-0048-28953</p>	<p>The DSEIS Overstates Relative Reductions of GHG Emissions Under the No Action Alternative Based on Its Purported Effects on Foreign Consumption of Oil.</p>	<p>Chapter 4 of the 2022 Gulf of Mexico GHG Analysis Addendum provides BOEM’s qualitative discussion for the estimates of foreign emissions (BOEM 2022c). There, BOEM acknowledges and discusses</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			<p>qualitatively how the estimates of foreign emissions from a shift in foreign oil consumption are not directly comparable to the estimates of emissions from domestic production and consumption of OCS oil and its substitutes. However, BOEM reiterates that it is providing a rational analysis of the relative change in emissions across the alternatives and is not “overstating” the relative reduction expected for the No Action Alternative.</p>
<p>NRDC et al.</p>	<p>BOEM-2022-0048-28948</p>	<p>The DSEIS does not take a hard look at the impacts Lease Sales 259 and 261 will have on GHG emissions. NEPA requires agencies to fully analyze a project’s impacts on greenhouse gas emissions (GHG), including upstream, midstream, and downstream GHG emissions.</p> <p>BOEM’s errors in the foreign emissions analysis for Lease Sales 259 and 261 are analogous to defects identified in recent court decisions and must be remedied. BOEM fails to quantify certain foreign emissions, despite having the ability to do so. BOEM further fails to cite to sufficient evidence to support its decision to exclude a quantitative analysis of upstream and midstream emissions. To comply with NEPA, BOEM must substantiate its conclusions and correct the above deficiencies in its upstream and midstream foreign GHG emissions analysis by providing a quantitative analysis or more thorough qualitative discussion of impacts, summarizing relevant scientific evidence, and evaluating the impacts based on methodologies accepted in the scientific community. Additionally, BOEM erroneously concludes that the No Action Alternative – cancellation of a Gulf of Mexico lease sale – would result in greater lifecycle GHG emissions than proceeding with a lease sale, contradicting its own findings elsewhere in the DSEIS. To avoid constructing a misleading portrayal of the</p>	<p>The impacts of the lease sales on GHG emissions are included in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c). The results of this addendum are referenced within the main chapters of the Draft Supplemental EIS. As mandated by recent court decisions, BOEM also included a newly developed quantification of emissions from an estimated shift in foreign oil consumption.</p> <p>While the Plaintiffs’ claims in the cases cited focused on emissions from the consumption of oil, BOEM has expanded all aspects of foreign emissions in its analysis and, where possible, provided a quantitative analysis. Where a quantitative analysis was not possible or would introduce additional uncertainties that would be misleading, BOEM explained why such an analysis was not possible and how a qualitative analysis was included instead. BOEM has the ability to quantify the downstream oil consumption component and has provided a detailed explanation and expert corroboration regarding the limitations for modeling upstream and midstream foreign emissions. Chapter 4 of the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c) provides BOEM’s expanded qualitative discussion, including limitations in estimating the impacts of OCS leasing on the foreign energy markets upstream, midstream, and downstream emissions. The limitations are supported by references within the 2022 Gulf of Mexico GHG Analysis Addendum to a memorandum by the consulting firm Industrial</p>

		implications of leasing in the GOM, BOEM should revise its conclusion to accurately reflect the data available.	Economics, Inc, which can be found at <a href="https://www.boem.gov/oil-gas-energy/energy-economics/national-ocs-program">https://www.boem.gov/oil-gas-energy/energy-economics/national-ocs-program</a> .
NRDC et al.	BOEM-2022-0048-28948	The DSEIS fails to include an adequate indirect impacts analysis using significant new information addressing the short-lived climate pollutants (SLCP) that will be emitted by Lease Sales 259 and 261 at all phases of oil and gas development.	Thank you for your comment. BOEM periodically (about every 3 years) reports information on air emissions inventory from the oil and gas industry in the Gulf of Mexico, with the latest corresponding to calendar year 2017 (Wilson et al. 2019a). This information is incorporated by reference in this Supplemental EIS and included in BOEM's analyses. Among SLCPs, methane is included, and the agency makes efforts to incorporate significant new information on methods and approaches not only for SLCPs emissions but for criteria pollutants and major GHGs.
NRDC et al.	BOEM-2022-0048-28948	The DSEIS' methane emissions analysis fails to consider new obligations under IRA.	The impact of the IRA on methane emissions is unclear and depends on how the USEPA implements the new law. As information becomes available, BOEM will incorporate it into our analyses. For more information on the IRA, refer to <b>Chapter 1.3</b> . For more information on the GHG analysis, refer to <b>Chapter 4.1</b> .
NRDC et al.	BOEM-2022-0048-28948	The DSEIS fails to adequately analyze the cumulative impacts of Lease Sales 259 and 261 GHG emissions as required by NEPA. To comply with recent court interpretations of NEPA's requirement to analyze GHG emissions, BOEM should more intentionally explain the implications for each of the proposed alternatives.	As a part of its resource analyses in Chapter 4 of this Supplemental EIS, BOEM's subject-matter experts include the effects of climate change on their resource of expertise. BOEM has also provided an expanded analysis of GHG emissions as an addendum to this Supplemental EIS.  Each alternative has estimated GHGs for the domestic life cycle and, to the best of BOEM's current ability, foreign emissions associated with each alternative. This directly addresses recent court decisions and Plaintiffs' claims pending in the Friends of the Earth v. Haaland appeal, for BOEM to analyze the GHG impact, both direct from OCS activity and the processing and consumption of the fuels produced, as well as changes in consumption abroad.
NRDC et al.	BOEM-2022-0048-28948	BOEM's social cost of greenhouse gases analysis should fully disclose the costs and benefits of Lease Sales 259 and 261. Though NEPA does not	BOEM looks at the costs of GHG emissions from the full lifecycle of OCS oil and gas production as well as the costs from substitutes that would be consumed in

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>require an explicit cost-benefit analysis, courts have held that when such an analysis is provided, it "cannot be misleading." Here, BOEM's social cost analysis is misleading.</p> <p>BOEM's presentation of the "social cost of greenhouse gases" (SC-GHG) is inadequate. Just as in the cases above, BOEM has omitted an accurate forecast of the lease sales' costs.</p> <p>Given recent court decisions concerning cost benefit analysis, BOEM should update its analysis to fully assess the costs of GHG emissions, rather than solely the benefits of GHG reductions.</p> <p>The DSEIS should holistically assess the costs of GHG emissions generated from all steps of the lease sale process, from the construction and operation of onshore infrastructure to the quantification of downstream emissions. Additionally, BOEM should present this information clearly and logically to ensure that the public is confident that BOEM fully assessed the available qualitative and quantitative information. In sum, BOEM insufficiently disclosed and analyzed critical cost and benefit information and should more clearly present this information in the FSEIS.</p>	<p>the absence of OCS oil and gas production anticipated from Lease Sales 259 and 261 under a No Action Alternative. BOEM acknowledges that (1) it does not account for the construction of onshore infrastructure that supports OCS oil and gas and (2) does not account for the construction of nuclear, offshore/onshore wind, solar, or other substitute sources. The need for additional onshore infrastructure is highly uncertain and would depend on factors such as the size of future discoveries and the level of future offshore oil and gas activity on existing leases. The development of any new onshore infrastructure beyond existing infrastructure would be analyzed through future permitting-related activities and, given the uncertainties about the scope of onshore infrastructure construction required under program (and lease sale) scenarios, are not incorporated into the Offshore Environmental Cost Model. The estimation of these impacts would require information on the level of onshore infrastructure development required under individual exploration and development scenarios that is not currently available (Industrial Economics Inc. 2018).</p>
NRDC et al.	BOEM-2022-0048-28948	BOEM's reliance on the GLEEM Model creates a misleading characterization of foreign GHG emissions.	BOEM utilizes GLEEM to estimate downstream emissions from oil consumption, providing information with which BOEM can then perform its broader analysis. GLEEM represents the best available information on this question, and the commenter does not provide an alternative source for BOEM to consider using in the future. Foreign GHG emissions continue to be the most challenging part of our GHG analysis for new oil and gas leasing; BOEM acknowledges these difficulties but continually refines its analysis. BOEM remains open to suggestions on how to improve the current analysis and welcomes suggestions to improve

			<p>its methodology and approach on estimating GHG emissions with new OCS oil and gas leasing. Additionally, there is no viable alternative available to estimate GHG emissions from the lease sale.</p>
<p>USEPA</p>	<p>CEQ No. 20220144</p>	<p>Direct and indirect greenhouse gas emissions have global scale impacts, including impacts on the coastal zone and outer continental shelf environment. Accordingly, we recommend strengthening the disclosure and analysis of GHGs, as well as practicable mitigation available to avoid or reduce such emissions.</p> <p>In accordance with NEPA requirements, the No Action Alternative is defined as the reasonably foreseeable actions and trends that would occur in the absence of the proposed action. However, the No Action Alternative (“no leasing scenario”) assumes that the same volume of production will come from substitute sources if the GOM lease sales do not occur. The GHG emissions from that hypothetical increase are then compared to the emissions from the leasing scenario, with the difference representing the net emissions of the proposed action. This methodology uses an incorrect baseline and does not represent a no action scenario. Most importantly, this approach underestimates the incremental emissions impacts of the proposed action. Further, this methodology is inconsistent with the No Action Alternative in other parts of the Supplemental Draft EIS, such as the water quality and coastal habitats sections.</p> <p>To accurately calculate the change in emissions between an action and no action alternative in a NEPA analysis, BOEM should calculate gross emissions from the proposed action and then correct for the existing production that gets displaced by the proposed production, yielding accurate net emissions. Further, EPA recommends</p>	<p>BOEM’s modeling does “calculate the change in emissions between an action and No Action Alternative in a NEPA analysis.” As the USEPA suggests, BOEM does “calculate gross emissions from the Proposed Action and then correct for the existing production that gets displaced by the proposed production, yielding” estimates of incremental emissions just as the USEPA suggests BOEM should do.</p> <p>BOEM’s models use elasticities and adjustment rates to estimate the substitute energy sources that may replace the foregone OCS oil and gas under a No Action Alternative. As part of its market simulation, the model accounts for the increase in price, reduction in demand, and supply of substitute energy sources. BOEM’s substitution analysis is described in detail in Chapter 2 of the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c).</p> <p>Contrary to the commenter’s assertion, the IRA is not expected to have a significant impact on petroleum supply. Most of the provisions, and the reports that analyze them, are focused on the electricity sector and emissions reductions through incentives for energy efficiency and renewables. One report that quantifies the impact on petroleum supply suggests that the impact to the domestic petroleum market would be very small (a decrease of less than 1% in demand) and minimal change supply (Larsen et al. 2022). For more information, refer to <b>Chapter 4.1</b>.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		the analysis should not assume that if the proposed action does not take place, the same volume of oil and gas production would be substituted elsewhere (e.g., the production and consumption of increased imports, increased onshore production and fuel switching). The Inflation Reduction Act (the Act or the IRA) is expected to have a significant influence on long-term energy demand and economics.	
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**Well Stimulation**

Well Stimulation			
Jeanne Gallahue	BOEM-2022-0048-13107	..just so you can squeeze off the rest of the oil in the Earth causing massive Earthquakes and worse	The largest earthquakes (greater than 4.3 on the Richter scale) in the Gulf of Mexico for the last 44 years number 10 in total. This is not a large number of earthquakes for a region. Only two have any proximity to oil and gas development. During this period there was much development of many oil and gas fields. Earthquakes occur primarily from shifts in subsurface rock layers from faulting, salt movement, and movement in basement rocks, which are independent of oil and gas production.

**Renewable Energy and Alternative Uses of the OCS**

Renewable Energy and Alternative Uses of the OCS			
Scott Eustis (Healthy Gulf)	10.24.22 Virtual Public Hearing Comments	Thanks for answering questions about when BOEM can easily comply with IRA. Don't blame Congress. You can easily comply with the law and remove areas suitable for wind power development from the lease sale and it's very disturbing that BOEM has their hand on the scale. And you know, y'all are leasing for oil drilling and carbon waste injection, areas, some of the very few areas that are suitable for wind power development in the Gulf tend to be near shore. The area is particularly off the Grand Island, then a subregions that are suitable for wind power development are already limited by a lot of legacy infrastructure. Doesn't serve as well. We still are owed a lot of land from that development. And so we don't want to see leasing that precludes wind	Thank you for your comment. BOEM is considering space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind activities, and OCS significant sediment resources and has added <b>Chapter 2.3.4</b> , Issues Identified, to this Supplemental EIS to address these issues. BOEM has also considered the need for OCS wind energy and OCS sediment usage in response to climate change in <b>Chapter 4.0.2.1</b> of this Supplemental EIS. This information will help the decisionmaker determine which alternative to choose in the Record of Decision for this Supplemental EIS and if any additional areas should be removed.

		development from those sub regions. You know, does Exxon really need the 80 or more leases off of coastal Texas that were put forward in least sale 257 for carbon waste injection? Does it really need that much of the ocean? And you know, areas highly suitable for wind power development? I think it's beyond belief. I know you all are smart guys and gals.	
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS fails to consider new circumstances and information relevant to the cumulative impacts of offshore wind development. The DSEIS includes no analysis of cumulative impacts of offshore wind energy development anticipated in the Program area.</p> <p>BOEM must analyze the cumulative impacts of offshore wind development in the context of Lease Sales 259 and 261.</p>	<p>BOEM determined that an analysis of the potential for alternative energy is outside the scope of this Supplemental EIS for a Proposed Action. The purpose and need identified for this Supplemental EIS is to provide an analysis of the environmental impacts of oil and gas leasing. However, BOEM does recognize the need to investigate the potential for alternative energy on the Federal OCS, and this is addressed in the 2017-2022 National OCS Oil and Gas Program EIS, from which this Supplemental EIS tiers.</p> <p>BOEM's Office of Renewable Energy is responsible for developing an offshore renewable energy program in the Gulf of Mexico. Information on BOEM's renewable energy program, OCS leases, and renewable energy projects is available on BOEM's website at <a href="http://www.boem.gov/Renewable-Energy/">http://www.boem.gov/Renewable-Energy/</a>.</p>
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS fails to analyze cumulative impacts associated with carbon capture and sequestration in the OCS.</p> <p>The DSEIS provides no analysis of the cumulative impacts of 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.</p>	<p>BOEM determined that an analysis of the potential for carbon capture and sequestration in the OCS is outside the scope of this Supplemental EIS for a Proposed Action. The purpose and need identified for this Supplemental EIS is to provide an analysis of the environmental impacts of oil and gas leasing. However, BOEM does recognize the need to investigate the potential for carbon capture and sequestration in the OCS. BOEM is working with BSEE to come up with a carbon sequestration rule. The public will have a chance to comment on the draft rule when it comes out.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

**Air Quality**

Air Quality			
Center for Biological Diversity	BOEM-2022-0048-28954	<p>The DSEIS fails to meet NEPA's requirements to disclose the environmental impacts of air pollution by comparing the proposed activity to other sources. BOEM wrongfully concludes that there that since the proposed activity is a small addition to the extensive onshore sources of air pollution its impacts on coastal non-attainment of air quality are minor. Rather, BOEM should estimate the quantity of air pollutants and disclose their contribution to air quality exceedances— to do otherwise would allow an important source of air pollution to evade consideration. Additionally, BOEM should consider the downstream air pollution of refining and processing of offshore oil and gas from the lease sales at onshore refineries and petrochemical facilities.</p> <p>It is undisputed that the lease sales will result in emissions of criteria pollutants including nitrogen oxides ("NOx"), particulate matter ("PM"), sulfur dioxide ("SO"), and carbon monoxide ("CO"). It will also cause ozone ("O3")—or smog—when VOCs, NOx, and ethane react with sunlight. Each of these pollutants are associated with an array of adverse health impacts. There are numerous sources of air pollution from the proposed action. Offshore oil and gas and processing also emits BTEX compounds benzene, toluene, ethyl benzene, and xylene that pose great potential harms. Benzene, for instance, is a known human carcinogen that has been linked to blood disorders such as leukemia, immune system damage and chromosomal mutations. The other BTEX compounds (toluene, ethylbenzene, xylene) have varying effects, including damage to the brain and nervous system, kidneys, and liver, with symptoms of exposure including fatigue,</p>	<p>BOEM considered impacts to air quality and many other resources in Chapter 4 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS; this Supplemental EIS provides a summary of that information as well as relevant updates. Additionally, cumulative impacts were discussed in Chapter 4.1.2.3 of the 2017-2022 GOM Multisale EIS and considered non-OCS oil- and gas-related impacts that included onshore emission sources from non-OCS oil- and gas-related activities including power generation, industrial processing, manufacturing, refineries, commercial and home heating, and motor vehicles (Chapter 3.3.2.5 of the 2017-2022 GOM Multisale EIS). These emissions are regulated by State agencies and/or the USEPA.</p> <p>Air emissions from OCS oil and gas development in the Gulf of Mexico would arise from emission sources related to drilling and production with associated vessel support, flaring and venting, decommissioning, fugitive emissions, and oil spills.</p> <p>The level of impacts to air quality from a single lease sale would be similar for Alternatives A-D. While there are some differences in the number of activities associated with the alternatives, many of the impacts associated with the alternatives are similar because the types of activities that occur are similar and the differences are not large enough to change the range of impact conclusions.</p> <p>The <i>Air Quality Modeling in the Gulf of Mexico</i> study (Wilson et al. 2019b), which is incorporated by reference into this Supplemental EIS, did estimate the quantity of National Ambient Air Quality Standards (NAAQS) air pollutants, and their exceedances were</p>

		<p>drowsiness, headaches, dizziness, confusion, eye and respiratory tract irritation, and loss of muscle coordination.</p> <p>These air pollutants also amplify the risks associated with COVID-19. A major study of air pollution and COVID-19 mortality in the United States found that exposure to even a small increase in fine particulate matter (“PM2.5”) was linked to an 8 percent greater chance of dying from COVID-19.</p> <p>The discussion of the air quality modeling study for the Gulf of Mexico region also fails to describe the air pollution impacts of the proposed lease sales. Instead, it merely notes the existence and methods of the studies and their uncertainties. BOEM must examine the data from its inventory tool referenced in the DSEIS, the Outer Continental Shelf Air Quality System, and use that data to model the air pollution impacts of its proposed action.</p> <p>BOEM cannot rely on EPA’s air pollution permit to substitute from its own analysis under NEPA. The failure of EPA to monitor and enforce air quality standards, as well as states to comply with requirements to reduce air pollution undermine the effectiveness of these permits. BOEM should ensure additional mitigation of air pollution affecting coastal areas that are exceeding or close to exceeding ozone air quality standards. For example, there are significant concerns that the proposed activities will contribute to non-attainment in the Breton National Wildlife Refuge.</p>	<p>discussed in the cumulative section. A key step in performing the <i>Air Quality Modeling in the Gulf of Mexico</i> study in support of the subsequent cumulative and visibility impacts analyses is development of comprehensive air emissions inventories that accurately depict the base year emissions within the study area and emissions associated with the Proposed Action (the future scenario).</p> <p>BOEM’s <i>Year 2014 Gulfwide Emissions Inventory Study</i> (Wilson et al. 2017), which is incorporated by reference in this Supplemental EIS, included a hazardous air pollutant (HAP) scoping task that included selected oil and natural gas platforms. As a result of the scoping study, BOEM included HAP estimates via the Gulfwide Offshore Activities Data System (GOADS) in the 2017 inventory (Wilson et al. 2019a), which is incorporated by reference in this Supplemental EIS. Benzene, toluene, ethylbenzene, and xylene (BTEX) compounds (along with 10 other compounds) were identified as key HAPs emitted from offshore oil and gas production non-combustion and combustion sources.</p> <p>BOEM conducts an emissions inventory study every 3 years to develop a calendar year air pollution emissions inventory for all OCS oil and gas production-related sources on the GOM. The data from the Gulfwide Offshore Activities Data System (GOADS), which was used in the preparation for this analysis, is the same data used in the Outer Continental Shelf Air Quality System (OCS AQS).</p> <p>BOEM’s regulations (30 CFR part 550 subpart C, Pollution Prevention and Control) looks at precursor pollutants to ozone.</p> <p>The <i>Air Quality Modeling in the Gulf of Mexico</i> study (Wilson et al. 2019b), which is incorporated by</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			<p>reference into this Supplemental EIS, examined the potential impacts of the proposed lease sales with respect to the NAAQS for the criteria pollutants O<sub>3</sub>, NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>2.5</sub>, PM<sub>10</sub>.</p> <p>The closest monitor reported near the Breton National Wildlife Refuge is in Meraux, Louisiana (AQS Site ID 22-087-0004). As of 2019, the maximum value of O<sub>3</sub> was reported to be 0.064 parts per million for the 8-hour standard, which is below the primary and secondary standard NAAQS of 0.070 parts per million (USEPA 2020). Impacts to the Breton National Wildlife Refuge potentially are uncertain as this area is surrounded by water. In the <i>Air Quality Modeling Study in the Gulf of Mexico Region</i>, there was uncertainty (National Academies of Sciences 2019; Wilson et al. 2019b) in modeled data over waters of the Gulf of Mexico likely due to limited meteorological and ambient air quality monitoring data. However, the nearby onshore ambient air quality monitor shows O<sub>3</sub> levels are attaining the NAAQS.</p>
<p>Kelsey Lamp (Protect Our Oceans Campaign Director, Environment America)</p>	<p>10.26.22 Virtual Public Hearing Comments</p>	<p>Secondly, the oil and gas extracted from the ocean needs to be refined to be used. Oil refineries are a major source of air pollution, releasing pollutants that exacerbate asthma and contribute to smog. and when refineries, malfunction, they can create air pollution, episodes that threaten public health like the 2019 fire at ExxonMobil's Bay Town, Texas Refinery.</p>	<p>BOEM describes the impacts of onshore facilities or activities that contribute to air pollution in coastal communities as a part of the cumulative impacts analysis in Chapter 4.14.3.2.3 (Cumulative Impacts in Social Factors) of the 2017-2022 GOM Multisale EIS and summarized in <b>Chapter 4.15.3</b> (Social Factors) of this Supplemental EIS. For an analysis of the cumulative impacts to air quality, refer to Chapter 4.1.2.3 of the 2017-2022 GOM Multisale EIS, which considered non-OCS oil- and gas-related impacts and included onshore emission sources from non-OCS oil- and gas-related activities including power generation, industrial processing, manufacturing, refineries, commercial and home heating, and motor vehicles (Chapter 3.3.2.5 of the 2017-2022 GOM Multisale EIS), which are summarized in <b>Chapter 4.2</b> of this Supplemental EIS.</p>

USEPA		EPA recommends that BOEM incorporate cumulative and indirect air quality impacts from potential flaring during Completion and Production Operations for site- or project-specific leases. We recommend the analysis discuss chemicals used during the fracking operation (including tracer material which could be released during the completion activity through flaring of unprocessed natural gas), any Hazardous Air Pollutants pursuant to the Clean Air Act Section 112, estimation of how many and type of flares required during the Production Operations, frequency of flaring, and estimated volume of flared natural gas.	Thank you for your comment. Key HAPs were estimated in the 2017 GOADS (Wilson et al. 2019a), which is incorporated by reference in this Supplemental EIS. Furthermore, venting and flaring volumes are reported in the Office of Natural Resources Revenue's Oil and Gas Operations Report (BOEM 2022d), which we use in the GOADS/OCS AQS. Reported monthly, the GOADS 2017 volume vented and flared data must be consistent with the information provided to the Oil and Gas Operations Report, including data reported based on metered volumes.
NRDC et al.	BOEM-2022-0048-28948	<p>the DSEIS fails to 1) incorporate updated information on air quality impacts of OCS lease sales into its impacts analysis; and 2) analyze the contribution of offshore oil and gas development to exceeding ozone air quality standards onshore as an effect of the proposed action. This constitutes a failure to conduct an adequate impacts analysis under NEPA.</p> <p>The DSEIS fails to incorporate updated rules and analysis from the Environmental Protection Agency in its analysis of the air quality impacts of the proposed action.</p> <p>The DSEIS fails to analyze the contribution of offshore oil and gas development to exceeding ozone air quality standards onshore as an effect of the proposed action.</p>	<p>The <i>Air Quality Modeling in the Gulf of Mexico</i> study (Wilson et al. 2019b), which is incorporated by reference into this Supplemental EIS, examined the potential impacts of the proposed lease sales with respect to the NAAQS for the criteria pollutants O<sub>3</sub>, NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>2.5</sub>, PM<sub>10</sub>.</p> <p>BOEM's air quality regulations can be found in 30 CFR part 550 subpart C, which describes BOEM's regulations for pollution prevention and control. The purpose of these regulations is to ensure that activities authorized in BOEM's approved plans (i.e., EPs, DOCDs, or DPPs) do not significantly affect the air quality of any state.</p> <p>The <i>Air Quality Modeling in the Gulf of Mexico</i> study (Wilson et al. 2019b), which is incorporated by reference into this Supplemental EIS, did estimate the quantity of NAAQS air pollutants, and their exceedances were discussed in the cumulative section.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

**Water Quality**

Water Quality			
Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM's reliance on EPA's regulation of discharges to conclude that the lease sales will have negligible water quality impacts is flawed. BOEM cannot solely rely on another agency – EPA – to prevent environmental degradation, and it has an independent duty to analyze the effects of its action. It is also improper for BOEM to evade analyzing the impacts of water pollution by attributing it as a pittance of overall impacts to the coastal and offshore waters. Under NEPA, BOEM must take a hard look specifically at the impacts of the proposed action and the cumulative impacts of all of those discharges, it is not a question of it being a small percentage of the anthropogenic damage to the Gulf.</p> <p>Each year oil companies discharge billions of gallons of produced water in the Gulf — 2014 and 2017 analyses estimated 75 and 30 billion gallons respectively. We analyzed federal records 2010 to 2020 showing 3,000 instances of offshore fracking, 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 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 DSEIS of the Lease Sale's water quality impacts, including cumulative impacts with the existing and planned offshore drilling activities.</p>	<p>The Clean Water Act (CWA) establishes conditions and permitting for discharges of pollutants into the waters of the United States under the National Pollution Discharge Elimination System (NPDES) and gives the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry and to set water quality standards for all contaminants in surface waters. Accordingly, the USEPA regulates all waste streams generated from OCS oil- and gas-related activities through permits issued by the USEPA Region that has jurisdictional oversight. Permits issued under Section 402 (NPDES) of the CWA for offshore activities must comply with any applicable water quality standards and/or Federal water quality criteria, as well as Section 403 (Ocean Discharge Criteria) of the CWA. The Ocean Discharge Criteria Evaluation for the proposed General Permit for Region 6 can be found at <a href="https://www.epa.gov/system/files/documents/2022-07/2022_GMG290000_ODCE.pdf">https://www.epa.gov/system/files/documents/2022-07/2022_GMG290000_ODCE.pdf</a>. For further information on the USEPA Region 6's NPDES permit GMG290000, including contacts for questions or comments, please refer to <a href="https://www.epa.gov/npdes-permits/western-and-central-gulf-mexico-offshore-oil-gas-npdes-program">https://www.epa.gov/npdes-permits/western-and-central-gulf-mexico-offshore-oil-gas-npdes-program</a>.</p> <p>Though BOEM does not regulate these discharges, BOEM does conduct NEPA analysis on the impacts to water quality and many other resources in Chapter 4 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS; this Supplemental EIS provides a summary of that information as well as relevant updates. Specifically, the cumulative impacts on water quality are addressed in Chapter 4.2.2.3 of the 2017-2022 GOM Multisale</p>

	<p>EPA's regulation of water pollution from offshore oil and gas sources is woefully inadequate.</p> <p>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") has insufficient limits and monitoring of the chemicals associated with well treatment and completion fluids, including fracking chemicals, to protect water quality.</p> <p>Additionally, the limits in EPA's permit are insufficient to protect water quality and marine life. EPA fails to include any limits on the discharges of most pollutants— including fracking chemicals and temperature, which can be an issue with severe temperatures encountered drilling.</p> <p>There is inadequate monitoring of discharges, including toxicity testing, to support BOEM's conclusion that there are negligible water quality impacts from discharges. EPA's General Permit only requires annual toxicity testing of produced waters for many facilities, but annual or even quarterly testing is insufficient to capture the moments—including fracking flowback—that may have the highest toxicity.</p> <p>Our 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.</p>	<p>EIS. Impact-producing factors, including additives used offshore in the GOM for fracturing activities, are discussed in Chapter 3, particularly Chapter 3.1.3.1, of the 2017-2022 GOM Multisale EIS. In Chapter 3.1.5, the role of the USEPA as well as the role of BSEE is discussed, including inspections and compliance.</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>Fracking and other well stimulation chemicals can kill or harm a wide variety of wildlife.</p> <p>There are a variety of studies that have shown harmful impacts on aquatic life. 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, 33 percent of operators covered under the 2017 permit are currently in violation of the permit.</p> <p>EPA's newly proposed Draft General Permit fails to correct any of these problems. BOEM must examine in its DSEIS the environmental impacts of offshore oil and gas water pollution rather than erroneously assuming that EPA's permit eliminates water pollution impacts.</p>	
Diane Desenberg	BOEM-2022-0048-16266	Drilling in the Gulf affects the water quality in the whole Gulf. And our water quality continues to deteriorate, affecting marine animal beachings, extinctions, human health for those who swim and breathe by the Gulf, and of course, climate chaos.	
Kelsey Lamp (Protect Our Oceans Campaign Director, Environment America)	10.26.22 Virtual Public Hearing Comments	In 2019, I co-authored a report entitled Offshore Drilling Onshore Damage and today I want to highlight two of the reports findings that illustrate the onshore pollution created by offshore drilling, which should be considered in decisions around leasing, moving forward alongside the global warming impacts of those lease sales. So first, offshore drilling often creates waste containing oil, toxic contaminants, and radioactive material. Some of this waste may be transported onshore for disposal, and once onshore this waste may be injected into disposal wells or spread on soil. Both disposal methods can lead to local water pollution.	BOEM includes a detailed description of onshore disposal of waste in Chapter 3.1.5.3 of the 2017-2022 GOM Multisale EIS and summarizes the impacts of onshore facilities or activities that contribute to pollution in coastal waterways as a part of the water quality analysis in <b>Chapter 4.3</b> of this Supplemental EIS and in more detail in Chapter 4.2 of the 2017-2022 GOM Multisale EIS. The USEPA and the States of Texas and Louisiana have the authorities to regulate waste and discharge disposal as discussed in Chapter 3.1.5 of the 2017-2022 GOM Multisale EIS.

**Estuarine Systems (Wetlands and Seagrasses/Submerged Vegetation)**

Estuarine Systems (Wetlands and Seagrasses / Submerged Vegetation)			
USEPA		<p>The Supplemental Draft EIS states that operations related to the proposed action over 50 years would be moderate considering the permanent loss of hundreds of acres of wetlands (Section 4.4.1.2 Analysis of Alternatives A-E Summary, pg.4-20). EPA recommends including an analysis of how the permanent loss of hundreds of acres of wetlands could exacerbate coastal degradation. We recommend BOEM assess erosion rates of armored and non-armored coastal areas, as well as wave action and storm surge data, to develop sustainable long-range solutions to protect shorelines and coastal barrier beaches via living shorelines and vegetated/semi-armored shorelines.</p>	<p>Thank you for your comment. BOEM conducted an initial analysis of the affected environment, including wetland loss, in Chapter 4.3.1 of the 2017-2022 GOM Multisale EIS from which this Supplemental EIS is tiered and which is incorporated by reference. BOEM has provided any relevant updates to the analysis of potential impacts from the Proposed Action in the 2018 GOM Supplemental EIS and this Supplemental EIS. These recommendations are useful in planning for future analyses and will be taken into consideration for subsequent activities.</p>
USEPA		<p>EPA recommends BOEM incorporate additional information for impacts that would require a Clean Water Act (CWA) Section 404 permit application, including an Approved Jurisdictional Determination (AJD) and the full analysis pertaining to the CWA 404(b)(1) Guidelines. To address 404 permit requirements, we recommend BOEM discuss steps taken to avoid and minimize impacts (such as modifying the footprint of direct impacts or minimizing the effect of those direct impacts). We recommend the preferred alternative discusses whether it meets the U.S. Army Corps of Engineers' definition of "least environmentally damaging practicable alternative" and include cumulative, secondary, direct, and indirect impacts. Compensatory mitigation may be required for unavoidable impacts to wetlands. EPA recommends BOEM clarify the extent of permanent impacts from construction and other activities that would require additional permits as well as potential mechanisms for mitigation.</p>	<p>In reference to the 404 Permit, no new facilities are expected to be constructed as a result of any alternative of a Proposed Action (page 3-84 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference). However, BOEM acknowledges that the possibility still exists that a company would decide to construct a facility and, if it supported OCS oil- and gas-related activity, it would likely be placed in the coastal zone and wetland impacts could result. That is why such potential impacts are discussed in this Supplemental EIS. Therefore, BOEM projects 0-1 gas processing plants because BOEM makes conservative infrastructure scenario estimates; nevertheless, the projection of between 0 and 1 is more likely to be 0 than 1 (page 3-91 of the 2017-2022 GOM Multisale EIS).</p> <p>BOEM would rely on mitigating measures typically required under the CWA's requirements, COE's 404 Permit, and State-permitting programs for any potential reduction or avoidance of impacts. BOEM has no authority to enforce mitigation for wetland</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			impacts, and there is no known footprint for construction at this stage of prelease impact assessment.
Ian Giancarlo (Environment Florida)	10.26.22 Virtual Public Hearing Comments	Tar balls even made their way onto Florida's beaches, devastating local communities, the tourism industry, and coastal environments, such as wetlands.	BOEM is very concerned about the potential impacts of oil spills on the environment and human uses of the environment. In the 2017-2022 GOM Multisale EIS and the 2018 GOM Supplemental EIS, OCS oil- and gas-related oil spills are analyzed in the "Accidental Events" chapters, and other spills (e.g., in State waters or from other sources on the OCS) are analyzed in the "Cumulative Impacts" chapters for all relevant resources from which this Supplemental EIS is tiered and which is incorporated by reference. As impacts from the <i>Deepwater Horizon</i> explosion, oil spill, and response continue to be assessed, additional analyses will be completed at the site-specific approval stage and in future NEPA analyses. Impacts of a catastrophic spill (including tar balls), which is not reasonably foreseeable, on coastal habitats are analyzed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).
Ian Giancarlo (Environment Florida)	10.26.22 Virtual Public Hearing Comments	Impacted wetlands have a reduced capacity to buffer storm surges and sea level rise, which are just going to get worse with climate change.	Thank you for your comment. BOEM conducted an initial analysis of the affected environment, including wetlands, in Chapter 4.3.1 of the 2017-2022 GOM Multisale EIS from which this Supplemental EIS is tiered and which is incorporated by reference. BOEM has analyzed the potential impacts from the Proposed Action to estuarine systems (wetlands and seagrasses/submerged vegetation) in <b>Chapter 4.4.1</b> of this Supplemental EIS as well as Chapter 4.3.2 of the 2017-2022 GOM Multisale EIS. This analysis considers the impact-producing factors that have been identified as potentially affecting these resources and describes potential impacts to these resources as a whole in the GOM.
Lesly Van Dame	BOEM-2022- 0048-20935	The Gulf of Mexico is over 5 million acres and is the largest gulf in the world comprising the 10th largest body of water on this planet. To quote a statemen: "The Gulf's coastal wetlands serve as an essential habitat for numerous fish and wildlife species, including migrating waterfowl (about 75% traversing the U.S.), seabirds, wading birds, furbearers, and sport and commercial fisheries." We cannot risk the value to the U.S. provided by a safe and life supporting area.	
Center for Biological Diversity	BOEM-2022- 0048-28954	BOEM is well aware that the offshore oil and gas industry contributes to wetlands loss along the Gulf Coast. While the DSEIS acknowledges wetland loss will be moderate from vessel operations	Thank you for your comment. In the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, BOEM analyzes impact-producing factors and potential effects at scales appropriate to the Proposed Action

		<p>associated with the lease sales over 50 years, it failed to include sufficient analysis of coastal habitat loss from other activities. From 1932 to 2010, coastal Louisiana lost about 1.2 million acres, equating to coastal wetlands disappearing at a rate of about one football field per hour. The oil and gas industry admits that it is responsible for at least 36 percent of the total loss of this area, though the Department of the Interior has stated that the industry could be responsible for as much as 59 percent of the loss. BOEM cannot dispute also that recent studies have shown that previous analyses overestimated the resilience of Louisiana marsh and wetlands. Presumably, the DSEIS' inadequacies are tied to its flawed assumption there will be only 0 to 1 pipelines making landfall.</p>	<p>and resources considered, including estuarine systems (wetlands and seagrasses/submerged vegetation) and provides an analysis of impacts of BOEM-regulated activities.</p> <p>BOEM considers the analysis of coastal habitat loss to be adequate. The cumulative analysis considers past, ongoing, and reasonably foreseeable activities, which includes current rates of coastal land loss.</p> <p>The scenario analyzed is developed through a series of spreadsheet-based data analyses tools and forecast models to estimate the oil and gas production volumes and associated exploration, development, and decommissioning activity anticipated to result in the Gulf of Mexico Program Area from actions proposed in BOEM's National OCS Oil and Gas Leasing Programs.</p> <p>Historical leasing trends, drilling trends, oil and gas discovery volumes, production activity, and other BOEM short-term forecasts are analyzed to generate the data and information used in the models. The forecasts developed are analyzed in conjunction with historical data to ensure that historical precedent and recent trends are reflected in each activity forecast.</p>
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**Deepwater Benthic Communities**

Deepwater Benthic Communities			
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS fails to analyze the direct, indirect, and cumulative impacts that Lease Sales 259 and 261 will have on deepwater marine environments, such as deepwater fishes, corals, and canyon habitats.</p> <p>The DSEIS confines the subject matter of its deepwater analysis to impacts on habitats and benthic communities. It is insufficient for BOEM to acknowledge that oil and gas activities will cause</p>	<p>BOEM conducted an initial analysis of the affected environment, including deepwater benthic communities, in Chapter 4.4.1 of the 2017-2022 GOM Multisale EIS from which this Supplemental EIS is tiered and which is incorporated by reference. BOEM has analyzed the potential impacts from the Proposed Action to deepwater benthic communities in <b>Chapter 4.5</b> of this Supplemental EIS, as well as Chapter 4.4.2 of the 2017-2022 GOM Multisale EIS. This analysis</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>environmental damage and fail to include an analysis of these impacts.</p> <p>It is incongruent for BOEM to simultaneously determine that damages to deepwater benthic communities as a result of OCS oil and gas activities will be “irreversible” on the one hand, and elect to conclude that the overall impacts to these same species and environments will be “negligible” on the other.</p>	<p>considers the impact-producing factors that have been identified as potentially affecting these resources and describes potential impacts to these resources as a whole in the GOM.</p> <p>The deepwater benthic communities chapter analyzes the impact to chemosynthetic, biogenic, and geological habitat and associated habitat-forming organisms (e.g., corals) in waters depths greater than 300 m (984 ft). Analysis of direct and indirect impacts, as well as from accidental events, to deepwater benthic communities is included in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM’s discussion of deepwater benthic communities including deep-sea, cold-water corals falls short in several respects. First, the agency finds that impacts to deepwater benthic communities from the lease sales will be “negligible” because the expected OCS oil- and gas- related activities would contribute “incrementally” to overall cumulative effects. As noted above, allowing the agency to avoid analysis under the guise of “incremental impacts” would excuse BOEM from ever having to do meaningful environmental analysis of offshore oil and gas leasing. Such artificial segregation of effects is improper in light of emerging evidence that anthropogenic impacts including industrial oil and gas activity influence benthic habitat quality in Gulf ecosystems.</p> <p>BOEM additionally fails to analyze the impacts of climate change on deepwater benthic communities including corals. The interacting stressors of oil and dispersants alongside climate change can pose significant challenges for some deepwater coral species.</p> <p>BOEM’s analysis of deepwater benthic communities also fails due to internal inconsistency. Specifically, the agency states that it has “incomplete or unavailable information” on “the</p>	<p>In the context of cumulative impacts, including the potential of climate change-related effects to alter baseline environmental conditions in the GOM, the potential impact of a single lease sale would contribute incrementally (i.e., additively) to overall ongoing existing and potential impacts to deepwater benthic communities. Relative to other existing and potential impacts, this incremental contribution is expected, per the scenario, to be small. Benthic habitat is spatially discrete, and no population impacts to deepwater benthic communities are expected to occur. The potential contributing direct and indirect impacts and those from accidental events to deepwater benthic communities are discussed in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.</p> <p>New information was identified that discusses the spatial distribution and community structure within deepwater canyons in the GOM . This information was reviewed, and it was determined that this information supports the previous analyses in the above documents and does not change any impact conclusions.</p>

		<p>locations of deepwater benthic communities in the [Gulf of Mexico].” It then goes on to conclude that “BOEM’s distancing criteria ... prevent oil and gas infrastructure from being installed in close proximity to sensitive deepwater coral communities.” If BOEM does not know where all these communities are, it cannot prevent oil and gas infrastructure from being installed in close proximity to them and thus cannot sufficiently protect them.</p>	<p>The analysis conducted in the above-referenced NEPA documents discusses impacts and impact duration from bottom-disturbing activities, drilling-related sediment and discharges, accidental oil spills, if they were to occur, and cumulative activities. BOEM reviews post-lease activity applications (drilling, pipelines, decommissioning activities, etc.) and applies lease stipulations and site-specific impact avoidance mitigations to avoid impacts to deepwater benthic communities. These measures reduce the impact of the proposed activities analyzed in this Supplemental EIS to “negligible.”</p>
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**Sargassum and Associated Communities**

Sargassum and Associated Communities			
<p>Center for Biological Diversity</p>	<p>BOEM-2022-0048-28954</p>	<p>BOEM’s discussions of impacts to Sargassum, associated communities, and Live Bottoms fail because they suffer from the defects identified above. First, the agency asserts that impacts to these species and communities will be “negligible” because they are “incremental,” an approach that effectively absolves BOEM from ever finding any significant impact from oil and gas leasing. In addition, BOEM neglects to even mention climate change in its discussion of <i>Sargassum</i>; in its discussion of impacts to Live Bottoms, the agency again erroneously asserts that climate change is a “non-OCS oil- and gas-related activit[y].”</p>	<p>BOEM conducted an initial analysis of the affected environment, including <i>Sargassum</i> and associated communities, in Chapter 4.5.1 of the 2017-2022 GOM Multisale EIS from which this Supplemental EIS is tiered and which is incorporated by reference. BOEM has analyzed the potential impacts from the Proposed Action to <i>Sargassum</i> and associated communities, including the effects of climate change, in Chapter 4.5.2 in the 2017-2022 GOM Multisale EIS and is incorporated by reference in <b>Chapter 4.6</b> of this Supplemental EIS.</p> <p>Further, this comment incorrectly characterizes BOEM’s impact determination for <i>Sargassum</i>. The Draft Supplemental EIS states “the incremental contribution of a Proposed Action on the population of <i>Sargassum</i> would be negligible.” This determination is based, in part, on the enormous range and population size of <i>Sargassum</i> in the Gulf of Mexico.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

**Topographic Features**

Topographic Features			
Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM once again evades its responsibility to conduct a thorough analysis of the proposed lease sales on corals because it concludes the impacts will be “negligible” because of their “incremental contribution” compared to the “overall cumulative effects” experienced by these species. The agency fails to discuss new research discussing how construction of ancillary facilities and dredging may affect coral species. BOEM also fails to include in its corals analysis any meaningful discussion of the myriad ways climate change impacts flowing from development of the lease sales will impact coral species. This is unacceptable given the dire threat climate change poses to coral species.</p> <p>Climate change is devastating corals across the globe and a growing body of scientific research highlights the imperative of reducing the fossil fuel emissions driving ocean warming if we wish to conserve coral species. ...Climate change underlies a number of identifiable threats to coral species including ocean warming, ocean acidification, disease, sea level rise, hurricanes, and hypoxia.</p>	<p>BOEM conducted an initial analysis of the affected environment, including corals, in Chapters 4.4.1.2, 4.6.1.1, and 4.9.5.1 of the 2017-2022 GOM Multisale EIS from which this Supplemental EIS is tiered and which is incorporated by reference. BOEM has analyzed the potential impacts from the Proposed Action to corals, including the effects of climate change, in Chapters 4.4.2, 4.6.1.2, and 4.9.5.2 of the 2017-2022 GOM Multisale EIS and is incorporated by reference into <b>Chapters 4.5, 4.7, and 4.10.5</b> of this Supplemental EIS.</p> <p>BOEM analyzes impact-producing factors and potential effects at scales appropriate to the Proposed Action and resources considered, including corals associated with topographic features, pinnacles and low-relief features, and other potentially sensitive benthic features. Protected corals within the area of potential effect (e.g., <i>Orbicella faveolata</i> and <i>Acropora palmata</i>) are also considered.</p> <p>BOEM has reviewed the additional sources of information cited regarding the effects of dredging activities on corals. The Supplemental EIS, and the documents from which it tiers, does discuss the direct/indirect impacts of sediment plumes and transport. The additional sources of information mentioned would not change the conclusions of the analysis or impact determinations for corals. BOEM will continue to review new information, as it becomes available, in future NEPA analyses.</p> <p>In the context of cumulative impacts, the potential impact of a single lease sale would contribute incrementally (i.e., additively) to overall ongoing existing and potential impacts to topographic features</p>

			<p>and other potentially sensitive hard bottom benthic communities, including habitat forming corals, in shallow water (&lt;300 m; 984 ft). Relative to other existing and potential impacts, this incremental contribution is expected, per the scenario, to be small. As with archaeological resources, benthic habitat is spatially discrete, and no population impacts to shallow-water benthic communities is expected to occur. The potential contributing direct and indirect impacts and those from accidental events to topographic features, pinnacle and low-relief features, and other potentially sensitive benthic communities are discussed in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.</p> <p>Regarding the portion of the comment on the potential impact of global climate change to coral and coral communities, it is outside of the scope and purpose of this NEPA analysis.</p>
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**Fish and Invertebrates**

Fish and Invertebrates			
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS fails to analyze the direct, indirect, and cumulative impacts that Lease Sales 259 and 261 will have on deepwater marine environments, such as deepwater fishes, corals, and canyon habitats.</p> <p>The DSEIS confines the subject matter of its deepwater analysis to impacts on habitats and benthic communities. It is insufficient for BOEM to acknowledge that oil and gas activities will cause environmental damage and fail to include an analysis of these impacts.</p> <p>It is incongruent for BOEM to simultaneously determine that damages to deepwater benthic communities as a result of OCS oil and gas activities will be “irreversible” on the one hand, and elect to conclude that the overall impacts to these</p>	<p>The direct, indirect, and cumulative impacts from routine activities (i.e., anthropogenic sound, bottom-disturbance, and habitat modification) and accidental events (e.g., reasonably foreseeable oil spills) associated with proposed Lease Sales 259 and 261 are discussed in Chapter 4.7 of the 2017-2022 GOM Multisale EIS and <b>Chapter 4.8</b> of this Supplemental EIS.</p> <p>These analyses apply to deepwater fishes; the impact analyses are generally framed in a manner that addresses impacts to fish and invertebrates regardless of water depth. For example, it is expected that the various life stages of fish and invertebrates would react or be impacted similarly from bottom disturbances resulting in increased turbidity in the water column regardless of where these disturbances occur.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>same species and environments will be “negligible” on the other.</p>	<p>Several studies (e.g., Pulster et al. 2020a; Romero et al. 2020; Snyder et al. 2019) that investigated the impacts of polycyclic hydrocarbon (PAH) exposure on deepwater fish and invertebrates are summarized in <b>Chapter 4.8.4</b> of this Supplemental EIS. Results from studies investigating the impacts of PAH exposure in deepwater fish and invertebrates are variable, likely include PAHs from multiple sources (i.e., both anthropogenic and natural), and depend on species-specific behaviors and habitat associations (e.g., pelagic or demersal). Further, fish and invertebrate species in the GOM are widespread throughout the basin as most species have pelagic eggs and/or larvae, which reduces the potential for population-level impacts from routine and accidental events reasonably expected to occur.</p> <p>Based on the most recently available information, BOEM does not expect population-level impacts to fish and invertebrates from proposed Lease Sales 259 and 261. Impacts to benthic habitats and associated habitat-building invertebrates such as corals are discussed in Chapters 4.4 and 4.6 of the 2017-2022 GOM Multisale EIS.</p> <p>Considering the above, and in the context of cumulative impacts, the potential impact of a single lease sale would contribute incrementally (i.e., additively) to overall ongoing existing and potential impacts to fish and invertebrates, including deepwater fish and invertebrates. Relative to other existing and potential impacts, this incremental contribution is expected, per the scenario, to be small.</p>
Earthjustice et al.	BOEM-2022-0048-28951	<p>As to fish and invertebrate resources, BOEM claims the effects “would be considered equal because of the diversity and widespread distribution of fish and invertebrate species throughout the potential area of interest.” It goes on to acknowledge that leasing in the Western Planning Area (WPA) would be smaller</p>	<p>The direct, indirect, and cumulative impacts from routine activities and accidental events associated with a proposed lease sale to fish and invertebrate resources are discussed in Chapter 4.7 of the 2017-2022 GOM Multisale EIS and <b>Chapter 4.8</b> of this Supplemental EIS. BOEM has updated the analysis in</p>

		<p>and bring less activity than leasing in the Central/Eastern Planning Area (CPA/EPA), but then concludes “the potential for impacts to populations is independent of the planning area(s) analyzed” because it assumes “the distribution of species may generally be considered even throughout their range of habitat within the planning area.” None of this means that the effects would be equal among alternatives. These statements refer only to spatial distribution vis a vis planning area boundaries. They do not explain why leasing over a larger area will have the same effects as leasing over a smaller area. This paragraph does not even consider how a regionwide lease sale encompassing both the WPA and CPA/EPA (Alternative A) compares with just one planning area (Alternative B or C), only how the WPA alone compares with the CPA/EPA alone (Alternative B vs. C). And even then, it does not explain why the different size and location of the planning areas is irrelevant or “independent.” Different fish and invertebrate populations inhabit different areas of the Gulf. A population inhabiting mainly areas off the Florida, Alabama, and Mississippi coasts will be affected much more by leasing in the CPA/EPA than by leasing in the WPA—the potential for impacts to that population will not be independent of the planning area analyzed. And a population spanning the Gulf will experience more widespread impacts under Alternative A than leasing in only the WPA or the CPA/EPA. Finally, this paragraph in the SEIS makes no effort to address the differential activity levels between the alternatives. To restate the obvious, a higher level of activity necessarily results in a higher level of effects from those activities. Even if fish and invertebrate species are diverse and have a widespread distribution, they will experience higher effect levels when activity levels are higher. BOEM offers no rational basis to</p>	<p>this Supplemental EIS to further clarify anticipated impacts to fish and invertebrates for each of the action alternatives. Although the action alternatives could result in a different level of activity and potential exposure of fish and invertebrates to impact-producing factors, because each planning area encompasses a similar breadth of habitat types (i.e., coastal, estuarine, continental shelf, continental slope, and abyssal plain) and associated species, a similar mix of species would be exposed to the analyzed routine activities and accidental events (negligible to minor impacts, excluding structure emplacement). Post-lease, site-specific mitigations applied also avoid and/or minimize impacts to diverse fish and invertebrate communities associated with sensitive hard bottom habitats regardless of the alternative chosen.</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		conclude that the effect levels to fish and invertebrates will be the same across alternatives.	
Earthjustice et al.	BOEM-2022-0048-28951	In this case, BOEM appears to be relying on a programmatic EFH consultation completed in 2017, even though BOEM and NMFS are actively working on an updated programmatic consultation that it expects will be complete by December 2022. NMFS has designated EFH for numerous species in the Gulf, including numerous tuna and billfish species, as well as numerous coastal pelagic, reef fish, coral, and other species. Given the dearth of analysis the SEIS presents on fish habitat and the fact that updated information and mitigation measures will be available very shortly, it is arbitrary and capricious and inconsistent with legal provisions requiring informed, transparent decision-making for BOEM to finalize any decision on this lease sale (or any other) without first completing the EFH consultation process and making that information available for comment by the Gulf of Mexico Fishery Management Council and the public as a whole. BOEM admits that decommissioning activities alone could decimate up to 45% of the greater amberjack population—a population that has been overfished and struggling to rebuild for at least 20 years. Additional impacts on the natural habitat of these species—much of which has already been degraded by oil- and gas-related activities—must be fully examined based on the best available science and disclosed to NMFS, the Council, and the public before BOEM speeds ahead with lease sales.	BOEM recently completed a regional, programmatic consultation with NMFS under the Magnuson-Stevens Fishery Conservation and Management Act (67 FR 2343). This consultation covers reasonably foreseeable oil and gas activities on the Gulf of Mexico OCS. Reasonably foreseeable activities include lease sales (including Lease Sales 259 and 261) 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. These activities were included and analyzed in the <i>Essential Fish Habitat Assessment for Oil and Gas Activities in the Gulf of Mexico</i> (BOEM 2022b). Conservation Recommendations from the 2022 EFH consultation include mitigations/conditions of approval, reporting standards, and triggers for site-specific EFH consultation that will also apply to Lease Sales 259 and 261.
Center for Biological Diversity	BOEM-2022-0048-28954	BOEM's analysis of impacts to fish and invertebrate resources is inadequate. The agency again fails to mention how OCS oil- and gas-related greenhouse gas emissions contribute to climate change, and how climate change in turn impacts Gulf fish and invertebrate resources. The agency also improperly segregates the impacts of Lease Sales 259 and 261 from the overall impacts of oil and gas exploration in	The impacts of how oil- and gas-related greenhouse gas emissions contribute to climate change are discussed programmatically in Chapter 4.2 of the 2017-2022 National OCS Oil and Gas Program EIS, and a summary of new research published since publication of the 2018 GOM Supplemental EIS investigating the impacts of climate change on GOM fish and invertebrates have been added to

	<p>the Gulf, finding that the “incremental contributions” of these lease sales would be “minor” and “negligible.” BOEM attempts to divert attention from the impacts of oil and gas by saying that fishing will have an even greater impact on fish and invertebrate resources. This rationale is a red herring; that a different stressor may have different or greater impacts than oil and gas development does not mean that the impacts of oil and gas development must necessarily be “minor.”</p> <p>While BOEM acknowledges that oil and gas infrastructure may have “moderate” impacts on species distributions in the Gulf (despite emerging research suggesting that the impacts of such infrastructure may be “significant”), the agency fails to discuss how these oil- and gas- associated structures may alter ecosystem structure and function by allowing the proliferation and dominance of exotic species. BOEM must conduct a more thorough and searching analysis of the impacts of oil and gas leasing on Gulf species assemblages and distributions.</p> <p>BOEM also must discuss the potential for entrainment and impingement of fish and invertebrates in cooling water intake structures on rigs and floating production storage and offloading facilities. The agency should describe what technological controls are being used to control entrainment and impingement of aquatic organisms at offshore facilities, what impacts still are likely to occur to Gulf species and ecosystems.</p> <p>BOEM also neglects to discuss research on the impacts of seismic surveys on fish and invertebrate species published subsequent to Elliott et al. (2019). For example, van der Knapp et al. (2021) investigated the extent and duration of behavioral</p>	<p><b>Chapter 4.8.4</b> of this Supplemental EIS. The results from these studies are consistent with previous BOEM analyses and do not alter previous conclusions. A lease sale would likely not involve the installation of new structures in continental shelf waters where they have the ability to attract and retain structure-oriented fish (i.e., reef fish) and invasive species (e.g., orange cup coral and lionfish), as well as result in up to moderate changes to species distributions in the region. It is likely the installation of new infrastructure associated with this lease sale would result in the installation of floating facilities in deep water (&gt;300 m; 984 ft), which could result in the short-term attraction of highly migratory pelagic fishes, such as sharks and tunas (negligible impact).</p> <p>The entrainment impact-producing factor (Chapter 3.1.5.1.6) was considered in the 2017-2022 GOM Multisale EIS and was determined to be insignificant under all reasonably foreseeable circumstances due to the limited exposure and/or response expected for fish and invertebrate resources. Therefore, it was not analyzed in Chapter 4.7 of the 2017-2022 GOM Multisale EIS. A Joint Industry Biological Baseline Study was completed for USEPA Region 6 in June 2009 (LGL Ecological Research Associates Inc. 2009), and an industry-wide cooling water intake structure entrainment monitoring study, approved by USEPA Region 6, was completed in 2014 (CSA Ocean Sciences Inc. and LGL Ecological Research Associates Inc. 2014). The results of these two studies support BOEM’s findings that entrainment is insignificant as an impact-producing factor for the purpose of this analysis. No new information has been found since publication of the 2017-2022 GOM Multisale EIS that would change this impact determination.</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>responses in free-swimming Atlantic cod (<i>Gadus morhua</i>) from exposure to a full-scale seismic survey. They found that cod left the detection area more quickly than expected in the days to weeks following the survey, that they decreased their activity during exposure, and that diurnal feeding cycles were disrupted. The authors conclude that “[t]he combined effects of delayed deterrence and activity disruption indicate the potential for seismic surveys to affect energy budgets and to ultimately lead to population-level consequences.” Hall et al. (2021) explored the impacts of seismic surveys on snow crab (<i>Chionoecetes opilio</i>). Several transcripts associated with immune function, inflammatory response, and metabolism showed significantly higher expression after seismic exposure. BOEM must integrate this and other emerging research into its analysis.</p> <p>BOEM also improperly downplays the effects of routine and catastrophic oil spills on fish species. Contrary to BOEM’s characterization, many taxa at high risk of extinction, including elasmobranchs, face a significant risk from oil spills in the Gulf of Mexico. That “[a]ccidental spills have been historically low-probability events and are typically small in size” does not mean “the expected impact to fishes and invertebrate resources from accidental oil spills is negligible.” The Deepwater Horizon catastrophe demonstrated the opposite—that accidental spills can be devastating. The statistical probability of a rupture from any one lease does not absolve BOEM from conducting a thorough and reasoned analysis of the impacts that oil spills, both small and large, would have on fish and invertebrate resources. This is especially true given the “spatially and temporally extensive” habitat modifications that oil and gas exploration and development have had on Gulf ecosystems and the fact that even small</p>	<p>The studies mentioned include species and environments that are dissimilar from those found in the GOM. Chapter 4.8.4 of the 2018 GOM Supplemental EIS includes a summary of the Meekan et al. (2021) study that investigated the impacts of a commercial seismic source on an assemblage of tropical demersal fishes targeted by commercial fisheries on the northwest coast of Australia. This study included species (e.g., <i>Lutjanidae</i> sp.) and environments (i.e., tropical and subtropical continental shelf) that more closely align with those found in the GOM. Further, seismic surveys are primarily conducted in deep water (&gt;300 m; 984 ft) and not over the continental shelf where the impacts to commercially valuable fishes, such as reef fish, occur. The additional sources of information mentioned would not change the conclusions of the analysis and impact determinations for underwater sound.</p> <p>Thank you for the additional resources regarding the impacts of accidental oil spills. Upon a global review of the available scientific literature related to the impacts of oil spills, the impact determination has been changed from “negligible” to “negligible to minor” in this Supplemental EIS for Lease Sales 259 and 261. BOEM acknowledges that, depending on the size of a reasonably foreseeable oil spill, its spatiotemporal distribution (e.g., shallow embayment with limited water flow), spill response (e.g., use of dispersants), and species and life-stages exposed, localized, but measurable impacts (e.g., mortality of eggs/larvae or immobile, benthic species and abandonment of suitable habitats) may occur. While population-level impacts would not be expected, short-term, community-level variations may be locally detected (e.g., species mix and relative abundance), constituting a “minor” impact. For more information regarding how accidental oil spills can impact fish and invertebrates, refer to Chapter 4.5.8 in BOEM’s</p>
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		<p>exposures to oil can harm fish and invertebrate organisms.</p> <p>A growing body of evidence demonstrate that even brief exposures to crude oil and its components can have severe impacts on fish and invertebrate species.</p> <p>Recent research demonstrates that fish exposure to oil and gas from any given lease—exposure that contributes to the cumulative stresses experienced by individual animals—rises to the level of significance.</p> <p>Leases 259 and 261 will contribute to elevated PAH exposures for both fish and invertebrates, placing species and ecosystems at risk. The agency’s assertion that the effects of routine activities and accidental spills “from OCS oil- and gas-related activities to the overall cumulative impacts on fish and invertebrate species as a result of a single lease sale would be minor” is thus erroneous.</p> <p>BOEM also completely neglects to discuss the impacts to fish and invertebrates from exposure to fracking chemicals. This omission is unjustified given the volume and toxicity of oil and gas- related discharges. This shortcoming is exemplified by considering the current General Permits that govern discharge into the Gulf of Mexico. Under these permits, offshore oil and gas facilities can discharge massive quantities of polluted wastewater into the ocean. These discharges are permitted despite the fact that BOEM and EPA often do not know what chemicals are used in fracking and other well operations, do not know the chemical composition of the waste fluids from these procedures, and have little to no information regarding the impacts of many of these chemicals on marine organisms.</p>	<p><i>Biological Environmental Background Report for the Gulf of Mexico OCS Region (BOEM 2021a).</i></p> <p>The CWA establishes conditions and permitting for discharges of pollutants into the waters of the United States under the NPDES and gives the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry and to set water quality standards for all contaminants in surface waters. Accordingly, the USEPA regulates all waste streams generated from OCS oil- and gas-related activities through permits issued by the USEPA Region that has jurisdictional oversight. Permits issued under Section 402 (NPDES) of the CWA for offshore activities must comply with any applicable water quality standards and/or Federal water quality criteria, as well as Section 403 (Ocean Discharge Criteria) of the CWA.</p> <p>The primary impact-producing factor of concern related to well stimulation activities in the Gulf of Mexico OCS would be discharges of well treatment, completion, and workover fluids, which are discussed in Chapters 3.1.5.1, 3.1.3.1, and 4.2 of the 2017-2022 GOM Multisale EIS, and <b>Chapter 4.3</b> of this Supplemental EIS. The potential effects of produced waters (including well treatment, completion, and workover fluids) on other resources, such as deepwater benthic communities (<b>Chapter 4.5.2</b>), live bottom habitats (<b>Chapter 4.7</b>), and protected species (<b>Chapter 4.10</b>) have also been analyzed and are expected to be negligible due to the assumed compliance with all permitting requirements and existing regulations. The same rationale is applied for fish and invertebrate resources. If fish and invertebrates were to come into contact with such discharges, impacts could occur at isolated locations, but they would be small in scale, limited in size, scope,</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>While EPA recently proposed a new NPDES permit for oil and gas facilities in the Western portion of the Gulf, this permit would allow more of the same. Under its draft terms, companies still could discharge unlimited quantities of waste fluids, including fracking chemicals, without adequate understanding of their numerous risks.</p> <p>The Industry Report acknowledges that “[p]erforming more comprehensive evaluations would require proprietary information on concentrations of individual substances in chemical products.” Unless and the oil and gas industry is required to disclose the complete chemical makeup of discharged products, government agencies will be unable to evaluate the toxicity of the individual chemicals or interacting chemicals and thus unable to ensure adequate protection of Gulf resources. BOEM must discuss fracking chemical toxicity and its implications for fish and invertebrate species in its analysis.</p>	and duration, with <b>negligible</b> population-level impacts expected.
Sheryl Collins	BOEM-2022-0048-15924	The oil deposits taken to the bottom by dispersants are just as harmful. The creatures that managed to survive are sick and feeding off these toxic waste products and humans eventually feed off them.	Thank you for your comment. The impacts of oil deposits/contaminants in sediments to fish and invertebrates are discussed in Chapter 4.7 of the 2017-2022 GOM Multisale EIS and in <b>Chapter 4.8.4</b> of this Supplemental EIS.
Linda S Barnes	BOEM-2022-0048-19052	The Gulf coast is still reeling from the effects of the Deepwater Horizon explosion and massive spill. Shellfish production is still down.	The impacts of accidental events to fish and invertebrates (including shellfish), such as oil spills, are discussed in Chapter 4.7 of the 2017-2022 GOM Multisale EIS and in <b>Chapter 4.8.4</b> of this Supplemental EIS. The cumulative impacts affecting shellfish from non-OCS oil- and gas--related activities, such as commercial fishing, the conversion or modification of wetlands, invasive species, and climate change, are also considered in Chapter 4.7 of the 2017-2022 GOM Multisale EIS.

**Birds**

Birds			
<p>Earthjustice et al.</p>	<p>BOEM-2022-0048-28951</p>	<p>For birds, the SEIS states Alternative A “would have more OCS oil- and gas-related activities than the other alternatives, and thus more potential for impacts,” and that “[i]mpacts from the other alternatives would follow in graded fashion.” BOEM then inexplicably disregards that common sense proposition to conclude that “the level of impacts would be the same for Alternatives A–D” “because of the diversity and distribution of offshore pelagic bird species.” Again, the fact that bird species may be diverse or widely distributed does not negate the fact that higher and more widespread activity levels result in more potential for impacts to those diverse bird species.</p>	<p>BOEM concludes from its analysis in the 2017-2022 GOM Multisale EIS, 2018 GOM Supplemental EIS, as well as this Supplemental EIS for Lease Sales 259 and 261 that the level of impacts from the Proposed Action on birds would be the same for Alternatives A-D despite Alternative A’s Area of Interest being larger than Alternatives B-D.</p> <p>The effects associated with selection of any of the alternatives would be equivalent because of the distribution of bird species throughout the potential areas of interest. The analyses provided in <b>Chapter 4.9.4</b> in this Supplemental EIS and in Chapter 4.8.2 of the 2017-2022 GOM Multisale EIS considered impacts to species occurring across all planning areas. While Alternatives B, C, and D would be in a smaller area with less projected activity than Alternative A, activities isolated to specific planning areas pose similar potential impacts to individuals as do activities occurring in all planning areas. Therefore, birds would be exposed to the analyzed impact-producing factors, regardless of the specific action alternative selected.</p>
<p>Center for Biological Diversity</p>	<p>BOEM-2022-0048-28954</p>	<p>BOEM’s discussion of the impacts of Lease Sales 259 and 261 to bird species falls short in several key respects. The agency again downplays the “incremental contribution” of the proposed action. First, BOEM assumes that bird habitat in and near the Gulf of Mexico is homogenous, which is demonstrably not the case. Second, the agency argues that very few individuals would be affected by routine oil and gas activities and that any impacts would be trivial. This, too, runs contrary to a substantial body of research. For example, Senzaki et al. (2020) found “that anthropogenic</p>	<p>BOEM analyzes impact-producing factors and potential effects at scales appropriate to the Proposed Action and resources considered, including birds. Population-level impacts and their contribution to the overall impact determinations were considered in both this Supplemental EIS and 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, which are incorporated by reference.</p> <p>BOEM analyzes the potential impacts from the Proposed Action to birds in <b>Chapter 4.9.2</b>. The analyses there take into account the impact-producing factors that BOEM has identified as potentially</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>noise and light can substantially affect breeding bird phenology and fitness.”</p> <p>Oil pollution poses a well-known and significant threat to seabirds. This is especially true in the Gulf of Mexico, where the produced low density, low viscosity “light Louisiana sweet crude” tends to remain at the surface and in upper water column for more extended periods of time than other crude oil forms. Seabirds are particularly vulnerable to offshore oil and gas development because of their frequent contact with the water’s surface, their myriad foraging strategies, and the propensity of oil—even the thinnest sheen—to adhere to the birds’ plumage. Contact with oil can lead to effects that are acute to chronic, and lethal to sublethal. Sublethal effects can occur even when oil is not visible. Oil exposure can induce long-lasting effects, even reducing long-term reproductive success. In addition to direct effects, seabirds can be impacted indirectly by oil pollution through reduced prey availability.</p> <p>Michael et al. (2022) assessed the relative vulnerability to oil of 24 seabird species whose habitat overlaps with oil and gas platforms in the northern Gulf of Mexico. Their vulnerability determination for each species was the synthesis of potential oil exposure (determined by seasonal occurrence, foraging technique, flocking behavior, and overlap with oil and gas platforms) and sensitivity (determined by age at first breeding, duration of incubation and fledging, and residency status). They found near-complete (~89 percent) overlap of oil and gas platforms within seabird habitat, “suggest[ing] a high potential for seabirds to interact with any given platform.”</p>	<p>affecting the resources and describes the potential impacts to those populations as a whole in the GOM.</p> <p>Oil spills are discussed in <b>Chapter 3.3.1</b> of this Supplemental EIS as well as in Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS. The potential effects of oil spills on birds are discussed in <b>Chapter 4.9.2</b> of this Supplemental EIS and Chapter 4.8.2.2 of the 2017-2022 GOM Multisale EIS.</p> <p>Climate change-related effects have the potential to alter baseline environmental conditions throughout the GOM. This Supplemental EIS discloses the potential impacts of Lease Sales 259 and 261 in the GOM. The effects of climate change on birds are discussed in Chapter 4.8.2.2 of the 2017-2022 GOM Multisale EIS.</p> <p>Finally, staff has reviewed and considered the additional citations provided in your comment. Lighting impacts from the Proposed Action on birds was previously analyzed in <b>Chapter 4.9.3</b>. The additional information provided in Senzaki et al. (2020) does not change the impact determination in this Supplemental EIS.</p> <p>Relevant information from Michael et al. (2022) has been added to <b>Chapter 4.9.4</b> of this Supplemental EIS.</p>
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Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM’s analysis of the lease sales’ impacts on protected birds is riddled with inconsistencies. For example, the agency says in its introductory paragraph that impacts to protected birds from an accidental oil spill could be “major ... if a large oil spill occurred with direct contact to a protected bird species or if the habitat became contaminated, resulting in mortality of a listed species.” BOEM then downgrades this risk, offering assurance that impacts to protected birds would be “negligible to moderate considering accidental events.” The agency also says that the impacts of marine debris will be negligible, while acknowledging in the same sentence that they could scale up to “moderate.” While finding that impacts to protected birds would be “negligible ... considering routine activities, negligible to moderate considering accidental events and OCS oil- and gas-related cumulative impacts, and negligible to major considering non-OCS oil- and gas-related cumulative impacts,” then</p>	<p>BOEM analyzes the potential impacts from the Proposed Action to protected birds in <b>Chapter 4.10.4</b>. The analyses there take into account the impact-producing factors that BOEM has identified as potentially affecting the resources and describe potential impacts to those populations as a whole in the GOM.</p> <p>BOEM does not find the circumstances described in this Supplemental EIS as “major impacts could occur if a large oil spill occurred with direct contact to a protected bird species or if the habitat became contaminated resulting in mortality of a listed species.” However, given the unlikelihood of these co-occurrences, BOEM concludes that the overall impact level of an accidental oil spill on protected species is negligible to moderate. An edit to this Final Supplemental EIS has been made to clarify this determination.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>agency offers a final conclusion that “the incremental contribution of a proposed impact to the cumulative impacts on protected birds would be negligible for any of the action alternatives.” The agency cannot hand-wave away acknowledged moderate to major impacts; it must provide a reasoned basis for its conclusions.</p> <p>Despite repeated acknowledgements of the potentially moderate to major impacts to protected birds, BOEM offers very little in the way of an informed analysis. Our comments on Section 4.9, supra, offer some discussion on expected impacts to bird species that BOEM must address in more detail. The agency must address the full suite of threats posed by the proposed lease sales to protected bird species, including but not limited to air pollution (given birds’ unique susceptibility to harm), water pollution from produced water and other discharges (including oil sheens), entanglement, climate change, noise, and lighting. BOEM also must address the impacts of plastic ingestion on protected seabirds and other species in the Gulf, both from discarded materials and from plastics that will be made by gas fracked as a result of the lease sales.</p>	<p>BOEM analyses both routine and accidental events in this Supplemental EIS. BOEM’s analysis concludes the impact level to be negligible for impacts of marine debris under routine activities given regulations prohibiting such disposal; however, the analysis for marine trash and debris disposal events concludes the impact level to be moderate in an accidental event.</p> <p>The conclusion for the incremental contribution of a proposed impact to the cumulative impacts on protected birds is determined to be negligible for any of the action alternatives for routine events. The levels mentioned for moderate to major impacts are conclusions for accidental events.</p> <p>Further, non-OCS oil- and gas-related impacts are analyzed in <b>Chapter 4.10.4</b> for protected birds and Chapter 4.8 of the 2017-2022 GOM Multisale EIS, from which this Supplemental EIS was tiered.</p>
<p>Maria Balbuena</p>	<p>BOEM-2022-0048-23443</p>	<p>There has not been enough research on the effects this [lease sale] will have ... our migratory birds that fly over the gulf annually to reside here during our different seasons.</p>	<p>Thank you for your comment. BOEM does consider, in its analysis, the migratory pathways of birds in Chapter 4.8 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS. BOEM’s subject-matter experts have used available scientifically credible evidence and applied accepted scientific methodologies to integrate existing information and extrapolate potential outcomes in completing this analysis and formulating the conclusions presented here. As new information becomes available, it will be reviewed and incorporated, as appropriate, in future NEPA analyses.</p>

API/NOIA	BOEM-2022-0048-28953	The DSEIS (at xvii) states that for Alternatives A through D, the cumulative impacts on non-OCS oil and gas-related sources “would be expected to be major.” Consistent with Table 4-3 and Section 4.10.4.5, however, BOEM should clarify that the incremental effect of Lease Sales 259 and 261 does not present major avian impacts.	Thank you for your comment. The conclusions of the analysis of the Proposed Action on protected birds are presented in <b>Chapter 4.10.4.2</b> and state that “the incremental contribution of a Proposed Action to the cumulative impacts on protected birds would be <b>negligible</b> for any of the action alternatives (i.e., Alternatives A-D). Under the No Action Alternative (i.e., Alternative E), which is the cancellation of a single lease sale, the additional incremental contribution to cumulative impacts on ESA-protected birds or their habitats would be <b>none</b> because new impacts would be avoided entirely.”
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**Marine Mammals**

Marine Mammals			
Earthjustice et al.	BOEM-2022-0048-28951	BOEM must consider an alternative that would exclude blocks from leasing in Rice’s whale habitat in De Soto Canyon and the 100–400m isobath in the western and central Gulf. The agency previously rejected an alternative to exclude blocks within the De Soto Canyon area to protect Rice’s whales, on the basis that the species’ “biologically important area” is further to the east and BOEM believed vessel mitigation would sufficiently reduce threats. BOEM states that it “reexamined” previously rejected alternatives during preparation of this SEIS, and found no new information to change its previous conclusions. As explained in Section VI below, however, there is now new information indicating the importance of De Soto Canyon and other habitat in the 100–400m isobath throughout the Gulf for the Rice’s whale, undermining BOEM’s previous rationale for rejecting this alternative. In addition, the current mitigation measures to reduce vessel strikes to Rice’s whales are inadequate. Excluding blocks from leasing in Rice’s whale habitat in not only De Soto Canyon but also in the 100–400m isobath across the Gulf would result in a significant benefit	<p>Thank you for your comment. As described in <b>Chapter 2.3.3</b>, BOEM considers the use of mitigation, including measures to reduce vessel strikes and overall avoidance, at all phases of energy development and planning. BOEM 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 core habitat. During the review process, Conditions of Approval (COAs) will be applied, as applicable (refer to <b>Chapter 2.3.3.3</b>). The COAs are an integral part of BOEM and BSEE’s program to ensure that operations are conducted in an environmentally sound manner with an emphasis on avoiding or minimizing adverse impacts. Further, COAs are not static. They are, and will be, continually revised to address new species information and technology and to maintain conformance with law, requirements of other agencies having jurisdiction of protected species (e.g., NMFS), or safety precautions as applicable.</p> <p>BOEM’s subject-matter experts have used available scientifically credible evidence and applied accepted scientific methodologies to integrate existing information and extrapolate potential outcomes in</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>for the critically endangered species. BOEM should consider that alternative in the final SEIS. This would be consistent with BOEM's recent decision to eliminate blocks in Rice's whale habitat in the western and central Gulf from wind leasing. It would be irrational and a double standard for BOEM to conclude in the SEIS that oil and gas leasing in Rice's whale habitat is not harmful when it has decided wind leasing in the same areas would be too harmful.</p>	<p>completing this analysis and formulating the conclusions presented here. As new information becomes available, it will be reviewed and incorporated, as appropriate, in future NEPA analyses.</p> <p>BOEM has reviewed updated information regarding Rice's whale core distribution in this Supplemental EIS. As discussed in <b>Chapter 4.10.1.4</b>, BOEM will continue to monitor current literature and work with NMFS as it relates to consultations. However, the conclusions found in this Supplemental EIS still remain valid.</p>
<p>Earthjustice et al.</p>	<p>BOEM-2022-0048-2895</p>	<p>Oddly, the SEIS then admits that "a smaller leased area . . . could decrease the likelihood of OCS oil- and gas-related activities impacting marine mammal populations, such as the Rice's whale and coastal bottlenose dolphin," but disregards that possibility because BOEM claims it lacks enough data on population densities, distributions, and migratory behaviors—this despite concluding earlier that the effects would be equivalent because of how populations are distributed and migrate. BOEM cannot state it knows populations are distributed widely enough to reach one conclusion but then claim it does not know how populations are distributed to avoid considering that its conclusion is incorrect. In any event, BOEM does not need precise data on population densities, distributions, and migratory patterns to make the basic assessment that higher and more widespread activity levels will have greater impacts to those populations than lower and more geographically constrained activity levels. BOEM also does not need precise data to reach basic conclusions about the spatial overlap of leasing in either the WPA or the CPA/EPA with marine mammal populations. For instance, BOEM states that the Rice's whale population is centered just to the east of the CPA. It follows that Alternatives A and B would have much greater impacts on Rice's whales from vessel traffic</p>	<p>Thank you for your comment. Habitat distribution information for marine mammals was evaluated in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, with no new information identified that changes the prior conclusions in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.</p> <p>BOEM's subject-matter experts have used available scientifically credible evidence and applied accepted scientific methodologies to integrate existing information and extrapolate potential outcomes in completing this analysis and formulating the conclusions presented here. As new information becomes available, it will be reviewed and incorporated, as appropriate, in future NEPA analyses.</p> <p>BOEM has reviewed updated information regarding Rice's whale core distribution in this Supplemental EIS. As discussed in <b>Chapter 4.10.1.4</b>, BOEM will continue to monitor current literature and work with NMFS as it related to consultations.</p>

		and oil spill risk than leasing under Alternative C, which would occur further from the core habitat. If BOEM properly assessed the relative impacts of the alternatives on marine mammals, it might conclude that leasing in only one planning area is the preferred option to reduce impacts to one or more protected marine mammal species.	
Earthjustice et al.	BOEM-2022-0048-2895	<p>We incorporate by reference the discussion in comments by the Natural Resources Defense Council et al. on this draft SEIS that BOEM must account for new information on the distribution and habitat use of Rice's whales in the Gulf of Mexico. Specifically, BOEM must account for new data and analysis showing that the species persistently occurs in the Western and Central Planning Areas. Given the devastating impacts of previous spills on the perilous population, BOEM cannot simply ignore this information in its decision to lease the very same regions of the OCS the species is known to occur to oil and gas activities for the next 30+ years.</p> <p>Even before new information on the Rice's whale's distribution came to light, the National Marine Fisheries Service NMFS had determined that existing oil and gas drilling activity on the OCS was jeopardizing the species' continued existence. The new information on Western Gulf sightings illustrates that Rice's whale occurrence overlaps much more significantly with oil and gas leasing and development than previously thought. These sightings, combined with information about the significant time the Rice's whale spends near the surface, demonstrate the elevated risk and likelihood of significant adverse effects to the species that could result from more leasing in the Gulf. In addition, BOEM has generally dismissed the noise pollution impacts to the species from oil and gas activities. Numerous scientific studies</p>	<p>Thank you for your comment. BOEM has reviewed updated information regarding Rice's whale core distribution in this Supplemental EIS. As discussed in <b>Chapter 4.10.1.4</b>, BOEM will continue to monitor current literature and work with NMFS as it related to consultations. However, the conclusions found in this Supplemental EIS still remain valid.</p> <p>As described in <b>Chapter 2.3.3</b>, BOEM considers the use of mitigation at all phases of energy development and planning, including review of plans, permits, and/or authorizations at the post-lease stage (i.e., 30+ years). During the review process, COAs will be applied, as applicable (refer to <b>Chapter 2.3.3.3</b>). The COAs are an integral part of BOEM and BSEE's program to ensure that operations are conducted in an environmentally sound manner with an emphasis on avoiding or minimizing adverse impacts. Further, COAs are not static. They are, and will be, continually revised to address new species information and technology and to maintain conformance with law, requirements of other agencies having jurisdiction of protected species (e.g., NMFS), or safety precautions as applicable.</p> <p>BOEM considered the effects of noise on marine mammals in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. Updated information was reviewed in <b>Chapter 4.10.1.4</b>. However, no new information was found nor additional mitigations warranted that would alter the conclusions previously</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		demonstrate that human- caused noise, including shipping noise, can cause a host of problems for the whales, including “the potential to degrade their habitat, reduce their listening space, mask biologically important sounds, and potentially cause injury.” BOEM must consider the new information on species occurrence when analyzing the effects of a lease sale and when considering impact minimization and mitigation of harms to the species.	presented in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS fails to consider new information relevant to the impacts of the proposed action on Rice’s whale.</p> <p>The DSEIS fails to consider significant new information concerning the habitat range of the endangered Rice’s whale. The DSEIS states only that “the primary core habitat of Rice’s whale is in the northeastern GOM, centered in De Soto Canyon in water depths between 150 and 410 m.” While this statement is true, the DSEIS makes no mention of the Rice’s whale’s persistent occurrence in the western and central GOM, demonstrated by the NOAA study. This new information is highly relevant to the impacts of the proposed action on the species.</p> <p>Rice’s whale is present across all regions of the OCS proposed for inclusion in Lease Sales 259 and 261, significantly increasing the likelihood that leasing activities will have an adverse impact on the endangered whale.</p>	Thank you for your comment. New information at the time of this Supplemental EIS’s development, available since publication of the 2018 GOM Supplemental EIS, is summarized in <b>Chapter 4.10.1.4</b> . Currently, the persistent occurrence of Rice’s whales has been documented for the core area (DeSoto Canyon in water depths between approximately 100 and 400 m [328 and 1,312 ft]). BOEM has reviewed the recent July 2022 publication (Soldevilla et al. 2022) that evaluated passive acoustic data indicating that it is plausible that the Rice’s whale’s distribution is broader. However, not enough information is available at this time to confirm their distribution or any seasonal movements outside of the core area that is already considered in this Supplemental EIS.
NRDC et al.	BOEM-2022-0048-28948	The DSEIS observes that NMFS released updated Stock Assessment Reports for marine mammals following the 2017-2022 GOM Multisale EIS and 2018 GOM SEIS. Despite the important role of marine mammal stock assessments in BOEM’s impacts analysis, the DSEIS does not use the new	Thank you for your comment. Based on the conservative assumptions built into the prior impact calculations included in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, and without identification or observation of significant increases in the densities (or other factors), the previous impact calculations should remain reasonably accurate and

		<p>stock assessment numbers to update its impacts analysis, nor does it even report them.</p> <p>When information relevant to reasonably foreseeable impacts is not available, NEPA requires the agency to include a summary of relevant “existing credible scientific evidence.” Here, three years of updated stock assessments—2017 to 2019—are available and relevant to the baseline condition of marine mammals in the Gulf. NEPA therefore requires the agency to incorporate the updated stock assessments in its discussion of the population baseline.</p>	<p>representative. Further, NMFS’ marine mammal stock assessment information is used to assess compliance with the MMPA. The MMPA is enforced by NMFS and designed to protect all marine mammals within the Gulf of Mexico OCS. As such, BOEM and BSEE comply with this law and potential stipulation language relative to the MMPA through ESA and is provided in <b>Section A.5.1 of Appendix A.</b></p>
<p>Center for Biological Diversity</p>	<p>BOEM-2022-0048-28954</p>	<p>BOEM’s analysis of the impacts of Lease Sales 259 and 261 on marine mammal species suffers from numerous shortcomings and non sequiturs. These flaws first become evident in the Executive Summary, when BOEM states:</p> <p>“Although a smaller leased area resulting in less projected OCS oil- and gas-related activity could decrease the likelihood of OCS oil- and gas-related activities impacting marine mammal populations, such as the Rice’s whale and coastal bottlenose dolphin, there are not enough conclusive data on the density, general distributions, and possible migratory behaviors of marine mammal populations in the GOM throughout the year to support a reasonable conclusive analysis. Therefore, because of the diversity and wide distribution of species in the Area of Interest, the level of impacts would be the same for Alternatives A-D.”</p> <p>This assertion can be rejected by common sense alone. To say that less leasing “could decrease the likelihood of OCS oil- and gas-related activities impacting marine mammal populations,” but that the agency cannot reasonably conclude whether this would be the case because “there are not</p>	<p>Thank you for your comment. As noted, BOEM eliminated a reduced lease sale alternative from further consideration because this alternative had no additional benefits over Alternative D and because it did not meet the IRA’s 60 million acre requirement for an offshore oil and gas lease sale necessary to offer an offshore wind lease within the following year. Refer to <b>Chapter 2.3.2.1</b> for more detail on why this alternative was eliminated. However, that reduced lease sale area was still projected to have a level of activities that fell within the range of the scenario in <b>Chapter 3.2.1</b>, including activities such as vessel trips through areas that were potentially going to be excluded. Additionally, that reduced lease sale area still overlapped general distributions and possible migratory behaviors of marine mammal populations in the GOM throughout the year.</p> <p>The impacts of OCS oil and gas leasing to marine mammals, including the Rice’s whale (formerly classified as Bryde’s whale), are summarized in <b>Chapter 4.10.1</b> of this Supplemental EIS and Chapter 4.9.1 of the 2018 GOM Supplemental EIS, and is discussed in detail in Chapter 4.9.1.2.2 (“Accidental Events”) of the 2017-2022 GOM Multisale EIS. Although impacts to marine mammal populations from</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

	<p>enough conclusive data on the density, general distributions, and possible migratory behaviors of marine mammal populations in the GOM throughout the year” is erroneous for several reasons.</p> <p>First, less leasing necessarily would reduce the likelihood of oil- and gas-related activities impacting marine mammal populations because there would be less of a disturbance footprint. Second, BOEM's statement that “the level of impacts would be the same for Alternatives A-D” assumes homogenous habitat and habitat use—an assumption belied by the research. Finally, the required analysis does not require “conclusive data.” There exist sufficient data, modeling techniques, and mapping methodologies for the agency to conduct informed analyses. Such analyses are particularly crucial for critically endangered Rice's whales and species with high site fidelity like Barataria Bay dolphins, which “are confined to small home ranges and exhibit year-round residency, all of which made them particularly vulnerable” to Deepwater Horizon oil and similar disturbance.</p> <p>BOEM later asserts that impacts from Lease Sales 259 and 261 on marine mammals will be “negligible” because they add only an “incremental contribution” to the “cumulative impacts” experienced by these species. They agency also argues that even regional impacts from “reasonably foreseeable routine activities and accidental events” will only be “negligible to moderate.” The agency states that this is the case despite the widespread and substantial impacts wrought on marine mammals by the Deepwater Horizon explosion, oil spill, and response and its lingering impacts, not to mention the cumulative and additive effects of Gulf industrialization. These assertions</p>	<p>routine and accidental events from OCS oil- and gas-related activities could be negligible to moderate, depending on affected species and population stocks, the incremental contribution of a single lease sale compared to cumulative impacts on marine mammal populations (including the <i>Deepwater Horizon</i> explosion, oil spill, and response; non-OCS oil- and gas-related activities; and the minimization of the OCS oil- and gas-related impacts through lease stipulations and applicable mitigations) is expected to be negligible. Impacts of a catastrophic spill, which is not reasonably foreseeable, on marine mammals, including the Rice's whale (as Bryde's whale), are analyzed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d). In addition, the impacts of the <i>Deepwater Horizon</i> explosion, oil spill, and response have been considered in this analysis.</p> <p>The Endangered Species Act of 1973 (16 U.S.C. §§ 1531 <i>et seq.</i>), 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 they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the adverse modification of designated critical habitat.</p> <p>With respect to the manatee and other ESA-protected marine mammal or other species, BOEM consults with respected service agencies (e.g., FWS and NMFS) on the applicable proposed future actions from a lease sale. The consultations and resulting opinions are summarized in <b>Chapter 5.3</b> of this Supplemental EIS.</p> <p>Chapter 4.9.1 (“Marine Mammals”) of the 2017-2022 GOM Multisale EIS includes a summary of geological</p>
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		<p>are erroneous and the agency’s evasive rationalizations allows it to avoid considering the myriad ways that oil and gas leasing harms the many marine mammal species that call the Gulf of Mexico home.</p> <p>BOEM’s assertions about the negligible impacts to marine mammals of oil and gas development generally, and the impacts of Lease Sales 259 and 261 specifically, are at odds with the best available science. For example, Whitehead and Shin (2022) attribute declining sperm whale (<i>Physeter macrocephalus</i>) populations in the Gulf of Mexico to the area’s industrialization. BOEM must not overlook the regional, population-level effects of oil and gas industrialization of the Gulf. The incremental and additive effects of every lease issued in the Gulf contribute to the demise of this species.</p> <p>Catastrophic oil spills like Deepwater Horizon add to the burden of Gulf industrialization. BOEM acknowledges that the effects of Deepwater Horizon on Gulf of Mexico dolphin populations “ha[ve] not ended.” Research demonstrates that the 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. Morey et al. (2022) found that Barataria Bay dolphins exhibit transcript profiles indicating “a shift in immune response, cytoskeletal alterations, and mitochondrial dysfunction,” which are most significant in dolphins exposed to Deepwater Horizon oil. De Guise et al. (2021) likewise found the potential for multigenerational immunological effects in Barataria Bay bottlenose dolphins.</p>	<p>and geophysical (G&amp;G) operations and potential impacts to marine mammal species that may result from G&amp;G activities. For a full analysis of the impacts of G&amp;G activities in the Gulf of Mexico, refer to the <i>Gulf of Mexico OCS Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas—Final Programmatic Environmental Impact Statement</i> (BOEM 2017c).</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>BOEM also fails to consider the best available science on the critically endangered Rice's whale (<i>Balaenoptera ricei</i>). Less than 100 Rice's whales—the only year-round, resident baleen whales in the Gulf of Mexico—currently remain. The agency relies on Rosel et al. (2021) for the proposition that the species' primary core habitat occurs in the De Soto Canyon area of the northeastern Gulf of Mexico. BOEM fails to consider more recent evidence suggesting that the whale occurs (and historically occurred) more broadly throughout the Gulf. Soldevilla et al. (2022) detected Rice's whale vocalizations at three sites in the northwestern Gulf of Mexico throughout the year, "indicat[ing] that some whales persistently occur over a broader range in the [Gulf of Mexico] that previously understood BOEM must integrate this new distributional data into its impacts analysis.</p> <p>BOEM also fails to consider the full suite of leasing impacts on the West Indian manatee (<i>Trichechus manatus</i>). The agency fails, however, to discuss two key factors related to manatees: first, the ongoing manatee unusual mortality event ("UME"), and second, research demonstrating the manatee's increasing range in the Gulf of Mexico.</p> <p>BOEM also fails to discuss the leases' potential impact on manatees in light of emerging research showing their increased use of Gulf of Mexico waters. Hieb et al. (2017) compiled more than 1700 documented manatee sightings in Alabama and Mississippi since the early 1900s and increasing mortalities since the mid-1980s. Cloyed et al. (2021) found partial migration contributing to the range expansion of West Indian manatees into the northern Gulf of Mexico. The authors believe this range shift may become increasingly important to manatees as the climate continues to change.</p>	
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	<p>Once again, BOEM omits any analysis of how the climate change impacts flowing from development of the lease sales will impact marine mammal species in the Gulf. Climate change poses a direct threat to West Indian manatees by increasing the likelihood of harmful algal blooms, extreme weather events (e.g., tropical storms and hurricanes), and disease. Harmful algal blooms, extreme weather events, and the spread of disease all stand to increase alongside climate change—change that combustion of the fossil fuels produced by the leases will amplify.</p> <p>In addition, vessels associated with the leasing program may facilitate the spread of pathogens or invasive species; exposure to and/or establishment a novel disease threat or ecosystem changes wrought through species introductions could prove catastrophic for the imperiled West Indian manatee population.</p> <p>There are several more overarching flaws to BOEM’s analysis of impacts to marine mammal species. First, the agency appears to argue that since scientists do not yet have a complete and final understanding of the impacts of the Deepwater Horizon oil spill (or from other spills like Exxon Valdez), the agency is absolved from undertaking a reasoned analysis of the impacts of Lease Sales 259 and 261 on Gulf marine mammal species. Such an approach would allow BOEM to avoid analyzing impacts of oil and gas development in perpetuity, as research on the aftermath of these disasters is ongoing. And what we continue to learn is increasingly concerning.</p> <p>Available evidence indicate that, some thirty years out, the Exxon Valdez spill continues to exact a toll on Alaska’s wildlife and ecosystems; for example,</p>	
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>one population of genetically unique killer whales is expected to go extinct as a delayed consequence of spill exposure. If anything, the growing body of evidence demonstrating substantial and ongoing impacts of marine oil spills decades after the events counsels for a precautionary approach to proceeding with additional offshore fossil fuel development activity. The lack of a tidy, complete set of conclusive data does not excuse BOEM from undertaking a thorough and reasoned analysis of the potential impacts of Lease Sales 259 and 261.</p> <p>In addition, BOEM's analysis of the impacts of anthropogenic noise (including seismic impacts) on marine mammals is incomplete. Marine mammals rely on sound for foraging, predator avoidance, communication, and spatial orientation. The impacts of incidental and deliberate anthropogenic noise include masking, physiological stress, and permanent (sometimes lethal) damage. As Chou et al. (2021) explain, the "increasing human acoustic footprint within a naturally noisy ocean can add both acutely intense noise stressors, and more subtly, another cumulative stressor in the context of other global factors such as climate change, ocean acidification, overfishing, and entanglement."</p> <p>Research continues to demonstrate the myriad harms marine mammals suffer from exposure to anthropogenic noise. For example, Gailey et al. (2022) found that "[i]ncreasing cumulative exposure to vessel and seismic sounds resulted in both a short- and longer-term decline in gray whale density in an area" off northeastern Sakhalin Island, Russia. This same population exhibited significant changes in gray whale movement and respiration response (e.g., increasing speed, surface time, directionality, respiration intervals). Mitigation measures did not eliminate (at least short-term)</p>	
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		<p>behavioral responses in these animals. Williams et al. (2022) found that anthropogenic noises (specifically seismic and vessel noise) led to substantial cardiovascular, respiratory, and locomotor reactions in narwhals, which resulted in a two-fold increase in the energetic cost of diving. Erbe et al. (2018) emphasize the importance of considering the impacts of aircraft noise on marine mammals, particularly at-risk species in small, confined habitats.” BOEM fails to integrate the latest science into its discussion of noise impacts and must assess this information in its analysis.</p> <p>Finally, BOEM also engages in a rather peculiar analysis of possible harms to marine mammals arising from stress-induced rapid ascents. The agency cites Fernández et al. (2017) as evidence that Risso’s dolphins (<i>Grampus griseus</i>) may succumb to nitrogen gas-bubble expansion decompression sickness during rapid ascents while struggling with prey. The agency says “this study brings to question how exposure to stressful situations, whether from natural or anthropogenic sources, may affect the diving behavior of marine mammals, including rapid ascents that may ultimately lead to death.” The agency concludes, however, that “[p]otential changes in diving behavior as a result of the routine activities are expected to be short-term and temporary. Thus, none of the routine activities are likely to cause such diving sickness.” This conclusion is irrational and erroneous. Just because a routine activity is “short-term” or “temporary” does not mean that it will not cause rapid ascent, decompression sickness, and/or death. It is the nature of the activity rather than the duration of the activity that determines an animal’s immediate response. BOEM’s current analysis is improper.</p>	
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

John Weber	BOEM-2022-0048-0003	Oil, gas, mineral exploration using sonic measures is deadly for whales and dolphins.	
Suzanne Blakeman	Center for Biological Diversity Form Letter Comments	The seismic cannons' noise pollution is devastating to remaining whale populations.	
Amelia Conley	Center for Biological Diversity Form Letter Comments	Belugas .... consume vast amounts of krill and plankton each day, leaving them extremely vulnerable to pollution and spills that poison their food. Noise pollution from frequent drilling and seismic airguns are major threats, causing an increase in collisions with vessels as the whales' echolocation is drowned out. We cannot afford to lose any more of these critically endangered whales. Both the Cook's Inlet Belugas and Rice's whales are federally recognised as endangered species, and therefore they and their habitats are protected under federal law. Oil drilling in the offshore leases 258 in Alaska, and leases 259 and 261 in the Gulf of Mexico would be a direct violation of the Endangered Species Act, as the leases are located in critical habitat for these whale species. As Secretary of the Interior, you have the power to protect these areas and the whales that call them home.	
Bryce King	Center for Biological Diversity Form Letter Comments	Anthropogenic noises now blind whales that have always used sound to see the world. This confusion has forced communities historically filled with eloquent song to cease making speeches and start yelling truncated sentences just so they can be heard. Such confusion often separates families and starves those lost from colonies, especially young calves that make a wrong turn and are then caught chasing hull shadows they think might be their mother. Whale elders that have always known where to go for food have been leading their faithful families down wrong turns or even onto beaches	

		because of hearing damages inflicted by military and cargo shipping operations.	
Kathryn Lezenby	BOEM-2022-0048-24651	I am most urgently concerned for the abundant wildlife that depend on the Gulf for all or part of their lives including Rice's whales, animals on the verge of extinction due to human activity. Energy exploration and development, and subsequent oil spills, oil dispersants, and vessel strikes from increased shipping, pose some of the greatest threats to whales. The 2010 BP disaster alone killed an estimated 20 - 22*% of Rice's whales, affected about 48% of their habitat, and caused long lasting reproductive issues. Even the a spill outside normal range of Rice's whales could harm them as storms can carry oil miles from it's source. Only 50 50 [sic] Rice's whales survive today; the loss of even one increases the chance of inbreeding, further threatening the survival of future generations.	The impacts of OCS oil and gas leasing to marine mammals, including the Rice's whale (formerly classified as Bryde's whale), are summarized in <b>Chapter 4.10.1</b> of this Supplemental EIS and Chapter 4.9.1 of the 2018 GOM Supplemental EIS, and is discussed in detail in Chapter 4.9.1.2.2 ("Accidental Events") of the 2017-2022 GOM Multisale EIS. Although impacts to marine mammal populations from routine and accidental events from OCS oil- and gas-related activities could be negligible to moderate, depending on affected species and population stocks, the incremental contribution of a single lease sale compared to cumulative impacts on marine mammal populations (including the <i>Deepwater Horizon</i> explosion, oil spill, and response; non-OCS oil- and gas-related activities; and the minimization of the OCS oil- and gas-related impacts through lease stipulations and applicable mitigations) is expected to be negligible. Impacts of a catastrophic spill, which is not reasonably foreseeable, on marine mammals, including the Rice's whale (referenced as Bryde's whale, the former species name, in the document), are analyzed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d). In addition, the impacts of the <i>Deepwater Horizon</i> explosion, oil spill, and response have been considered in this analysis. As noted in <b>Chapter 5</b> , BOEM continues to comply with the 2020 BiOp issued by NMFS, including the reasonable and prudent alternative and reasonable and prudent measures that prevent jeopardy and reduce impacts on listed species in compliance with the ESA.
Leo Scheibelhut	BOEM-2022-0048-0002	Searching for and drilling for oil in the Gulf has a strong negative effect on the recently discovered Rice's whale[sometimes known as the Gulf of Mexico whale]. Only 51 are estimated to survive, BP's Deepwater Horizon oil disaster cost billions of dollars, of which BP only paid approximately \$14.3 billion. BP's disaster also killed an estimated 20% of all the Rice's whales then living and causing health problems in many more.	
Morgan Huetten (Turtle Island Restoration Network)	10.26.22 Virtual Public Hearing Comments	The sperm whale, giant manta ray, white tip shark, gulf sturgeon, are all threatened, and that is not the end of the list of threatened species. Continuing with more unnecessary leases, will continue to harm these species. While it may seem like I am exaggerating, I have personally seen deceased	Thank you for your comment. The purpose of the EIS process is to analyze the potential impacts of the Proposed Action on the marine, coastal, and human environments. The 2017-2022 GOM Multisale EIS, 2018 GOM Supplemental EIS, and this Supplemental EIS were prepared using the best information publicly

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		dolphins and turtles on our Galveston beaches... New oil rigs destroy oceanic floor ecosystems, and can cause further damage to animals with the loud noise pollution.	available at the time. They focus on identifying and disclosing the baseline conditions and potential environmental effects of oil and natural gas leasing, exploration, development, and production in the Gulf of Mexico.
Edward L. Simpson	BOEM-2022-0048-12514	Rice whales are in trouble, so are most ocean and land wildlife. We have destroyed, made uninhabitable, and causes mass extinctions.	BOEM analyzes the potential impacts from the Proposed Action to marine mammals and fishes (protected or otherwise) in <b>Chapters 4.10.1</b> and <b>Chapter 4.8</b> , respectively, and benthic communities are described in <b>Chapter 4.5</b> (Deepwater Benthic Communities) and <b>Chapter 4.7</b> (Live Bottoms). The analyses take into account the impact-producing factors our subject-matter experts have identified as potentially affecting their resource of expertise and describes those potential impacts to those populations as a whole in the Gulf of Mexico OCS.
Form Letter 1	BOEM-2022-0048-0422	BOEM has the obligation to make those decisions based on a full evaluation of the environmental effects that leasing will cause – including climate pollution, oil spills and harms to the critically endangered Rice's whale... Finally, continuing with massive lease sales increases the already dire harm to Gulf wildlife – like the 50 remaining critically endangered Rice's whale	Further, all OCS oil- and gas-related activities must comply with the Endangered Species Act and Marine Mammal Protection Act. Site-specific actions undergo an environmental review to ensure that impacts to protected species are reduced and/or avoided.
Bruce Hlodnicki	BOEM-2022-0048-9483	Why is it that you NEVER consider how these huge lease sales increase the death and destruction of the Gulf's wildlife? Consider there are just 50 critically endangered Rice's whales remaining.	
Susan ORourke	BOEM-2022-0048-15192	The marine life we are losing that we may never see again along with their dwindling habitats due to pollution, are another reason to stop these oil and gas leases.	
Leda Beth Gray	BOEM-2022-0048-6486	Lastly, continuing with these lease sales would further harm to the 50 remaining critically endangered Rice's whale and to other sensitive wildlife	
Linda S Barnes	BOEM-2022-0048-19052	The Gulf coast is still reeling from the effects of the Deepwater Horizon explosion and massive spill... Marine mammals and sea turtles are still showing birth defects at increased levels.	Thank you for your comment. Impacts of a catastrophic spill, which is not reasonably foreseeable, on marine mammals are analyzed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d), including reproductive failure. In addition, the impacts of the <i>Deepwater Horizon</i> explosion, oil spill, and response have been considered in this analysis.
API/NOIA	BOEM-2022-0048-28953	The DSEIS (at 4-56) concludes that impacts to marine mammals from conducting Lease Sale 259 or 261 would be "negligible to moderate." This appears to be an error. The DSEIS should instead	Thank you for your comment. Page 4-56 is consistent with the summary on page 4-51 of <b>Chapter 4.10.1</b> . At the regional, population-level impacts from reasonably foreseeable routine activities (OCS oil- and gas-related

		<p>conclude that impacts from the proposed action are “negligible,” consistent with the preceding discussion in 4.10.1 and Table 4-3.</p>	<p>and non-OCS oil- and gas-related effects) and accidental events could be negligible to moderate for Alternatives A, B, C, or D. Of note, <b>Table 4-3</b> summarizes the incremental contribution of a Proposed Action compared to the No Action Alternative and does not account for cumulative conditions and impacts.</p>
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**Sea Turtles**

Sea Turtles			
<p>Earthjustice et al.</p>	<p>BOEM-2022-0048-28951</p>	<p>The SEIS contains a similarly flawed explanation for sea turtles, stating, “The effects associated with Alternative A, B, C, or D would be equivalent because of the diversity and distribution of sea turtles throughout the GOM.” The SEIS acknowledges there would be less activity and in a smaller area under Alternative C than under Alternatives A or B (it makes no comparison between A and B), but concludes the “level of impacts” under those alternatives “would be the same” “because of the free-swimming ability and wide distribution of species.” Even if impact types may be similar among alternatives, impact levels and locations are different. And none of those factors negates the fact that more widespread and higher magnitude activity levels have greater effects. In fact, the free-swimming ability of sea turtles makes them more susceptible to the more widespread activity levels under Alternative A (and B, given the larger area of the CPA/EPA) because they will encounter impacts throughout their ranges. It is nonsensical to conclude that oil and gas leasing and development in just one planning area will have the same level of impact as regionwide leasing and development simply because sea turtles occur in more than one planning area. That assessment also fails to acknowledge that different sea turtle species and life stages inhabit different habitats and geographic areas of the Gulf, so the impacts will be different</p>	<p>The potential impacts of Alternatives A-E to sea turtles are summarized in <b>Chapter 4.10.2</b> of this Supplemental EIS and discussed in detail in Chapter 4.9.2.2 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference. Although impacts to sea turtle populations from routine OCS oil- and gas-related activities and accidental events could be negligible to moderate, depending on affected species and population stocks, the incremental contribution of a single lease sale compared to cumulative impacts on sea turtle populations (including non-OCS oil- and gas-related activities and the minimization of the OCS oil- and gas-related impacts through lease stipulations and applicable mitigations) is expected to be negligible.</p> <p>BOEM and BSEE’s review of plans, permits, and/or authorizations at the post-lease stage includes review of sea turtle habitat. During the review process, COAs will be applied, as applicable (refer to <b>Chapter 2.3.3.3</b>). The COAs are an integral part of BOEM and BSEE’s program to ensure that operations are conducted in an environmentally sound manner with an emphasis on avoiding or minimizing adverse impacts. Further, the COAs are not static. They are continually revised to address new species information and technology and to maintain conformance with law, requirements of other agencies having jurisdiction of protected species (e.g., NMFS), or safety precautions as applicable.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>depending on the area leased and developed. BOEM offers no rational explanation to conclude that impact levels to sea turtles will be the same, regardless of the area leased or subsequent level of development that will occur.</p>	
<p>Center for Biological Diversity</p>	<p>BOEM-2022-0048-28954</p>	<p>BOEM wrongly concludes that the impacts of lease sales 259 and 261 will be “negligible” to sea turtles because of their “incremental” effects compared to the “cumulative impacts” experienced by these species in the Gulf of Mexico. The agency reasons that while an oil spill might have “moderate” impacts to sea turtles by causing injury or mortality in an affected turtle, it need not incorporate such considerations into its discussion because such impacts are “not anticipated and unlawful for this proposed action.”</p> <p>BOEM also relies heavily on “incomplete or unavailable information” for its cursory analysis of impacts to sea turtles.</p> <p>Indeed, BOEM once again fails to discuss the potential for climate change flowing from the leases to impact Gulf species—in this case sea turtles. Climate change poses an existential threat to Gulf of Mexico sea turtles. While [T]he agency omits any meaningful analysis of how the climate change impacts flowing from development of the lease sales will impact sea turtle species.</p> <p>One such climate-related threat is an increase in extreme weather events. A recent study found that differences in dispersal [of Kemp’s ridley sea turtle hatchlings] among sites and the impact of hurricane frequency and intensity could influence the survivorship and somatic growth rates of turtles from different nesting sites and hatching cohorts, either improving survival by encouraging retention in optimal pelagic habitat or decreasing survival by</p>	<p>BOEM analyzes impact-producing factors and potential effects at scales appropriate to the Proposed Action and resources considered, including sea turtles. Population-level impacts and their contribution to the overall impact determinations were considered in both this Supplemental EIS and 2017-2022 GOM Multisale EIS, which is incorporated by reference.</p> <p>BOEM analyzes the potential impacts from the Proposed Action to sea turtles in <b>Chapter 4.10.2</b>. The analyses there take into account the impact-producing factors that BOEM has identified as potentially affecting the resources and describes the potential impacts to those populations as a whole in the GOM.</p> <p>Oil spills are discussed in <b>Chapter 3.3.1</b> of this Supplemental EIS as well as in Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS. The potential effects of oil spills on sea turtles are discussed in <b>Chapter 4.10.2</b> of this Supplemental EIS and in Chapter 4.9.2.2 of the 2017-2022 GOM Multisale EIS.</p> <p>Climate change-related effects have the potential to alter baseline environmental conditions throughout the GOM. This Supplemental EIS discloses the potential impacts of Lease Sales 259 and 261 in the GOM. The effects of climate change on sea turtles are discussed in Chapter 4.9.2.2 of the 2017-2022 GOM Multisale EIS.</p>

	<p>pushing hatchlings into dangerous shallow habitats. Considering such factors in future population assessments may aid in predicting how the potential for increasing tropical storms, a phenomenon linked to climate change, could affect Kemp's ridley and other populations of sea turtles in the Atlantic Ocean.</p> <p>Climate change also leads to algal blooms that threaten sea turtle species.</p> <p>In addition to climate change, oil spills pose a major risk to endangered sea turtle species in the Gulf. Numerous recent studies have revealed the massive scale and extent of Deepwater Horizon spill impacts on sea turtles that inhabit the Gulf of Mexico. Releases of oil or other contaminants from the Lease Sales 259 and 261 would further threaten Gulf of Mexico sea turtles and their habitat. For example, the northwestern Gulf of Mexico provides critically important foraging grounds for Kemp's ridley sea turtles, with the vast majority (82 percent) of adult, reproductive-aged females using the area. Threats in the region, including oil and gas development, may have a disproportionately higher impact on adult female turtles—a critical demographic for recovery of the species. Ameliorating threats to the Gulf of Mexico Kemp's ridley is of critical importance given the species' recent declining trend.</p> <p>In addition to a declining population trend, Ramirez et al. (2020) found significant reductions in the growth rates of juvenile Kemp's ridley sea turtles beginning in 2012; they hypothesize this is related in part to long-term harmful effects flowing from the Deepwater Horizon oil spill on oceanic and neritic food web in the Gulf of Mexico. Further, in the wake of the Deepwater Horizon oil spill, Kemp's</p>	
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>ridley sea turtle embryos were one and a half times more likely to exhibit deformities including craniofacial and carapace deformities. Lease Sales 259 and 261 pose myriad threats to loggerhead sea turtles as well. Bencotter et al. (2021) found that loggerhead sea turtles were nesting at smaller sizes than expected in the Gulf of Mexico. Small turtle size may limit the turtles' ability to recover from oil spills.</p> <p>The risk to sea turtles from oil spills is not uniform throughout the Gulf. Research continues to reveal areas of heightened risk. BOEM cites Putman et al. (2019) for its modeling of young sea turtle abundance and distribution in the western North Atlantic. Given this paper and other emerging research on sea turtle use of the Gulf of Mexico, it is incumbent upon the agency to conduct a more fine-scale analysis to determine development impacts to sea turtles across the Gulf of Mexico (e.g., western vs. central vs. eastern). For example, Fujisaki et al. (2020) found clearly delineated common foraging grounds for Kemp's ridley and loggerhead sea turtles along the northern Gulf and western Florida coast.</p> <p>BOEM must remedy the identified shortcomings and conduct a more thorough analysis of the impacts of Lease Sales 259 and 261 on sea turtle species.</p>	
<p>Morgan Huette (Turtle Island Restoration Network)</p>	<p>10.26.22 Virtual Public Hearing Comments</p>	<p>Aside from human impacts, there are numerous endangered species that are native to the Gulf of Mexico. All five species of sea turtle that live in the Gulf are endangered, and there are only seven species of sea turtle in the world... Continuing with more unnecessary leases, will continue to harm these species. While it may seem like I am exaggerating, I have personally seen deceased dolphins and turtles on our Galveston beaches.</p>	

NPS	BOEM-2022-0048-22806	Increased light pollution has the potential to... negatively impact nesting adult sea turtles, and decrease sea-finding success for hatchling sea turtles. We are particularly concerned about endangered Loggerhead Sea Turtles ( <i>Caretta caretta</i> ), which have designated Critical Habitat on Horn and Petit Bois islands under the Endangered Species Act.	Potential impacts from artificial lighting to sea turtles are analyzed in Chapter 4.9.2.2.3 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference. Since completion of the 2017-2022 GOM Multisale EIS, BOEM determined that artificial lighting from OCS oil- and gas-related activities is not expected to affect free-swimming juveniles or adults and would be located too far away to disorient hatchlings. For more information on lighting and visual impacts on sea turtles, refer to Chapter 4.6.7 of the <i>Biological Environmental Background Report for the Gulf of Mexico</i> (BOEM 2021a).
API/NOIA	BOEM-2022-0048-28953	The DSEIS (at 4-61) concludes that impacts to sea turtles from conducting Lease Sale 259 or 261 would be “negligible to moderate.” Again, this appears to be an error. The DSEIS should instead conclude that impacts from the proposed action are “negligible,” consistent with the preceding discussion in 4.10.2 and Table 4-3.	<p>The impacts of OCS oil and gas leasing to sea turtles are summarized in <b>Chapter 4.10.2</b> of this Supplemental EIS and discussed in detail in Chapter 4.9.2.2 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference. Although impacts to sea turtle populations from routine OCS oil- and gas-related activities and accidental events could be negligible to moderate, depending on affected species and population stocks, the incremental contribution of a single lease sale compared to cumulative impacts on sea turtle populations (including non-OCS oil- and gas-related activities and the minimization of the OCS oil- and gas-related impacts through lease stipulations and applicable mitigations) is expected to be negligible.</p> <p>Page 4-61 is consistent with the summary on pages 4-57 through 4-58 of <b>Chapter 4.10.2</b>. At the regional, population-level, impacts from reasonably foreseeable routine activities (OCS oil- and gas-related and non-OCS oil- and gas-related effects) and accidental events could be negligible to moderate for Alternatives A, B, C, or D. Of note, <b>Table 4-3</b> summarizes the incremental contribution of a Proposed Action compared to the No Action Alternative and does not account for cumulative conditions and impacts.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

**Beach Mice**

Beach Mice			
Center for Biological Diversity	BOEM-2022-0048-28954	BOEM erroneously declares that the impacts of the lease sales will be “negligible” to the four species of endangered beach mice because of the sales’ “incremental” effects compared to the “cumulative impacts” experienced by these species. While acknowledging that habitat loss poses a significant impact on the beach mice species, the agency omits any analysis of how the climate change impacts flowing from development of the lease sales will accelerate this habitat loss through, e.g., sea level rise, increasingly frequent extreme weather events, and associated beach erosion and flooding. For example, storms can lead to fragmentation of coastal dune systems, isolating scrub dune from the coastal zone, and reducing beach mice’s ability to find food, refuge, and recolonization sites. Given the substantial threat posed by climate change to beach mice, and given the inextricable link between climate change and lease sales 259 and 261, BOEM must conduct a more well-reasoned analysis on expected impacts to the four endangered beach mice species.	Issues related to climate change, including global warming, sea-level rise, and programmatic aspects of climate change relative to the environmental baseline for the GOM are discussed in Chapter 4.2.1 of the 2017-2022 National OCS Oil and Gas Program EIS, which is incorporated by reference, and in <b>Chapter 4.0.2</b> of this Supplemental EIS. Potential impacts to beach mice from hurricanes, sea-level rise, and habitat alteration are analyzed in Chapter 4.9.3.2.3 of the 2017-2022 GOM Multisale EIS, which is also incorporated by reference. Climate change-related effects have the potential to alter baseline environmental conditions throughout the GOM. BOEM analyzes impact-producing factors and potential effects at scales appropriate to the Proposed Action and resources considered. This Supplemental EIS discloses the potential impacts of GOM Lease Sales 259 and 261.

**Commercial Fisheries**

Commercial Fisheries			
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS fails to consider new circumstances and information relevant to the cumulative impacts of the expanding aquaculture industry in the Gulf of Mexico.</p> <p>Taken together, E.O. 13921 and NOAA Fisheries’ Notice of Intent demonstrate that aquaculture development in the GOM is reasonably foreseeable, and numerous biological and physical resources will be impacted by the industry’s presence. BOEM must analyze the significant new</p>	BOEM analyzed the Proposed Action and a full range of alternatives for potential effects on OCS resources, competing uses of resources, and space-use conflicts; refer to Chapter 4.10 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS. As a foreseeable activity in the GOM, interaction with potential aquaculture is considered in impact analyses, and aquaculture is also considered among the factors included in the cumulative effects analysis. Analysis of unknown aquaculture activities (e.g., unplanned aquaculture

		information and circumstances regarding cumulative impacts of aquaculture development in the context of Lease Sales 259 and 261.	<p>siting, scale, environmental effects, and mitigation) is not within the scope of this Supplemental EIS.</p> <p>As new information becomes available, it will be reviewed and incorporated, as appropriate, in future NEPA analyses.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>As is the case throughout the DSEIS, BOEM omits any analysis of how the climate change impacts flowing from development of the lease sales would impact Gulf of Mexico fisheries. The agency does this despite the substantial impacts that climate change is having and will continue to have on fisheries and coastal communities in the Gulf of Mexico and worldwide. As Andrews et al. (2021) explain, fishery resources are directly impacted by greenhouse gas emissions flowing from offshore oil and gas development:</p> <p>This discussion also counters BOEM’s assertion that it need not meaningfully consider the “incremental” and “minor” impacts of lease sales 259 and 261 because they constitute only a fraction of the overall cumulative impact of oil and gas and non-oil and gas related activities in the Gulf of Mexico. As Andrews et al. make clear, every single lease issued is a part of the cumulative effects faced by fisheries in the Gulf of Mexico. The available “evidence suggests that oil development is negatively impacting [small scale fisheries] and coastal communities” and “that the economic potential of the hydrocarbon industry is often outweighed by its negative ramifications on coastal communities whose livelihoods are dependent on the ocean.” BOEM must meaningfully address these issues in its environmental analysis.</p>	<p>In the short term, BOEM anticipates continued oil and gas leasing because the IRA requires that, as conditions for issuing any “lease for offshore wind development,” the Department hold “an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development” and “the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres” (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.</p> <p>The impacts of how oil- and gas-related greenhouse gas emissions contribute to climate change are discussed programmatically in Chapter 4.2 of the 2017-2022 National OCS Oil and Gas Program EIS, and a summary of new research published since the publication of the 2018 GOM Supplemental EIS investigating the impacts of climate change on GOM fish has been added to <b>Chapter 4.9.4</b> of this Supplemental EIS. BOEM outlines the impacts of economic factors of a lease sale in Chapter 4.14.2 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS and which shows a net positive impact to commercial fisheries. Commercial fisheries (<b>Chapter 4.12</b>) and recreational fisheries (<b>Chapter 4.13</b>) are analyzed separately from biological resources because these activities target a subset of marine species and are also subject to a range of potential space-use conflicts</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			and management strategies, as discussed in the analysis. In short, BOEM does consider the “incremental” and “minor” impacts of a lease sale but finds that the potential effects to fisheries and coastal communities is not significant when considering all factors.
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**Archaeological Resources**

Archaeological Resources			
Dorothy Peña (Indigenous Peoples of the Coastal Bend)	10.26.22 Virtual Public Hearing Comments	We are not recognized by the State or the Federal Government who claim the Karankawa are extinct. Our people were not consulted, are still here, and still have their sacred sites on the Gulf of Mexico. The Gulf of Mexico was a source of sustenance and resources to our ancestors, and continues to be to this day. We are currently trying to protect McGloin's Bluff, which is a space containing precious artifacts, and also precious pothole wetlands . We cannot afford to lose our history and our Gulf to offshore oil spills and pollution.	<p>BOEM conducts government-to-government consultation with federally recognized Indian Tribes. However, BOEM is currently in the process of refining its approach to environmental justice analysis in the Gulf of Mexico, including how non-federally recognized Tribes are engaged throughout the process. These comments are important in helping BOEM analysts to better understand areas and topics of potential concern.</p> <p>BOEM does not authorize or permit any activities in State waters or onshore. Any such activities would be subject to State laws and regulations and/or the environmental review requirements of the appropriate lead Federal agency.</p> <p>BOEM encourages all members of the public to participate in the Section 106 process of the National Historic Preservation Act and provide information on historic properties that may be affected by a lease sale on the OCS. BOEM's analysis in <b>Chapter 4.15</b> has indicated that a lease sale will have negligible impacts on archaeological resources provided that appropriate measures are implemented to identify, evaluate, and avoid or mitigate those resources as described in Chapter 4.13 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, which are incorporated by reference into this Supplemental EIS.</p>

## Land Use and Coastal Infrastructure

Land Use and Coastal Infrastructure			
Morgan Huetten (Turtle Island Restoration Network)	10.26.22 Virtual Public Hearing Comments	The environment is also being altered when new oil and gas infrastructure is built. New oil rigs destroy oceanic floor ecosystems, and can cause further damage to animals with the loud noise pollution.	BOEM analyzes the potential impacts from the Proposed Action to benthic communities in <b>Chapter 4.6</b> (Deepwater Benthic Communities) and <b>Chapter 4.8</b> (Live Bottoms) and the impacts from noise are analyzed in <b>Chapter 4.9</b> (Fish and Invertebrate resources), <b>Chapter 4.11.1</b> (Marine Mammals), and <b>Chapter 4.11.2</b> (Sea Turtles). These analyses tier to analyses completed in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS and consider impact-producing factors (including infrastructure emplacement) identified as potentially affecting the respective resource and describes those potential impacts.
Chris Phelan	10.26.22 Virtual Public Hearing Comments	I can tell you right now, we can't even build these platforms where we used to because all that is there is tanks for exporting our oil. And so I'm going to urge BOEM to not let these leases go, to let no more leasing in the Gulf of Mexico. They're not using all the leases that they have now, and they have drilling equipment just stored over here while we export our oil and gas.	BOEM analyzes changes to land use resulting from the Proposed Action in <b>Chapter 4.15.1</b> , which tiers to analyses completed in the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS. BOEM's mission is the economically and environmentally responsible development of offshore energy and mineral resources. BOEM does not have jurisdiction over policies related to the export or import of oil and gas resources.

## Economic Factors

Economic Factors			
NRDC et al.	BOEM-2022-0048-28948	BOEM Should Design Lease Sales 259 and 261 to Assure Fair Market Value by Modifying the Bidding Process for Lease Sales 259 and 261	Assuring receipt of fair market value on OCS lands is mandated by the OCSLA. After each lease sale, BOEM will analyze block-specific geological and geophysical data and assess the oil and gas potential for each OCS block that receives a bid. BOEM also develops and maintains discounted cash flow models that provide a stochastic analysis of the net present value of lease sale blocks. Decisions to accept or reject a bid on an OCS block are based in part on these analyses.

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

<p>NRDC et al.</p>	<p>BOEM-2022-0048-28948</p>	<p>Similar to BOEM's GHG analysis and social cost analysis modeling, the DSEIS's economic factors analysis fails to consider the impacts of IRA.</p> <p>IRA's likely impacts on the transportation sector and the demand for petroleum will significantly change the price of oil and consequently oil supply and demand, altering the economic outlook for Lease Sales 259 and 261. By excluding the economic impacts of IRA and other emissions reducing federal policies in the DSEIS, BOEM has failed to consider an important aspect of the proposed action in its analysis of economic factors.</p>	<p>Per Section 18 of the OCSLA, BOEM is required to develop a schedule of oil and gas lease sales on the OCS for 5-year periods. Moreover, the IRA requires the Secretary of the Interior to conduct Lease Sales 259 and 261; thus, the OCSLA and IRA drive the purpose and require the Secretary of the Interior to propose an action. The need is to meet national energy needs as articulated by the OCSLA and discussed in the sources of energy consumption in the United States presented in the 2017-2022 GOM Multisale EIS and 2017-2022 National OCS Oil and Gas Program. The Proposed Action is a single GOM oil and gas lease sale. This Supplemental EIS is expected to be used to inform individual decisions on GOM Lease Sales 259 and 261.</p> <p>In reference to considering the IRA in this Supplemental EIS, BOEM has provided additional information in <b>Chapter 1</b> to more directly consider the impacts of the IRA. If oil and gas were not produced from the proposed lease sale, market forces dictate most of this forgone energy would likely be procured from other sources to meet energy demands (refer to Table 3 of the 2022 Gulf of Mexico GHG Analysis Addendum; BOEM 2022c).</p> <p>Further, in the short term, BOEM anticipates continued oil and gas leasing because of the IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres" (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS</p>
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			<p>offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>Indeed, study after study has shown that investment in clean energy creates many more jobs than investment in fossil fuels. Globally, undertaking ambitious climate action could result in an additional 65 million jobs by 2030 as compared to a business-as-usual scenario.</p> <p>A recent global survey of more than 200 of the world’s most senior economists at the onset of the COVID-19 downturn reinforced these findings, concluding that clean energy infrastructure is the top investment we can make, both in terms of climate benefits and having the highest stimulus effect. Clean energy infrastructure is also particularly well suited as an economic recovery measure because it is very labor intensive in the early stages. Investment in a full suite of just transition policies will bring family sustaining jobs, many economic benefits, and a brighter future for all.</p>	<p>Thank you for your comment. As is noted in Chapter 3.3.2.6.4 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS, BOEM recognizes renewable energy can revitalize key sectors of the economy. In addition, renewable energy in the GOM is being introduced through BOEM’s Renewable Energy Program.</p> <p>However, BOEM does anticipate continued oil and gas leasing because of the IRA requires that, as conditions for issuing any “lease for offshore wind development,” the Department hold “an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development” and “the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres” (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.</p>
Grant Bixby (Business Alliance for Protecting the Pacific Coast)	10.26.22 Virtual Public Hearing Comments	<p>But in our local area, our spill was felt very acutely by my family, by my clients, by friends, and hundreds of business owners who use the ocean daily. I work in real estate on the coast, and I sell an ocean-based lifestyle and property values are high around here because of the proximity of the beautiful coastline, with all the recreation, food, and commerce that it provides. And the Gulf Coast is no different. My own vacation rental clients lost months’ worth of reservations during this bill last October. Our Huntington Beach Local Air Show, which brings millions of people to the area over a three-day period was canceled, and the major hotels and retail centers were essentially empty,</p>	<p>BOEM analyzes the potential impacts of oil spills on the GOM environment and human uses of the environment in this Supplemental EIS. The OCS oil- and gas-related oil spills in the GOM are analyzed in the “Accidental Events” chapters and other spills (e.g., in State waters or from other sources on the OCS) are analyzed in the “Cumulative Impacts” chapters for all relevant resources.</p> <p>BOEM outlines the impacts to recreational resources in the GOM (<b>Chapter 4.13</b>), including tourism, from a lease sale in Chapter 4.12 of the 2017-2022 GOM Multisale EIS, and they are summarized in the 2018</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		and local schools and rental places suffered cancellations. Newport Harbor, which is the largest private yacht harbor in the world, was closed for two weeks, no boats going in or out, including all the local fishing companies, whose boats were either grounded or stuck at sea, and then had to go to San Diego. They had lingering losses, now trying to convince their purchasers that there catch is safe again, to eat... We all have so much at stake, economically, environmentally, and just like Southern California, the Gulf Coast, could grow their economy and expand their ocean-based culture by working together to preserve our ocean and coastlines.	GOM Supplemental EIS and this Supplemental EIS. Impacts to commercial fishing ( <b>Chapter 4.11</b> ) and recreational fishing ( <b>Chapter 4.12</b> ) are analyzed in Chapters 4.10 and 4.11 of the 2017-2022 GOM Multisale EIS, and summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS. In short, any oil spills arising from a Proposed Action are likely to be small and localized. Additionally, there would likely be response and mitigation efforts subsequent to an oil spill and there would be other recreational sites of similar type and size available in the area. As such, the impacts of an oil spill on recreational resources are expected to be negligible to minor.
Ian Giancarlo (Environment Florida)	10.26.22 Virtual Public Hearing Comments	Tar balls even made their way onto Florida's beaches, devastating local communities, the tourism industry, and coastal environments, such as wetlands.	Further, impacts from a catastrophic event in the GOM, which are not part of the Proposed Action and not reasonably foreseeable, are discussed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d), which is incorporated by reference.
James Freedman	BOEM-2022-0048-9500	The tourism industry along the Gulf Coast dwarfs the oil industry. It also is a much more efficient way of distributing wealth, supporting small restaurants, bars, shops, rental properties, Air B&B's and private hotels rather than lining the pockets of multi-national corporations. It is stupid to risk all that by giving the oil companies more control of the Gulf	
Elizabeth Ann Dowds	BOEM-2022-0048-23217	As a resident of Florida, who actually lives on the Gulf Coast, Fort Myers, I speak from experience that Florida can not truly afford even 1 accident due to fossil fuel drilling. As a state that has a economy that relies on tourism, beaches, restaurants how can it put those very things in danger. Fort Myers Beach is devastated ! There are businesses that have lost everything, may never be able to recover from the losses of Hurricane Ian. The lives lost in that community! The fishing industry of that area can not afford for the fish to disappear. The restaurants that rely on those fresh catch of the day can not afford the fish to become endangered. The	

		chefs, waitresses, waiters, bartenders jobs depend on great food, great beaches as well do many retail stores and amusement attractions.	
Claudia Steiner (The Rachel Carson Council)	10.26.22 Virtual Public Hearing Comments	One major issue I hear my fellows despair over, is the economic implications of the coastal wreckage brought by offshore drilling. It threatens the tourism industry, where many of them work summer jobs, the fishing industry through which many of their families have been employed for generations, and recreation which many of them have enjoyed responsibly their whole lives.	
Scott Eustis (Healthy Gulf)	10.24.22 Virtual Public Hearing Comments	I know you all do your homework, but it seems that the SEIS has really not looked at how wind as a resource is graphically limited, and that's not in the alternatives analysis. So you give, among the options given, we have to go for no action... and there's an economics paper, Iverson 2015, which outlines how renewables, quote, serve as a backstop, and thus determine the total amount of fossil carbon that is economically accessible. Exxon has read this paper. I hope BOEM has read this paper because and takes areas suitable for wind power development out of lease of this lease sale and future lease sales.	Thank you for your comment and the citation. BOEM is considering space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind activities, and OCS significant sediment resources, and has added <b>Chapter 2.3.4</b> , Issues Identified, to the Supplemental EIS to address these issues. BOEM has also considered the need for OCS wind energy and OCS sediment usage in response to climate change in <b>Chapter 4.0.2.1</b> of this Supplemental EIS. This information will help the decisionmaker determine which alternative to choose in the Record of Decision for this Supplemental EIS.
Louisiana Mid-Continent Oil & Gas Association	BOEM-2022-0048-28918	Offshore oil and natural gas development supports over 350,000 jobs throughout the U.S., contributing billions to the economy and local, state, and federal tax revenues.  Specifically, in Louisiana, 250,000 Louisianans are directly impacted by the oil and natural gas industry with one out of every nine jobs in Louisiana. In addition, the industry accounted for nearly \$4.5 billion of state and local tax revenue in 2019, which represents 14.6 percent of total state taxes, licenses and fees collected. Much of this revenue stream finds its way into local economies and helps provide critical operating resources for local governments.	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 4.14.2 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS. The analysis is summarized in Chapter 4.15.2 in the 2018 GOM Supplemental EIS and this Supplemental EIS.

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>Furthermore, revenues from the Gulf of Mexico oil and gas leasing program and production provide critical funding for the federal treasury and local communities.</p> <p>Offshore revenues provide critical funding for our coastal communities that depend on energy revenues to fund vital services like education, health care, police and fire protection, and highways and infrastructure. The Gulf of Mexico Energy Security Act (GOMESA) allows Gulf States to share in offshore revenue generated from oil production.</p> <p>In Louisiana, revenue generated from the offshore oil and natural gas industry provides a lifeline to important environmental priorities set out by Governor Edwards and state and local lawmakers.</p>	
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**Social Factors (Including Environmental Justice)**

Social Factors (Including Environmental Justice)			
USEPA		<p>EPA recommends BOEM consider incorporating lease stipulations for site- or project-specific plans and applications tiering from this proposed action to mitigate impacts to minority, low-income, and indigenous populations, as applicable. We recommend the NEPA analysis of the site- or project-specific plans evaluates all potential direct, indirect, and cumulative impacts in accordance with the CEQ guidance. Impacts may include those from pipelines, oil and gas receiving shore infrastructure, ports, servicing operations, initial construction and deployment, exploration, connected actions, and other activities. EPA recommends BOEM analyze whether minority, low-income, and indigenous populations are disproportionately and adversely impacted by site- and project-specific lease sales.</p>	<p>Thank you for your comment. These comments and recommendations are useful in planning for future analyses and will be taken into consideration.</p> <p>The analysis performed for this Supplemental EIS and 2017-2022 GOM Multisale EIS considered the potential effects of the Proposed Action(s) and a range of alternatives. At this stage, site-specific and project-specific information is not known and, therefore, further analysis would be conducted when those details become known.</p> <p>Throughout the environmental review processes, BOEM routinely requests comment and engages cooperating agencies when appropriate. It is understood that some BOEM-authorized OCS oil- and</p>

		<p>EPA recommends use of the EJ Mapping and Screening Tool (EJScreen) for screening-level information regarding population demographics, environmental indicators, and other information for further analysis. We also recommend BOEM meaningfully engage minority, low-income, and indigenous communities of the GOM region regarding the scope of the proposed action, impacts, development and implementation of mitigation, monitoring, and other information associated with the proposed action. This plays a role in leveraging an agency's ability to collect data for informed decision-making.</p> <p>CEQ's EJ guidance states that agencies should recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. .... EPA recommends further evaluating whether Gulf Coast minority and low-income commercial or subsistence fishers and their respective coastal communities could potentially experience disproportionately high and adverse impacts from these and other routine OCS oil- and gas-related activities.</p> <p>It is unclear whether the Supplemental Draft EIS determined whether a catastrophic oil spill or other accidental events (e.g., oil spills, loss of well control, accidental air emissions, pipeline failures, and chemical and drilling fluid spills) could potentially have disproportionate impacts on minority and low-income commercial or subsistence fishers, coastal fishing communities, or cleanup workers. EPA recommends further evaluating whether impacts from accidental events (including spills that are catastrophic or otherwise) to minority and low-income commercial or subsistence fishers, coastal fishing communities, and cleanup workers could potentially be disproportionately high and adverse.</p>	<p>gas-related activities may be indirectly related to onshore activities authorized or regulated by other Federal and State agencies, and BOEM assumes those activities are conducted in accordance with the overarching statutes and regulations governing those processes.</p> <p>Given the existing extensive and widespread network of supporting industries and infrastructure for offshore oil- and gas-related industry and its associated labor force, the impacts of routine activities related to a single OCS lease sale are expected to be negligible, widely distributed, and to have little impact. Routine activities reasonably expected to result from a single lease would be incremental in nature, not expected to change existing conditions, and expected to contribute to the sustainability of current industry, related support services, and associated employment. Stipulations on site- or project-specific plans in relation to environmental justice concerns warrants future consideration but is outside the scope of this Supplemental EIS.</p> <p>BOEM's demographic analysis highlights minority and low-income percentages at the county level. Because of the broad geographic scope of the affected environment, additional information at the county scale, across the 133-county region, provides limited usefulness. Meaningful engagement with environmental justice communities in the GOM is important. BOEM is currently conducting technical workshops with external parties to find ways to improve analysis and engagement. Regionally, BOEM continues to develop strategies to better understand community impacts and identify potential solutions.</p> <p>BOEM will retain the recommendation for use of the USEPA's EJScreen tool for project- and site-specific</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>It is unclear whether the Supplemental Draft EIS has factored past, present, and reasonably foreseeable future cumulative impacts to minority and low-income commercial or subsistence fishers and coastal fishing communities in the disproportionate impact determination. EPA recommends further evaluating whether Gulf Coast minority and low-income commercial or subsistence fishers and their respective coastal communities could potentially experience disproportionately high and adverse impacts, in light of their potential proximity to proposed activities and any other sources of environmental stress they may experience historically, currently, or projected to occur in the future (including those outside the scope of BOEM's jurisdiction).</p>	<p>analysis and identification of vulnerabilities for future analyses of specific exploration and development plans that may result from the lease sale.</p> <p>In reference to environmental justice communities in the region, they are supported by several interconnected resources, including land use and coastal infrastructure (<b>Chapter 4.15.1</b>), economic factors (<b>Chapter 4.15.2</b>), social factors (<b>Chapter 4.15.3</b>), commercial fisheries (<b>Chapter 4.11</b>), recreational fishing (<b>Chapter 4.12</b>), and recreational resources (<b>Chapter 4.13</b>). Cumulative impacts to these resources are discussed in the 2017-2022 GOM Multisale EIS, which is incorporated by reference in this Supplemental EIS, and could translate into impacts in environmental justice communities through changes in economic opportunities, population, health, and community character and identity.</p> <p>In BOEM's accidental oil-spill analyses, catastrophic oil-spill analysis, and cumulative analysis, BOEM has considered past, present, and reasonably foreseeable future cumulative impacts to minority and low-income commercial or subsistence fishers and coastal fishing communities in the commercial fisheries and recreational fishing chapters (<b>Chapters 4.11 and 4.12</b>).</p>
Earthjustice et al.	BOEM-2022-0048-28951	<p>BOEM has ignored the effects of offshore drilling on the onshore communities that live near the associated midstream (or downstream) oil and gas infrastructure, including refineries, gas processors, and petrochemical facilities. Nearly half of the country's petroleum refining capacity and over half of its natural gas processing capacity can be found along the Gulf Coast. Most of the U.S.'s basic chemical production naturally takes place there as well, making use of the raw materials, such as ethylene, propylene, and benzene, that are</p>	<p>Thank you for your comment. These comments and recommendations are useful in planning for future analyses and will be taken into consideration. BOEM is currently conducting technical workshops with external parties to find ways to improve analysis and engagement.</p> <p>BOEM's analysis (<b>Chapter 4.15.3.4</b> of the Supplemental EIS) takes into consideration the referenced research, as well as the broader body of</p>

		<p>developed by the area’s refiners and processors. Of the “top 10 production complexes in the world, 5 are located in Texas and 1 is located in Louisiana.”</p> <p>This concentration of fossil fuel-related industrial activity has resulted in long-standing health and quality of life impacts for local residents, with the effects often falling disproportionately on communities of color already burdened by high rates of poverty and inadequate access to health care.</p> <p>An EIS must include not only the direct effects of a proposed action but indirect and cumulative effects as well.</p> <p>Consequently, the pollution emitted by onshore infrastructure must be captured in any assessment of proposed leasing, as both an indirect and a cumulative effect.</p> <p>In the SEIS, BOEM dismisses onshore environmental justice effects by disclaiming any legal responsibility to consider them at all:</p> <p>This is flatly incorrect. Indeed, CEQ has long-standing guidance that directly addresses this scenario:</p> <p>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?” Here, multiple sections of OCSLA call for BOEM to consider the environment (including the marine, coastal, and human environments) when conducting OCS leasing.</p>	<p>relevant literature, within the context of NEPA and the Proposed Action. BOEM maintains that potential environmental justice impacts that may arise from downstream support activities cannot be influenced by BOEM’s decisionmaking 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 Federal agencies are required to consider environmental justice impacts for their proposed Federal actions.</p> <p>Regarding the connections between offshore and onshore activities, refineries exist within not only just 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. Chapters 3.1.7.3 and 4.14.1 of the 2017-2022 GOM Multisale EIS discuss downstream industries in further detail, including complications with tying potential lease sale activities to effects on the onshore infrastructure network.</p> <p>BOEM will retain the recommendation for use of the USEPA’s EJScreen tool for project- and site-specific analysis and identification of vulnerabilities for future analyses of specific exploration and development plans that may result from a lease sale.</p> <p>In reference to environmental justice communities in the region, they are supported by several interconnected resources, including land use and coastal infrastructure (<b>Chapter 4.15.1</b>), economic factors (<b>Chapter 4.15.2</b>), social factors (<b>Chapter 4.15.3</b>), commercial fisheries</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

	<p>BOEM's failure to specifically document the effects happening onshore is especially egregious in light of the fact that BOEM has conducted modeling to assess some pollutants, including greenhouse gasses, that result from midstream and downstream activities. And yet other pollutants, such as benzene and formaldehyde, that have long plagued local residents were not considered, although they too result from same industrial activity. BOEM cannot blind itself to the toxic pollutants that local residents will be forced to breathe as a result of its proposed leasing while at the same time assessing other emissions related to the use of fossil fuels and its byproducts.</p> <p>As a result of BOEM's cramped view of NEPA, it has failed to provide any real specificity around environmental justice concerns, such as the type and volume of pollutants that residents will be exposed to or an explanation of the harm to health and welfare that can be expected to result. Nowhere in the collection of NEPA documents that BOEM relies upon—not in the Multisale EIS, not in the EIS for Lease Sales 250 and 251, and not in the present EIS for Lease Sales 259 and 261—does the agency provide any detail as to the effects of the onshore pollution associated with oil and gas infrastructure on the Gulf Coast's most vulnerable inhabitants. Without adequate information that considers the precise impacts on environmental justice communities, both government decisionmakers and the public are deprived of the transparency needed to achieve better outcomes.</p> <p>The SEIS's treatment of onshore effects is inexcusable, and its inadequacy highlights another instance in which harms to environmental justice communities have been neglected in favor of fossil fuels development. If BOEM is to give environmental</p>	<p><b>(Chapter 4.11)</b>, recreational fishing <b>(Chapter 4.12)</b>, and recreational resources <b>(Chapter 4.13)</b>. Cumulative impacts to these resources are discussed in the 2017-2022 GOM Multisale EIS, which is incorporated by reference in this Supplemental EIS, and could translate into impacts in environmental justice communities through changes in economic opportunities, population, health, and community character and identity.</p> <p>In response to wetland loss and environmental justice, impacts of coastal storms, hurricanes, sea-level rise, and subsidence are addressed in the cumulative portion of the land use/coastal infrastructure chapter (Chapter 4.14.1 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS), the social factors chapter (Chapter 4.14.3 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS), and Chapter 3.3.2 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS based on existing peer-reviewed research. An environmental justice determination can be found in Chapter 4.14.3.3 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS.</p> <p>The impacts of climate change are addressed in the 2017-2022 National OCS Oil and Gas Program and are incorporated by reference into this Supplemental EIS.</p>
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		justice impacts meaningful attention, considerably more analysis in the final SEIS is required.	
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS' "environmental justice determination" is premised on false and dangerous assumptions. BOEM erroneously determined that EJ communities would not be measurably harmed by OCS activities resulting from Lease Sales 259 and 261 in violation of NEPA and in contravention of recent executive orders on EJ.</p> <p>BOEM must analyze the incremental impact of Lease Sales 259 and 261 on EJ communities, irrespective of their onshore position, distant from physical offshore assets.</p> <p>Regardless of the amount of emissions attributable to BOEM's offshore activities, any corresponding impacts from these activities on EJ communities are precisely the kind of cumulative effects NEPA requires BOEM to consider. BOEM must re-evaluate the assumptions supporting its "environmental justice determination" so that its logic is consistent with other portions of the DSEIS and with scientific understanding of the transboundary nature of air, water, and debris pollution.</p> <p>BOEM cites to a significant amount of literature on impacts to EJ communities in the Gulf South region but still arbitrarily concludes that Lease Sales 259 and 261 will not exacerbate and/or contribute to these impacts.</p>	
Center for Biological Diversity	BOEM-2022-0048-28954	The DSEIS' cursory environmental justice analysis and determination is inadequate. It's conclusion that "[i]mpacts to GOM populations from a proposed action would be immeasurably small for environmental justice since these low-income and minority communities are located onshore and distant from Federal OCS oil- and gas-related activities" is erroneous.	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>BOEM must take a hard look at the contributions that these lease sales will have both by adding additional, polluting infrastructure as well as the impacts of prolonging existing refineries and petrochemical facilities on overburdened communities of color and low wealth communities.</p> <p>Offshore oil from the Gulf of Mexico is brought onshore in Texas and Louisiana, where four of the top 10 toxic pollution-emitting oil refineries in the United States, and all 10 of the worst polluting petrochemical facilities. Most of them are in low-income communities of color. For example, Port Arthur, Texas and an area called Cancer Alley, Louisiana, are Black communities that host several refineries and rank among in the highest categories of risk to exposure for cancer causing pollution.</p> <p>See EPA's EJ screen below with Port Arthur and Cancer Alley circled showing clusters of environmental justice communities and toxic releases.</p> <p>Moreover, ports that export offshore oil and gas are expanding, and they disproportionately expose environmental justice communities to pollution. A study of the cancer risk from air pollution in Houston determined that the highest cancer risk was along the ship channel and disparities among risk based on ethnicity.</p> <p>Not only do direct, upstream, and downstream emissions pollute environmental justice communities, but also the emissions exacerbate hurricanes, severe storms, and flooding.</p> <p>BOEM must also weigh the impacts of the lease sales on communities of color who depend on the</p>	
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		potential for disproportionate impacts of the lease sales.	
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM should revise its "social factors" analysis to discuss the human health, socioeconomic, and cultural vulnerabilities of specific EJ communities that will be impacted by Lease Sales 259 and 261.</p> <p>BOEM's grouping of all disadvantaged coastal communities into one category is overly broad as there are numerous distinct communities that will be impacted differently by Lease Sales 259 and 261.</p> <p>The DSEIS should analyze the Lease Sales' contributing stressors that will aggravate existing health conditions in minority and low-income communities. The DSEIS does not analyze the existing baseline health conditions and vulnerabilities for distinct coastal communities. Without discussing the existing health burdens, vulnerabilities, and related conditions in disadvantaged communities, the DSEIS is not able to capture the additional harms attributable to Lease Sales 259 and 261.</p> <p>BOEM should publish an environmental justice technical report identifying impacts to the minority and low-income populations that will be affected by Lease Sales 259 and 261.</p>	<p>Thank you for your comment. These comments and recommendations are useful in planning for future analyses and will be taken into consideration. BOEM is currently conducting technical workshops with external parties to find ways to improve analysis and engagement.</p> <p>Because of the regional nature of the proposed activity (with the affected environment encompassing 133 counties) and the diffuse nature of the upstream and downstream activities, discussing specific communities (before the lease has taken place and with lease- or project-level actions not known) is not feasible. An environmental justice technical report would be beneficial for future agency actions, but it is outside the scope of the current activity.</p> <p>Environmental justice communities in the region are supported by several interconnected resources, including land use and coastal infrastructure (<b>Chapter 4.15.1</b>), economic factors (<b>Chapter 4.15.2</b>), social factors (<b>Chapter 4.15.3</b>), commercial fisheries (<b>Chapter 4.11</b>), recreational fishing (<b>Chapter 4.12</b>), and recreational resources (<b>Chapter 4.13</b>). Cumulative impacts to these resources are discussed in the 2017-2022 GOM Multisale EIS, which is incorporated by reference in this Supplemental EIS, and could translate into impacts in environmental justice communities through changes in economic opportunities, population, health, and community character and identity.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	In the United States, fossil fuel pollution and resulting climate harms are already causing hundreds of thousands of premature deaths each year, and this toll will escalate absent the rapid phase-out of fossil fuels.	The impacts from climate change on coastal populations, including those with particular vulnerabilities, are discussed in Chapter 4.14.3.2.1 of the 2017-2022 GOM Multisale EIS, and further expanded with recent literature in <b>Chapter 4.15.3.4</b> of this Supplemental EIS. Health concerns related to

		<p>Climate change threatens public safety, health and well-being, with particular harms to children, older adults, communities of color, low-income communities, immigrant groups, and persons with disabilities and pre-existing medical conditions. Many of these same communities are also disproportionately impacted by the impacts from upstream oil and gas production.</p> <p>Health risks from climate change include increased exposure to heat waves, floods, droughts, and other extreme weather events; increases in infectious diseases; decreases in the quality and safety of air, food, and water; displacement; and stresses to mental health and well-being.</p> <p>The Gulf region is already ground-zero for many of these impacts. For example, in Texas’ record-breaking freeze in the winter of 2021 left millions of people without power and water, resulting the deaths of dozens of people. The storm not only highlights the immense climate harms that communities in the Gulf region are already suffering, but the inexcusable failures of the fossil fuel industry to prepare for the demands of a changing climate and the complete absence of accountability by regulatory agencies and industry officials....</p> <p>Renewable energy avoids the toxic air and water pollution created by the current fossil fuel-dominated energy system that disproportionately harms Black, Brown, Indigenous, and low-wealth communities as well as injuring wildlife and ecosystems.</p>	<p>climate change are beyond the scope of this Supplemental EIS.</p>
<p>Scott Eustis (Healthy Gulf)</p>	<p>10.24.22 Virtual Public Hearing Comments</p>	<p>The petition of Louisiana tribes to the UN on the basis that inaction of BOEM and the United States on climate constitutes forced displacement from their historic lands, and I really hope BOEM reaches out to the United Houma Nation and other Louisiana</p>	<p>BOEM regularly engages and invites government-to-government consultation with federally recognized Tribes on agency activities that may have Tribal implications. We further encourage all community members, including non-federally recognized Tribes and other indigenous groups to engage in the NEPA</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>tribes affected by the loss of land that this lease sale represents.</p>	<p>process by participating in public meetings and submitting oral or written comments. BOEM also conducts community-specific outreach with communities potentially affected by the Proposed Action in order to hear concerns and answer questions. At the lease-sale stage, the future location of activities and any potential onshore effects is not known, and the established NEPA and consultation processes are our best avenue for identifying specific concerns. Additionally, for future actions that may affect historic properties eligible for listing on the National Register of Historic Places, we welcome additional Tribal input as interested parties through the Section 106 process of the National Historic Preservation Act.</p> <p>In the current Supplemental EIS, impacts of coastal storms, hurricanes, sea-level rise, and subsidence are addressed in the cumulative portion of the land use/coastal infrastructure chapter (Chapter 4.14.1 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS), the social factors chapter (Chapter 4.14.3 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS), and Chapter 3.3.2 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS based on existing peer-reviewed research. An environmental justice determination can be found in Chapter 4.14.3.3 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS.</p> <p>The impacts of climate change are addressed in the 2017-2022 National OCS Oil and Gas Program and are incorporated by reference into this Supplemental EIS.</p>
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Pete Stauffer (Ocean Protection Manager, Surfrider Foundation)	10.26.22 Virtual Public Hearing Comments	New offshore drilling would also increase onshore impacts through oil refineries and air pollution that disproportionately harm lower income and communities of color.	BOEM describes the impacts of onshore facilities or activities that contribute to air pollution in coastal communities as a part of the cumulative impacts analysis in Chapter 4.14.3.2.3 (Cumulative Impacts in Social Factors) of the 2017-2022 GOM Multisale EIS and summarized in <b>Chapter 4.15.3</b> (Social Factors) of this Supplemental EIS. For an analysis of the cumulative impacts to air quality, refer to Chapter 4.1.2.3 of the 2017-2022 GOM Multisale EIS, which considered non-OCS oil- and gas-related impacts and included onshore emission sources from non-OCS oil- and gas-related activities including power generation, industrial processing, manufacturing, refineries, commercial and home heating, and motor vehicles (Chapter 3.3.2.5 of the 2017-2022 GOM Multisale EIS), which are summarized in <b>Chapter 4.2</b> of this Supplemental EIS. However, BOEM has no regulatory authority over any onshore activities, including onshore activities that are located near low-income and minority populations. BOEM has no authority to control the actions of onshore facilities. All onshore facilities are permitted and regulated by State oversight agencies.  In reference to environmental justice communities in the region, they are supported by several interconnected resources, including land use and coastal infrastructure ( <b>Chapter 4.15.1</b> ), economic factors ( <b>Chapter 4.15.2</b> ), social factors ( <b>Chapter 4.15.3</b> ), commercial fisheries ( <b>Chapter 4.11</b> ), recreational fishing ( <b>Chapter 4.12</b> ), and recreational resources ( <b>Chapter 4.13</b> ). Cumulative impacts to these resources are discussed in the 2017-2022 GOM Multisale EIS, which is incorporated by reference in this Supplemental EIS, and could translate into impacts in environmental justice communities through changes in economic opportunities, population, health, and community character and identity.
Brady Bradshaw (Center for Biological Diversity)	10.26.22 Virtual Public Hearing Comments	Communities on the Gulf Coast are already burdened by public safety and health consequences, including refining and climate change intensified disasters... Finally, offshore platforms feed into a system of onshore infrastructure that threatens human health with toxic chemicals, including carcinogens and endocrine disruptors. But BOEMs abysmal environmental justice analysis failed to properly examine the disproportionate impact on EJ communities from refining and processing.	
Zainab Mirza (Center for American Progress)	10.26.22 Virtual Public Hearing Comments	Environmental justice communities are disproportionately impacted by the oil and gas industry and by the effects of climate change. These communities live in proximity to the coast where drilling occurs and the refineries where fossil fuels are processed, and their health is on the line.	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			<p>Please refer to Chapter 4.14.3.3 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS, for more detail on BOEM's environmental justice considerations. Please refer to Chapters 4.14.1 and 4.1 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS, for analyses of onshore infrastructure and air quality. The effects of climate change are considered in the cumulative impacts section of the social factors chapter (Chapter 4.14.3 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS).</p>
<p>Chris Phelan</p>	<p>10.26.22 Virtual Public Hearing Comments</p>	<p>Furthermore, your EIS does not capture all the externalities. I live here in Corpus Christi, and I can tell you that we're seeing the effects of sea level rise, we see the effects of oil and gas in our communities in the health effects, and these are primarily communities of color that feel these effects. Here locally, you have ignored the Karankawa people. You do not recognize their tribe, and consequently your EIS is flawed because you go and you consult with tribes who are nowhere near us, and you ignore the tribes that are here. And so I have a real problem with your EIS.</p>	<p>BOEM conducts government-to-government consultation with federally recognized Indian Tribes. However, BOEM is currently in the process of refining its approach to environmental justice analysis in the Gulf of Mexico, including how non-federally recognized Tribes are engaged throughout the process. These comments are important in helping BOEM analysts to better understand areas and topics of potential concern.</p> <p>Storms, hurricanes, and sea-level rise, impacts of coastal storms, hurricanes, sea-level rise, and subsidence are addressed in the cumulative section of the land use/coastal infrastructure chapter (<b>Chapter 4.15.1</b>, as well as Chapters 4.14.1 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS), social factors chapter (<b>Chapter 4.15.3</b>, as well as Chapters 4.14.3 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS), and <b>Chapter 3.4.2</b>, as well as Chapter 3.3.2 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, based on existing peer-reviewed research.</p>

Luke Metzger (Executive Director, Environment Texas)	10.26.22 Virtual Public Hearing Comments	But on the horizon loom the rigs really ruining our view. And sometimes, when we visit, we even see disgusting tar balls marring the beaches. And offshore drilling is really damaging the ability of my family and that of many Texas families to enjoy our beaches, and we should not add to their number with more rigs.	Please refer to the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS, for a discussion on accidental events, including oil spills ( <b>Chapter 3.3</b> ), coastal barrier beaches and associated dunes ( <b>Chapter 4.4.2</b> ), and water quality ( <b>Chapter 4.3</b> ).
Morgan Huetter (Turtle Island Restoration Network)	10.26.22 Virtual Public Hearing Comments	We often see the results of tar balls washing onto the beaches, and that is just what we can see with our naked eye. This is the same water millions of people swim in every summer. By continuing to approve more new leases, coastal communities continue to be sacrifice zones.... If we have the opportunity to stop the possibility of future oil spills that will cause adverse negative health effects and coastal communities, we should take it.	<p>Potential impacts as a result of a low-probability catastrophic event are also discussed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p> <p>In short, any oil spills arising from a Proposed Action are likely to be small and localized. Additionally there would likely be response and mitigation efforts subsequent to an oil spill, and there would be other recreational sites of similar type and size available in the area. As such, the impacts of an oil spill on recreational resources are expected to be negligible to minor.</p> <p>One key factor in managing risk is implementing a rigorous regulatory regime to ensure that post-lease drilling activities are conducted in a safe manner, whether those activities occur in shallow water or deep water. Please refer to Appendix A of the 2017-2022 GOM Multisale EIS for information on BOEM and BSEE's post-lease processes.</p>
Dorothy Peña (Indigenous Peoples of the Coastal Bend)	10.26.22 Virtual Public Hearing Comments	I represent the indigenous people of the Coastal Bend from so called Corpus Christi, Texas, the home and settlement of the Karankawa people and their descendants. Our organization is also comprised of Lipan Apache, Tonkawa and Comanche people... We are not recognized by the State or the Federal Government who claim the Karankawa are extinct. Our people were not consulted, are still here, and still have their sacred sites on the Gulf of Mexico. The Gulf of Mexico was a source of sustenance and resources to our	BOEM is currently in the process of refining its approach to environmental justice analysis in the Gulf of Mexico, including how non-federally recognized Tribes are engaged throughout the process. These comments are important in helping BOEM's analysts to better understand areas and topics of potential concern. We look forward to becoming better informed of the Karankawa Tribe and current cultural movement, as well as the Indigenous Peoples of the Coastal Bend, to appreciate how these might intersect with BOEM's activities and decisionmaking.

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>ancestors, and continues to be to this day... We cannot afford to lose our history and our Gulf to offshore oil spills and pollution. Our people, children, community, deserve better opportunities than the ones you continue to provide to us. We want to see a just transition away from oil and gas and a system which centers the rights and health of the workers.</p>	<p>Regarding sacred sites on the Gulf of Mexico, BOEM does not authorize or permit any activities in State waters or onshore. Any such activities would be subject to State laws and regulations and/or the environmental review requirements of the appropriate lead Federal agency. BOEM encourages all members of the public to participate in the Section 106 process of the National Historic Preservation Act and provide information on historic properties that may be affected by a lease sale on the OCS. BOEM's analysis in <b>Chapter 4.14</b> has indicated that a lease sale will have negligible impacts on archaeological resources provided that appropriate measures are implemented to identify, evaluate, and avoid or mitigate those resources as described in Chapter 4.13 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS.</p>
Form Letter 2	BOEM-2022-0048-0035	<p>The biggest flaw with the plan is that there was no consultation with frontline communities. The SEIS does use academic research that touches on this when discussing environmental justice, but academic research is no substitute for engaging the community members that will be directly impacted by new leases in the Gulf of Mexico. What happens on offshore drilling rigs does not stay in the ocean, and that raw product produced has to be refined somewhere. Often, this is next door to low-income communities and communities of color, unjustly exposing them to environmental pollution that can cause respiratory illness, developmental delays, and cancer, to name a few. While it is true that it is impossible to account for which refined product would come from proposed leases 259 and 261 due to comingling of products, this does not excuse the responsibility the BOEM will have for whatever adverse effects result from what is produced from these sites. As far as I am aware, no frontline community members were consulted with in the</p>	<p>Since lease sales occur offshore and not adjacent to any human communities, there are few, if any, direct impacts. However, BOEM is currently conducting technical workshops with external parties to find ways to improve analysis and engagement.</p> <p>BOEM has no regulatory authority over any onshore activities, including onshore activities that are located near low-income and minority populations. BOEM has no authority to control the actions of onshore facilities. All onshore facilities are permitted and regulated by State oversight agencies.</p> <p>Please refer to Chapter 4.14.3.3 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS, for more detail on BOEM's environmental justice considerations. Please refer to Chapters 4.14.1 and 4.1 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS</p>

		creation of this plan, but based on previous responses seen in oral testimony this past year, it is clear that residents who live near the Gulf of Mexico are against any new leases. To allow for continued production of fossil fuels, rather than decreasing these numbers ASAP, allows for continued environmental injustice.	and this Supplemental EIS, for analyses of onshore infrastructure and air quality.
The Climate Reality Project	BOEM-2022-0048-25262	There was no meaningful consultation with frontline communities while considering these leases; thus, their voices and perspectives have not been heard. Based on testimonies given by frontline and fenceline community members in the past year, it is clear that residents who live near the Gulf of Mexico are against any new leases. Allowing for continued production of fossil fuels allows for continued environmental injustice. The SEIS does use academic research that touches on this when discussing environmental justice, but academic research is no substitute for engaging the community members who will be directly impacted by new leases in the Gulf of Mexico.	
Leda Beth Gray	BOEM-2022-0048-6486	Also Gulf human communities, which have suffered the effects of fossil fuel extraction for far too long.	Environmental justice communities in the region are supported by several interconnected resources, including land use and coastal infrastructure ( <b>Chapter 4.15.1</b> ), economic factors ( <b>Chapter 4.15.2</b> ), social factors ( <b>Chapter 4.15.3</b> ), commercial fisheries ( <b>Chapter 4.11</b> ), recreational fishing ( <b>Chapter 4.12</b> ), and recreational resources ( <b>Chapter 4.13</b> ). Cumulative impacts to these resources are discussed in the 2017-2022 GOM Multisale EIS, which is incorporated by reference in this Supplemental EIS, and could translate into impacts in environmental justice communities through changes in economic opportunities, population, health, and community character and identity.
Friends of the Earth	BOEM-2022-0048-28862	I'm writing to ask that you cancel all remaining offshore sales, including Lease Sales 259 and 261, pursuant to the Inflation Reduction Act (IRA). The Gulf of Mexico has historically been treated as the nation's sacrifice zone for Big Oil. Offshore pipeline leak rates in the Gulf are 10.28 times the national rate. The primarily Black, Indigenous, and communities of color who live in this region have suffered the worst impacts of fossil fuel pollution for far too long. Your administration's commitment to environmental justice alone begs for a swift end to oil and gas development in this region.	In reference to oil spills, for further information on BOEM's analyses of past offshore spills, please refer

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			<p>to Chapter 3.2.1.1 of the 2017-2022 GOM Multisale EIS.</p> <p>Lease Sales 259 and 261 are being held pursuant to the IRA, which requires them to be held no later than March 31 and September 30, 2023, respectively. BOEM has no discretion on whether to hold these lease sales.</p>
API/NOIA	BOEM-2022-0048-28953	<p>The Associations especially concur with the DSEIS (at 4-95) that the No Action Alternative, “cancellation of a single lease sale, would negatively impact firms and employees that depend on recurring leases.” The Associations also concur with the DSEIS’s environmental justice determination (at 4-98), including that “[i]mpacts to GOM populations from a proposed action would be immeasurably small for environmental justice since these low-income and minority communities are located onshore and distant from Federal OCS oil- and gas-related activities.”</p>	Thank you for your comment.
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM has further failed to consider numerous studies conducted after the BP Deepwater Horizon oil spill analyzing the human health impacts of exposure to an oil spill and to the dispersants used to clean up the oil. Exposure to oil spills has been additionally linked to considerable adverse mental health effects.</p>	<p>Studies on human health impacts related to the <i>Deepwater Horizon</i> spill (including both from the oil spill itself as well as dispersants) are discussed in Chapter 4.14.3 of the 2017-2022 GOM Multisale EIS, Chapter 1.3.1.16.3 of the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d), both of which are incorporated by reference into this Supplemental EIS, and in <b>Chapter 4.15.3</b> of this Supplemental EIS.</p>
Shannon Faye	BOEM-2022-0048-26647	<p>There isn't a view from any vantage point near my home that is not disrupted by oil and natural gas platforms in the Gulf. Local fishermen and family-run businesses still have not recovered from the BP catastrophe. Our natural fisheries are struggling. I live in one of two coastal counties that make up the bulk of the tax base for our state from tourism alone. I urge you to not sell off millions of acres of Gulf leases because it's bad for business and that's bad for the rest of us!</p>	<p>BOEM analyzes the potential impacts of oil spills on the environment and human uses of the environment. In this Supplemental EIS, OCS oil- and gas-related oil spills are analyzed in the “Accidental Events” chapters, and other spills (e.g., in State waters or from other sources on the OCS) are analyzed in the “Cumulative Impacts” chapters for all relevant resources.</p>

Coralie Pryde	BOEM-2022-0048-28949	They also endanger the health and welfare of the many people living along the Gulf Coast who have long made their living from the bounty from the Gulf waters... Finally, current levels of global warming have already made parts of the Gulf Coast essentially unlivable for those who do not live and work in an air-conditioned environment. The massive area-wide lease sales made under the Trump administration exacerbated the environmental injustices faced by those who have historically lived in these coastal areas.	<p>Additionally, effects to commercial and recreational fisheries and recreational resources are addressed in the Supplemental EIS in <b>Chapters 4.11, 4.12, and Chapter 4.13</b>. Impacts to both of these fisheries are expected to be low to minor.</p> <p>Climate change is addressed in the cumulative portion of the social factors chapter (<b>Chapter 4.15.3</b>, as well as Chapters 4.14.3 of the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS).</p>
Luke Metzger (Executive Director, Environment Texas)	10.26.22 Virtual Public Hearing Comments	It's been 12 years since the deep water horizon disaster in the Gulf of Mexico, which is, of course, the largest oil disaster in U.S. history, and we all still remember those tragic images of the oil covered wildlife and beaches, the loss of more than \$23 billion in tourism related income, and really the tarnished reputation of our Gulf communities. And because we remember that, we don't want any more leases that could lead to more spills. It would be nice to think that deep water horizon was unique or a freak occurrence. But the truth is, there are thousands of oil spills in U.S. waters each year. Most of these are small, but they add up, and each puts our Gulf communities at risk of further catastrophe. and the bottom line is that we can't afford more leasing and the risk of another catastrophic spill because, as of today, you can't look us in the eye, and truthfully tell us that another deep water horizon isn't on the horizon for Texas.	<p>In short, any oil spills arising from a Proposed Action are likely to be small and localized. Additionally, there would likely be response and mitigation efforts subsequent to an oil spill, and there would be other recreational sites of similar type and size available in the area. As such, the impacts of an oil spill on recreational resources are expected to be negligible to minor.</p> <p>While limiting leasing (i.e., cancelling proposed lease sales) might reduce risk, activities would still occur from past OCS oil and gas lease sales. BOEM considers a key to managing risk is through implementing a rigorous regulatory regime to ensure that post-lease drilling activities are conducted in a safe manner, whether those activities occur in shallow water or deep water. Please refer to Appendix A of the 2017-2022 GOM Multisale EIS for information on BOEM and BSEE's rigorous post-lease processes.</p> <p>Safety measures and technologies have increased since the <i>Deepwater Horizon</i> oil spill. A fact sheet on research and regulatory reforms can be found on BOEM's website at <a href="http://www.boem.gov/2017-2022-GOM-Multisale-Public-Meeting-HandoutsVisuals/">http://www.boem.gov/2017-2022-GOM-Multisale-Public-Meeting-HandoutsVisuals/</a>.</p> <p>Additionally, effects to commercial and recreational fisheries are addressed in the Supplemental EIS in</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			<b>Chapters 4.11 and 4.12.</b> Impacts to both of these fisheries are expected to be low to minor.
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**TOPIC 5 – CUMULATIVE ANALYSIS**

Topic 5 – Cumulative Analysis			
Earthjustice et al.	BOEM-2022-0048-28951	<p>BOEM, however, has instead repeatedly turned NEPA's cumulative effects obligation on its head by focusing only on the incremental portion of a single Gulf of Mexico lease 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...</p> <p>The key inquiry then is to assess the total accumulated harm from all of the various ecological insults catalogued by BOEM. Instead, the SEIS limits its attention to the subset of effects associated only with a lease sale, as measured against the full universe of adverse impacts...</p> <p>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.</p> <p>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 regarding why more definitive information could not be provided." 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</p>	<p>This Supplemental EIS includes analysis of both the incremental impact of a single lease sale and the cumulative impacts of the OCS Oil and Gas Program, as well as the cumulative impacts of non-OCS oil- and gas-related activities in the Gulf of Mexico. Refer to each resource summary in <b>Chapter 4</b> of this Supplemental EIS for impact analyses. For a full analysis on each resource, refer to Chapter 4 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference and from which this Supplemental EIS tiers.</p> <p>Cumulative analyses are included in order to put the incremental contribution of a Proposed Action in context considering all of the other types of activities (i.e., past, present, and reasonably foreseeable) that have the potential to cause impacts similar to those analyzed for a Proposed Action, including cumulative impacts from the overall OCS Oil and Gas Program.</p>

		perfunctory; it must provide a useful analysis of the cumulative impacts of past, present, and future projects.” 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.	
NRDC et al.	BOEM-2022-0048-28948	BOEM should revise its cumulative impacts analysis emphasizing the prevalence of production and associated risk of deepwater and ultra-deepwater extraction.	BOEM’s routine oil and gas operations analysis is inclusive of all types of oil and gas development including deepwater and ultra-deepwater extraction. For more information on the high pressure and high temperature operations, refer to BOEM’s <i>HPHT Production in the Gulf of Mexico</i> technical report (BOEM 2020b), which is incorporated by reference in this Supplemental EIS. More information on the new applicable regulations and standards for both shallow-water and deepwater drilling operations can be found on BSEE’s website at <a href="http://www.bsee.gov/About-BSEE/BSEEHISTORY/Reforms/Reforms/">http://www.bsee.gov/About-BSEE/BSEEHISTORY/Reforms/Reforms/</a> .
NRDC et al.	BOEM-2022-0048-28948	There are significant new circumstances or information bearing on the cumulative impacts of Lease Sales 259 and 261 when added to three reasonably foreseeable future actions: offshore wind, aquaculture, and carbon capture and sequestration. The FSEIS must therefore analyze cumulative impacts of the proposed action combined with these industries.	<p>Cumulative analyses are included in order to put the incremental contribution of a Proposed Action in context considering all of the other types of activities (i.e., past, present, and reasonably foreseeable) that have the potential to cause impacts similar to those analyzed for a Proposed Action, including impacts from the cumulative OCS Oil and Gas Program.</p> <p>BOEM determined that an analysis of the potential for alternative energy is outside the scope of this Supplemental EIS for a Proposed Action. The purpose and need identified for this Supplemental EIS is to provide an analysis of the environmental impacts of oil and gas leasing. However, BOEM does recognize the need to investigate the potential for alternative energy on the Federal OCS, and this is addressed in the 2017-2022 National OCS Oil and Gas Program, from which this Supplemental EIS tiers.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			<p>BOEM's Office of Renewable Energy is responsible for developing an offshore renewable energy program in the Gulf of Mexico. Information on BOEM's renewable energy program, OCS leases, and renewable energy projects is available on BOEM's website at <a href="http://www.boem.gov/Renewable-Energy/">http://www.boem.gov/Renewable-Energy/</a>.</p> <p>BOEM determined that an analysis of the potential for carbon capture and sequestration in the OCS is outside the scope of this Supplemental EIS for a Proposed Action. The purpose and need identified for this Supplemental EIS is to provide an analysis of the environmental impacts of oil and gas leasing. However, BOEM does recognize the need to investigate the potential for carbon capture and sequestration in the OCS. BOEM is working with BSEE to come up with a carbon sequestration rule. The public will have a chance to comment on the draft rule when it comes out.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM's analysis fails to consider the cumulative impacts of all federal oil and gas leasing. Indeed, BOEM fails to even examine the cumulative climate impacts of both Lease Sale 259 and 261—looking instead at the impacts of only one lease sale despite claiming its analysis covers both lease sales. Production of fossil fuels, including oil and gas, from U.S. federal public lands is responsible for a significant share of both domestic and global greenhouse gas emissions. Carbon dioxide emissions from fossil fuels produced on federal lands represent a quarter of all U.S. CO2 emissions.</p> <p>Greenhouse gas pollution resulting from these lease sales and subsequent exploration and development, considered alongside existing federal fossil fuel development; potential development from leases previously issued but not yet under production; the other lease sales mandated by the Inflation Reduction Act —Lease Sale 257 in the Gulf of</p>	<p>This Supplemental EIS includes analysis of both the incremental impact of a single lease sale and the cumulative impacts of the 2017-2022 National OCS Oil and Gas Program, as well as the cumulative impacts of non-OCS oil- and gas-related activities in the Gulf of Mexico. Refer to each resource summary in <b>Chapter 4</b> of this Supplemental EIS for impact analyses. For a full analysis on each resource, refer to Chapter 4 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference and from which this Supplemental EIS tiers.</p> <p>Cumulative analyses are included in order to put the incremental contribution of a Proposed Action in context considering all of the other types of activities (i.e., past, present, and reasonably foreseeable) that have the potential to cause impacts similar to those analyzed for a Proposed Action, including impacts from the cumulative OCS Oil and Gas Program.</p>

	<p>Mexico and Lease Sale 258 in Cook Inlet—and BOEM’s proposed 2023–2028 OCS Oil and Gas Leasing Program would contribute to catastrophic climate change and undue degradation to the atmosphere, frontline communities, wildlife, and other environmental resources BOEM is legally obligated to protect.</p> <p>Neither BOEM, nor any other agency within Interior, has ever conducted a comprehensive evaluation of the costs to our climate and other resources from Interior’s federal fossil fuel leasing program. BOEM must therefore take a hard and comprehensive look at the cumulative climate change impacts of authorizing new leasing, together with committed or potential emissions under existing leases, other leases required by the Inflation Reduction Act, and BOEM’s proposed five-year oil and gas OCS leasing program for 2023–2028, which proposed 11 more lease sales. Only then can BOEM have any chance of conducting a comprehensive evaluation of the true costs of these lease sales.</p> <p>BOEM’s failure to consider such impacts is particularly egregious given that the agency has no valid analysis on which it can rely to permit continued offshore oil and gas drilling activities in the Gulf. For example, a federal court vacated Gulf of Mexico Lease Sale 257 due to Interior’s “serious fail[ure]” to properly examine the climate impacts of new oil and gas activity.</p> <p>While the court’s vacatur order only applied to Lease Sale 257, BOEM’s flawed analysis is more pervasive. The inadequate and unlawful analyses on prior five-year programs and lease sales; the Program EIS; Multisale EIS; and 2017 SEIS are also governing BOEM’s approval of all oil and gas activity on existing leases in the Gulf of Mexico.</p>	<p>The impacts of the lease sales on GHG emissions are included in the 2022 Gulf of Mexico GHG Analysis Addendum (BOEM 2022c). The results of this addendum are referenced within the main chapters of this Supplemental EIS. As mandated by recent court decisions, BOEM also included a newly developed quantification of emissions from an estimated shift in foreign oil consumption. The court’s decision on Lease Sale 257 was based in part on the GHG analysis lacking a consideration of GHG emissions from an increase in foreign consumption of oil. The analysis for this Supplemental EIS has been expanded to address this and other similar court decisions related to GHG emissions from an increase in the foreign consumption of oil.</p> <p>While those court decisions focused on emissions from the consumption of oil, BOEM expanded its consideration referenced in this Supplemental EIS to consider more broadly all aspects of foreign emissions. BOEM is able to quantify the downstream oil consumption aspect; it has also provided a detailed explanation and expert corroboration regarding the limitations within its analysis as related to upstream and midstream foreign emissions. Chapter 4 of the 2022 Gulf of Mexico GHG Analysis Addendum provides BOEM’s expanded qualitative discussion. BOEM extensively explains its capabilities and the limitations in estimating the impacts of OCS leasing on the foreign energy markets upstream, midstream, and downstream emissions. The limitations are supported by references in the 2022 Gulf of Mexico GHG Analysis Addendum to a memorandum by consulting firm Industrial Economics, Inc (IEc) (BOEM 2022c).</p> <p>BOEM and BSEE implement a rigorous regulatory regime to ensure that post-lease activities are conducted in a safe manner. Refer to Appendix A of</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		BOEM is relying on these flawed environmental reviews for all subsequent oil and gas activities conducted on existing leases, including exploration, development, and drilling. As explained by the U.S. District Court for the District of Columbia, BOEM does not prepare environmental impact statements for its approval of exploration or development plans (known as development and operations coordination documents) in the Gulf. Instead, it has a categorical exclusion that exempts the approval of such plans—as well as the approval of permits to drill—from additional NEPA review.	the 2017-2022 GOM Multisale EIS for information on BOEM and BSEE's rigorous post-lease processes.
Morgan Huette (Turtle Island Restoration Network)	10.26.22 Virtual Public Hearing Comments	I urge you to look at the bigger picture when considering these two leases. The effects of two lone leases may not be drastic, but when you add them to the existing 9,000 other approved leases, the results will be catastrophic.	Thank you for your comment. This Supplemental EIS does not only consider two lease sales, it considers the potential impacts of two lease sales under several alternatives. The alternatives are either planning areawide or regionwide. This Supplemental EIS includes analysis of both the incremental impact of a single lease sale and the cumulative impacts of the OCS Oil and Gas Program, as well as the cumulative impacts of non-OCS oil- and gas-related activities in the Gulf of Mexico. Refer to each resource summary in <b>Chapter 4</b> of this Supplemental EIS for impact analyses. For a full analysis on each resource, refer to Chapter 4 of the 2017-2022 GOM Multisale EIS and a summary in the 2018 GOM Supplemental EIS.
Robin Miller	BOEM-2022- 0048-12027	I live on Sanibel Island in the Gulf of Mexico off mainland Florida. I am experiencing first hand the devastation inflicted by the oil and gas industries.  Climate pollution, oil spills, poor water quality, and stronger hurricanes produced from climate warming have significantly harmed our local economy, property values, ecology, wildlife, livelihoods and personal health and safety.	Thank you for your comment. BOEM outlines the impacts of economic factors of a lease sale in Chapter 4.14.2 of the 2017-2022 GOM Multisale EIS, which is summarized in the 2018 GOM Supplemental EIS and this Supplemental EIS and incorporated by reference into this Supplemental EIS. Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS presents a detailed discussion of oil-spill risk, the estimated number of spills, and the likelihood of coastal spills. Chapter 3.3.2.9 of the 2017-2022 GOM Multisale EIS discusses the climate change issue. In short, while the above-mentioned chapters recognize and analyze

			effects of the Proposed Action, they are expected to be localized and minor or negligible.
NPS	BOEM-2022-0048-22806	Should single or multiple 4-6 story high oil and gas drilling rigs be installed near (i.e., 3 to 15 miles) the Gulf Islands National Seashore boundary (which, in Mississippi extends one mile from the mean low tide line) there will be a high probability that wildlife may be directly and adversely affected, including several different species of seabirds, shorebirds, neo-tropical migratory song birds, and sea turtles, among others. Several terrestrial and subaquatic species of wildlife utilize the undeveloped barrier islands for nesting and foraging habitat, as well as for refuge when migrating through the area. Many of these species are federally listed as threatened and endangered (e.g., four species of sea turtles, Gulf sturgeon and Piping plover), or species of special management concern (e.g. Least terns, black skimmers, and plover shorebird species). These animals are sensitive to drilling-related toxic compounds when released into the water column or incorporated in the sediments. Although, under optimal conditions, one platform may have little net effect, many platforms could result in the magnification of toxins around the islands via water and sediment movement. Because this area is the most pristine in this part of the Gulf of Mexico, any contamination (including mercury, hydrocarbons) could have more significant effects than those in more developed areas of the Gulf. Artificial lighting, as well as a predicted net increase in service carriers to the rigs, including low flying helicopters and vessels necessary to transport equipment and personnel to/from the rigs, has the high potential to disorient and disrupt migrating wildlife from safely reaching the barrier islands seeking protection and staging for which these species have used the barrier islands for millennium. The NPS requests	<p>Alternatives A-D analyze the potential impacts of a single lease sale. Alternatives A, B, and D analyze the potential for additional development to occur within 15 miles (24 kilometers) of the Gulf Islands National Seashore. Additional buffer zones around the Gulf Islands National Seashore were a considered alternative under the 2017-2022 GOM Multisale EIS and 2018 GOM Supplemental EIS, which are incorporated by reference into this Supplemental EIS, but they were not analyzed in detail in this Supplemental EIS. More information on this analysis can be found in Chapter 2.2.3 of the 2017-2022 GOM Multisale EIS.</p> <p>The mentioned ESA-listed species and any associated critical habitat is considered in the analysis, as well as in the FWS and/or NMFS consultations. Artificial lighting impacts to resources have also been analyzed, and an initial analysis can be found in the applicable resources in Chapter 4 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS.</p> <p>Potential impacts of oil spills on birds and sea turtles are analyzed in this Supplemental EIS and 2017-2022 GOM Multisale EIS. Further, impacts to wildlife from a catastrophic event are discussed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d), which is incorporated by reference.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		that the PEIS include an analysis that recognizes and addresses these concerns.	
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**TOPIC 6 – OIL SPILLS**

Topic 6 – Oil Spills			
Earthjustice et al.	BOEM-2022-0048-28951	In its assessment of effects to coastal habitats, BOEM concludes impacts to estuarine habitats and coastal barrier beaches and associated dunes “would be major . . . due to cumulative OCS oil- and gas-related spills resulting from all past and present leasing activities.” And it concludes impacts from such accidental events would be “moderate” for seabirds and other waterbirds further inshore. But it concludes the same spills would have only “negligible” impacts to fishes and invertebrate resources, no impact to marine mammals or sea turtles, and “negligible to minor” impacts on commercial and recreational fisheries. BOEM offers no rational explanation for these contradictory conclusions. They are illogical on their face given that fish and invertebrates inhabit the estuarine habitats that would be majorly impacted. And marine mammals, sea turtles, fish, and invertebrates would experience essentially the same exposure to oil spills as moderately impacted birds. The Natural Resource Damage Assessment from the Deepwater Horizon spill demonstrates just that. The SEIS therefore appears to arbitrarily understate the impact of oil spills to several species and resources.	<p>The magnitude of potential impact from cumulative impacts from the OCS oil- and gas-related activities on estuarine habitats and coastal barrier beaches and associated dunes was assessed to be major, while the magnitude of potential impact from accidental oil spills on estuarine habitats and coastal barrier beaches and associated dunes for a single lease sale was assessed to be minor in the 2017-2022 GOM Multisale EIS, 2018 GOM Supplemental EIS, and this Supplemental EIS. Overall, impacts to estuarine habitats from small and large oil spills associated with activities related to the Proposed Action would be expected to be minor because of the distance of most post-lease activities from the coast, the expected weathering and biodegradation of spilled oil over that distance, the projected low probability of large spills near the coast, the resiliency of wetland vegetation, and the available cleanup techniques.</p> <p>In the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS, the habitat resource chapters (i.e., estuarine habitats and coastal barrier beaches and associated dunes) focus on the impact-producing factors that would affect their environment while the other chapters concentrate on the biological effects of the impact-producing factors on fauna (i.e., birds, fish and invertebrates, and protected species) and human resources (i.e., commercial and recreational fisheries).</p> <p>Catastrophic oil spills, such as the <i>Deepwater Horizon</i> explosion, oil spill, and response, are not reasonably foreseeable accidental events under this Proposed Action. Impacts to wildlife from a catastrophic event</p>

			<p>are discussed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p> <p>Upon a global review of the available scientific literature related to the impacts of oil spills, the impact determination for fish and invertebrates has been changed from “negligible” to “negligible to minor” in the Supplemental EIS for Lease Sales 259 and 261. BOEM acknowledges that, depending on the size of a reasonably foreseeable oil spill, its spatiotemporal distribution (e.g., shallow embayment with limited water flow), spill response (e.g., use of dispersants), and species and life stages exposed, localized, but measurable impacts (e.g., mortality of eggs/larvae or immobile, benthic species, and abandonment of suitable habitats) may occur. While population-level impacts would not be expected, short-term, community-level variations may be locally detected (e.g., species mix and relative abundance), constituting a “minor” impact. For more information regarding how accidental oil spills can impact fish and invertebrates, refer to Chapter 4.5.8 of BOEM’s <i>Biological Environmental Background Report for the Gulf of Mexico OCS Region</i> (BOEM 2021a).</p>
<p>Earthjustice et al.</p>	<p>BOEM-2022-0048-28951</p>	<p>BOEM’s oil spill analysis is missing critical information needed to satisfy NEPA’s hard look requirement and adequately evaluate oil spill risk. Most glaringly, 1) BOEM arbitrarily excludes all spills greater than 10,000 bbl from its source data in estimating future large-scale oil spills; 2) BOEM irrationally uses an incomplete and static data set to determine future spill rate; and 3) BOEM fails to evaluate the impacts of the largest reasonably foreseeable oil spill that could occur as a result of the proposed action. We also incorporate by reference the discussion of BOEM’s oil spill analysis in comments on this draft SEIS filed by NRDC et al., which raise flaws including BOEM’s reliance on outdated spill data, failure to account for the</p>	<p>Thank you for your comment. BOEM has reviewed <b>Chapter 3.3.1</b> and has confirmed that it complied with its obligations under NEPA to determine if the information was relevant to reasonably foreseeable significant adverse impacts and, if so, whether it was essential to a reasoned choice among alternatives and, if it was essential, whether it can be obtained and whether the cost of obtaining the information is exorbitant, as well as whether scientifically credible information using generally accepted scientific methodologies can be applied in its place (40 CFR § 1502.22).</p> <p>BOEM determined that, because a catastrophic event like the <i>Deepwater Horizon</i> explosion, oil spill, and</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>transition into deepwater drilling, flawed assumptions that future oil spills will follow past patterns, and failure to consider catastrophic discharge events.</p>	<p>response is not considered reasonably foreseeable as a result of a Proposed Action, the analysis should not be overly emphasized in this Supplemental EIS to avoid confusion over whether it is or is not part of a Proposed Action. This is allowed under CEQ's regulations that removed the requirement to analyze 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 <i>Deepwater Horizon</i> explosion and oil spill, refer to the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p> <p>Additionally, the work of Ji et al. (2014) defined a reasonable range of potentially catastrophic spill sizes and applied extreme value statistics to historical spill data to describe the statistical likelihood of the occurrence of a catastrophic oil spill. While there are competing analyses (e.g., Eckle et al. 2012), BOEM believes the Ji et al. (2014) provides a more robust statistical analysis by utilizing both extreme value statistical methods and complementary risk assessment methods to characterize the potential frequency of a catastrophic spill event.</p>
Earthjustice et al.	BOEM-2022-0048-28951	<p>BOEM claims that the only platform- or pipeline-related spill more than 10,000 bbl in the last fifteen years was Deepwater Horizon, and then excludes Deepwater Horizon from its spill calculations because it allegedly was not "reasonably foreseeable." BOEM's assumptions and conclusions are flawed for several reasons.</p>	<p>The 15-year timespan is used in the analysis because trend analysis showed it to be the best timespan for representing how spill rates have changed while also maintaining a significant portion of the production and spill record (Anderson and LaBelle 2000; Anderson et al. 2012). The spill rates used in the Oil-Spill Risk Analysis (OSRA) are based on a 15-year period (1996-2010) for OCS platforms and pipelines and a</p>

	<p>First, BOEM provides zero support or reasoning for its arbitrary choice to limit historical data to the “last fifteen years.” It is also not apparent what 15-year span BOEM is using, as the word “last” suggests BOEM looked at spills between the years 2007 and 2022, but the SDEIS claims the spill data it used to derive its spill estimates were between the years 1996 and 2010.</p> <p>Second, the claim that there has only been one spill—Deepwater Horizon—that has spilled more than 10,000 bbl is fundamentally false. BOEM’s own reports have said that in 2017, there was a 16,152 bbl spill in the OCS caused by damage to a pipeline segment. 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. Those spills released 53,000 bbl, 65,000 bbl, and 80,000 bbl into the Gulf of Mexico. 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, and Taylor Energy, which is the longest-running spill in U.S. history and has spilled crude oil into the Gulf for the past 18 years; it is still ongoing. 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.</p> <p>Third, the exclusion of Deepwater Horizon from the spill calculations is unfounded. As just discussed, the Ixtoc and Taylor Energy oil spills demonstrate that several catastrophic oil spills in the Gulf have happened in the past, so such large-scale spills as</p>	<p>20-year period (1989-2008) for tankers (Ji et al. 2017), as found in Anderson et al. (2012).</p> <p>Regarding the 2017 spill of 16,152 bbl, BOEM has removed the statement that the <i>Deepwater Horizon</i> was the only oil spill &gt;10,000 bbl. BOEM was also able to confirm the spill in oil-spill statistics published by BSEE, as well as a press release (BSEE 2019d; 2022).</p> <p>However, this single spill does not change the overall conclusions of the analysis presented in the Supplemental EIS. For BOEM to clarify, please provide further information (e.g., date, location, spill type) regarding the additional spills you inquired about.</p> <p>In reference to the <i>Ixtoc</i> 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 large spill.</p> <p>To the point on the 10,000-barrel (bbl) cutoff, this is a cutoff for very large spills that has been used routinely in the past and in previous reports and is not unique to this Supplemental EIS or the oil-spill statistics used for it.</p> <p>BOEM considers a catastrophic spill such as the <i>Deepwater Horizon</i> oil spill a low-probability catastrophic event, which is not reasonably foreseeable and which is why it is not included in calculations.</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>not unforeseeable. They are likely to happen again in the future.</p> <p>It is unreasonable and arbitrary for BOEM to ignore the full historic spill data set it has in its possession and calculate oil spill risk under an arbitrary assumption that zero spills greater than 10,000 bbl have occurred in the past. Even under its flawed assumption, BOEM concludes in the SEIS that there is a 29% chance of a spill greater than 10,000 bbl under Alternative A. Had BOEM included the seven large-scale oil spills described herein in its oil spill calculations, its conclusions of the number and probability of large-scale oil spills expected from each alternative would likely be far greater and higher and influence its environmental impacts assessment</p>	
<p>Earthjustice et al.</p>	<p>BOEM-2022-0048-28951</p>	<p>BOEM also uses an incomplete historical data set to determine future spill risk and fails to factor in changed circumstances that have increased the potential frequency and magnitude of large-scale oil spills occurring today and into the future. Both errors are significant and must be remedied with supplemental analyses so that the agency and the public can make an informed decision regarding the approval of these lease sales.</p> <p>To begin, BOEM arbitrarily relies on spill data only up to the year 2010 to calculate the rate of future spills, failing to incorporate over a decade of more recent data to determine spill risk. At a minimum, BOEM should use its 2016 Update of Occurrence Rates for Offshore Oil Spills as a baseline for its spill risk assessment. As stated in the accompanying report by Susan Lubetkin, Ph.D., although the 2016 report is imperfect at best, it does use “offshore spill data from several components of oil and gas infrastructure—platforms, pipelines, tankers, and barges—through 2015 to calculate</p>	<p>Spill rates from the 2016 update (ABS Consulting Inc 2016) are included in the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS, and are compared to spill rates from previous reports (Anderson and LaBelle 2000; Anderson et al. 2012) despite not being used in the Oil-Spill Risk Analysis modeling for the 2017-2022 National OCS Oil and Gas Program (Ji et al. 2017). The spill rates from the 2016 update were not significantly different and would not have altered the conclusions of the 2017-2022 GOM Multisale EIS. As described in Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS, this study considered data from 1969-2011 and also examined a number of causal factors including equipment failure, human error, weather/natural causes, and other/external factors and noted trends. The MMS (now BOEM and BSEE) imposed more stringent design and assessment criteria for both new and existing structures in the GOM.</p>

		<p>several spill rates.” BOEM should then incorporate spill data since the 2016 report and draw from databases it has readily available for use. For instance, the Bureau of Safety and Environmental Enforcement’s (BSEE’s) Offshore Incident Statistics site shows summary statistics of offshore incidents from 2007 through 2020. And BSEE’s calendar year oil and gas production page includes oil and gas production by year from 2012 through 2021. Incorporation of these updated data is necessary to accurately assess current spill risk.</p> <p>Additionally, BOEM must evaluate what factors influence current spill risk, identify trends to contextualize increasing risk in the Gulf, and adjust the SDEIS’s spill estimates accordingly. The agency has the ability to compare data trends, it simply needs to do the work. In the SDEIS, “[s]pill rates were calculated based on the assumption that spills occur in direct proportion to the volume of oil handled and are expressed as the number of spills per billion barrels of oil handled (spills/BBO).” BOEM thus assumes an equivalence between volume of oil handled and spill occurrence, ignoring mounting evidence that shows this is an erroneous assumption. Factors such as increased hurricane severity and frequency due to climate change, increased deepwater and ultra-deepwater drilling, and aging oil and gas infrastructure all increase the probability of future oil spills and, importantly, the likelihood that these spills could be catastrophic.</p> <p>The SEIS’s conclusions on oil spill risk are not meaningful or accurate because BOEM relies on an incomplete set of historical data and fails to account for changed circumstances. BOEM needs to reevaluate its oil spill analysis and conduct a new assessment that reflects the true risk of oil spills under each alternative.</p>	
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Earthjustice et al.	BOEM-2022-0048-28951	<p>The SEIS fails to identify what is the largest reasonably foreseeable spill that could occur under each alternative, and in turn, falls short of NEPA's requirements to assess the reasonably foreseeable impacts of approving these lease sales. The SEIS summarizes the "mean number" of <math>\geq 1,000</math> bbl spills and <math>\geq 10,000</math> bbl spills, but places no upper bounds on the spill sizes and makes no effort to evaluate the impacts of any discrete spill in its impacts analysis. Instead, BOEM excludes "catastrophic oil spills" entirely from its analysis because they are "not reasonably foreseeable," and then for all other spills, makes dismissive and broad conclusory statements such as: "Accidental spills have been historically low-probability events and are typically small in size. Therefore, the expected impact to fishes and invertebrate resources from accidental oil spills is negligible." BOEM makes no attempt to identify what size spill could reasonably occur between <math>\geq 1,000</math> bbl and its undefined "catastrophic" spill size. At most, BOEM makes a brief note that the impacts of "a large oil spill (<math>\geq 1,000</math> bbl)" would cause "moderate" cumulative impacts to birds in the Gulf of Mexico OCS under Alternatives A–D. The agency provides zero indication of the actual spill size of this "large oil spill" and no further analysis of the spill. Confoundingly, BOEM at one point states that "most of the OSRA modeled oil spills are of a size and number that population-level impacts are unlikely," but provides no information in the SEIS about OSRA's modeled outputs or which modeled spills likely could have population-level impacts.</p> <p>BOEM has the data and modeling capabilities to evaluate the largest reasonably foreseeable spills anticipated to occur under the alternatives and the duty to engage in that analyses under NEPA. BOEM's failure to evaluate the expected environmental harms from the largest oil spill</p>	<p>Thank you for your comment. BOEM recognizes that each oil-spill event is unique and that its outcome depends on several factors, including time of year and location of the release relative to winds, currents, land, and sensitive resources, as well as specifics of the well and response effort. BOEM also understands that the severity of impacts from an oil spill cannot be predicated on volume alone. BOEM has analyzed a low-probability catastrophic event (BOEM 2021d) in conjunction with its analysis of potential effects, as requested by CEQ pursuant to its regulation at 40 CFR § 1502.22. A low-probability catastrophic spill is, by definition, not reasonably certain to occur. 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 (Ji et al. 2014). The Oil-Spill Risk Analysis model discussed in <b>Chapter 3.3.1</b> uses historic spill event, meteorological, and oceanographic data, along with current oil and gas production trends, to analyze potential behaviors and impacts of spills. In addition to the <i>Gulf of Mexico Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d), please refer to the 2017 Oil-Spill Risk Analysis report (Ji et al. 2017), which is referenced in the Draft Supplemental EIS, as well as previous reports with spills categorized by size (ABS Consulting Inc 2016; Anderson and LaBelle 2000; Anderson et al. 2012).</p>
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		anticipated to occur as a result of the proposed action is arbitrary and capricious and violates NEPA.	
Center for Biological Diversity	BOEM-2022-0048-28954	<p>The DSEIS arbitrarily downplays the possibility, and thus the costs, of routine and large oil spills— there are about 250 to 300 offshore oil spill reports each year spotted by NOAA. Offshore oil and gas development consistently results in both chronic and disaster-related oil spills. For example, in 1979, an exploratory well in the Gulf of Mexico blew out and spilled 140 million gallons of oil over the course of 10 months. In 1989, the Exxon Valdez spilled more than 11 million gallons of oil into Alaska’s Prince William Sound. In 2004, Hurricane Ivan hit the Gulf of Mexico off the coast of Louisiana toppling an offshore well platform owned by Taylor Energy, which has been leaking gallons upon gallons of oil every day for nearly two decades, and is now the longest (and possibly largest) oil spill in U.S. history. In 2008, a barge carrying 419,000 gallons of heavy fuel collided with a 600-foot tanker in the Mississippi River, near New Orleans and spilled hundreds of thousands of gallons of fuel; and in 2009, a vessel struck a barge in the Houston Ship Channel, spilling 10,500 gallons of oil. In the same year, a supply vessel collided with a Liberian oil tanker, 40 miles offshore of Galveston, Texas, causing 18,000 gallons of oil to spill. And in 2010, BP’s Deepwater Horizon rig exploded, causing estimated 206 million gallons of oil to spill into the Gulf of Mexico over the course of almost three months.</p> <p>Climate change will also make the risks of such spills more likely due to increased frequency and severity of storms from climate change. Indeed, the Gulf has already seen the impacts of such storms. For example, Hurricane Ian—one of the strongest hurricanes to ever hit Florida, with sustained winds</p>	<p>Thank you for your comment. Oil spills are discussed in Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS. Furthermore, information on oil spills is summarized and updated in <b>Chapter 3.3.1</b> of this Supplemental EIS.</p> <p>BOEM understands that the <i>Deepwater Horizon</i> explosion, oil spill, and response had impacts on the Gulf of Mexico. However, the <i>Deepwater Horizon</i> explosion and oil spill was a catastrophic event, and a catastrophic oil spill is not part of a Proposed Action nor is it considered likely to occur. Catastrophic spills are discussed in the <i>Gulf of Mexico Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p> <p>Climate change is discussed in <b>Chapter 4.0.2.1</b> of this Supplemental EIS and Chapter 4.2.1 of the 2017-2022 National OCS Oil and Gas Program EIS. Furthermore, Chapter 3 of the 2017-2022 GOM Multisale EIS discusses coastal environments and hurricanes among other related topics, which are incorporated by reference into this Supplemental EIS.</p> <p>The severity of storms and their impacts on states bordering the Gulf of Mexico is evident; however, connecting such impacts to climate change is out of scope for this Supplemental EIS.</p> <p>Accidental air emissions, including natural gas, are discussed in Chapter 3.2.3 of the 2017-2022 GOM Multisale EIS. Furthermore, impacts to wildlife from accidental releases are discussed in the relevant resource chapters in the 2017-2022 GOM Multisale EIS. Additionally, the release of natural gas is</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>of 150 miles per hour—caused massive damage to Florida’s Gulf coast, has killed over a dozen people so far with thousands of people still unaccounted for, and left millions without power. And in 2021, Hurricane Ida made landfall in Louisiana with near-Category 5 winds, an observed storm surge of at least 8 to 10 feet, and offshore waves nearly 40 feet high. More recent National Weather Service data show that Hurricane Ida’s surge reached as high as 14 feet. It caused at least 55 reported spills and accidents, mostly from existing oil and gas infrastructure and “underscores the frailty of the region’s offshore oil and gas infrastructure.” This included, for example, a spill from the Phillips 66 Alliance Oil Refinery in Plaquemines Parish; the release of various chemicals at different facilities from power outages and other problems; extensive air pollution from refineries that flared gas because they were shutdown; and extensive damage to Port Fourchon—the largest base supporting the offshore oil and gas industry—along with damage to various offshore rigs and pipelines. One report found that there were 2,230 pollution events that occurred directly or indirectly because of the hurricane. This included 171 oil spills involving at least 229,633 gallons cumulatively; 257 reports of oil spills or sheens, 22 of which added up to an area that equaled over 25 square miles; 48 instances of air pollution reported, with over 1 million pounds of pollutants emitted. The report also noted that these numbers are likely underestimates “due to severely lacking data protocols by the response agencies involved.”</p> <p>BOEM’s analysis ignores the impacts of gas leaks. Gas spills or leaks can endanger wildlife and water quality. Indeed, methane, as the primary component of natural gas, can have serious ecological and fisheries consequences. During underwater gas</p>	<p>discussed in Chapter 1.2.2.5 of the <i>Gulf of Mexico Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d), which is incorporated by reference into this Supplemental EIS. Localized, low-oxygen conditions may be created by the aerobic oxidation of methane in the water column. However, methane that is realized into the water column through natural seeps or small gas leaks gas (and any resultant oxygen consumption) would be highly localized. BOEM considers a catastrophic spill (or natural gas release) such as the <i>Deepwater Horizon</i> oil spill a low--probability catastrophic event, which is not reasonably foreseeable and which is why it is not included in the Supplemental EIS analyses. Despite the high concentrations of methane and the resultant high rates of methanotrophy, hypoxic conditions were not recorded in the dissolved gas and oil plumes of the <i>Deepwater Horizon</i> oil spill. Furthermore, ice cover is not expected in the geographic area of analysis of the Supplemental EIS.</p>
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Brady Bradshaw (Center for Biological Diversity)	10.26.22 Virtual Public Hearing Comments	The Draft EIS states that a catastrophic spill is not foreseeable and not included in the spill estimates. This is short-sighted considering that companies are recklessly drilling in deeper waters amidst climate change intensified hurricanes while spill prevention standards remain insufficient.	
Jo Ann Duman	BOEM-2022-0048-24544	The devastating pollution from the Deep Horizon disaster, oil wells that have leaked for decades, and active wells polluting without penalties, still is in the Gulf and you have not required cleanups of that pollution. The public health is continuously impacted by that pollution.	Aside from the leaking wells from the Taylor Energy platform that was lost during Hurricane Ivan and which 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

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

John Weber	BOEM-2022-0048-0003	The Gulf of Mexico already has much oil/gas infrastructure. Some of it is leaking. We don't need any more and the existing leaking structures should be fixed. We should plan for the long-term capping of all the wells in the Gulf of Mexico. This will be needed to prevent the worst effects of the climate crisis. Thank you.	<p><a href="https://www.boem.gov/environment/environmental-studies/environmental-studies-planning">https://www.boem.gov/environment/environmental-studies/environmental-studies-planning</a>. The Taylor Energy leak has been included in the oil-spill analysis that is summarized in <b>Chapter 3</b> of this Supplemental EIS and discussed in detail in the 2017-2022 GOM Multisale EIS. BOEM's analysis in this Supplemental EIS 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 <b>Chapter 3.3</b>. Potential impacts from these activities are analyzed in each resource chapter of <b>Chapter 4</b>. BOEM acknowledges that, even with stringent standards, risk is not wholly eliminated. For example, Table 3-17 of the 2017-2022 GOM Multisale EIS acknowledges that, even with application of these standards, certain small spills (<math>\geq 1,000</math> 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.</p> <p>BOEM understands that the <i>Deepwater Horizon</i> explosion, oil spill, and response had impacts on the Gulf of Mexico. However, the <i>Deepwater Horizon</i> explosion and oil spill was a catastrophic event, and a catastrophic oil spill is not part of a Proposed Action nor is it considered likely to occur. Catastrophic spills are discussed in the <i>Gulf of Mexico Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p> <p>Safety measures and technologies have increased since the <i>Deepwater Horizon</i> oil spill. A fact sheet on research and regulatory reforms can be found on BOEM's website at <a href="http://www.boem.gov/2017-2022-GOM-Multisale-Public-Meeting-Handouts-Visuals/">http://www.boem.gov/2017-2022-GOM-Multisale-Public-Meeting-Handouts-Visuals/</a>.</p> <p>To learn more about compliance as related to pollution issues, please refer to Chapter 3.1.5.1 of the 2017-2022 GOM Multisale EIS. Oil-spill response and</p>
Karen Nagy	BOEM-2022-0048-13497	In addition, drilling in the Gulf is too dangerous. There is already enough environmental harm going on in this region. Contamination from ongoing leaks, an inability to fully clean up spills...	
Stacey Eichner	BOEM-2022-0048-22849	I recall vividly the BP/Transoceanic catastrophe in the Gulf of Mexico that is STILL leaking today. Or perhaps the Exxon Valdez disaster in Prince William Sound, or maybe the leak of the California coast; it doesn't seem to matter, these catastrophes continue to occur in relation to oil.	

			decommissioning are discussed in Chapter 3.2.8 and Chapter 3.1.6, respectively, of the 2017-2022 GOM Multisale EIS and are incorporated by reference into this Supplemental EIS.
RJ Harrington, Jr.	BOEM-2022-0048-0009	Deep Water Horizon and it's catastrophic environmental impact must not be forgotten!	BOEM's analysis in this Supplemental EIS 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 <b>Chapter 3.3</b> . Oil spills are discussed in Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into the Supplemental EIS. The fate of spilled oil, including tarballs, is discussed in Chapter 3.2.1.3 of the 2017-2022 GOM Multisale EIS, with response strategies discussed in Chapter 3.2.8.2. Spill treating agents (e.g., dispersants) are discussed in Chapter 3.2.8.2.2 of the 2017-2022 GOM Multisale EIS. Furthermore, information on oil spills is summarized and updated in <b>Chapter 3.3.1</b> of this Supplemental EIS. BOEM's subject-matter experts continually update their analysis considering the best available peer-reviewed and government research.  Potential impacts from these activities are analyzed in each resource chapter of <b>Chapter 4</b> in the "Accidental Events" chapters, and other spills (e.g., in State waters or from other sources on the OCS) are analyzed in the "Cumulative Impacts" chapters. BOEM uses decades of historical data on previous oil spills combined with oceanographic data to reliably estimate the probabilities of oil spills occurring over the long-term oil and gas production in the Gulf of Mexico. 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 of the 2017-2022 GOM Multisale EIS and this Supplemental EIS.
Alexcia Best (Oceana)	10.26.22 Virtual Public Hearing Comments	The oil and gas industry has caused irreparable damage to the environment in both the U.S. and Trinidad. In Trinidad, the Gulf of Paria was marred by oil spills in 2013 and 2021. These oil spill disasters devastated local fishing communities and caused lasting harm to the ecosystem. Of course, these paled in comparison to the 2010 deep water horizon spill that led to \$60 billion in cleanup and settlement costs devastated Gulf States, and continues to impact animals, plants, and people in the region. More than 150 whales and dolphins died along with hundreds of thousands birds and fish. We can't let a disaster like this happen again.	
Claudia Steiner (The Rachel Carson Council)	10.26.22 Virtual Public Hearing Comments	Oil spills are a terrifying possibility for people whose roots are established in a once thriving biodiversity hotspot. They are not rare. There were over 6,000 oil spills in the 2010's decade. Economic implications of beach and industry closures aside, these inevitable spills pose irreparable damage to public health and biodiversity.	
Zainab Mirza (Center for American Progress)	10.26.22 Virtual Public Hearing Comments	Furthermore, the threat of oil spills, which is outlined throughout the Draft EIS is an additional concern. The Exxon Valdez and BP horizon oil spills cost Americans over \$60 billion and devastated people, ecosystems, and economies. With additional drilling comes the risk of additional catastrophic oil spills, and the Gulf is not a sacrifice zone.	
Morgan Huetten (Turtle Island Restoration Network)	10.26.22 Virtual Public Hearing Comments	Despite promises that toxic oil spill disasters are rare, it cannot be guaranteed. If we have the opportunity to stop the possibility of future oil spills that will cause adverse negative health effects and coastal communities, we should take it.	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Ian Giancarlo (Environment Florida)	10.26.22 Virtual Public Hearing Comments	Florida is truly an amazing place with amazing beaches and now, I imagine the scene blackened by oil from offshore drilling operation, something that decades more drilling in the Gulf makes all the more likely. Floridians should not have to bear the thought of damaging oil spills any longer. In June of 2010, as we all know, the deep water horizon spill released over 200 million gallons of oil into the Gulf of Mexico, killing tens of thousands of animals like seabirds, sea turtles and fish, also injuring dolphins. Tar balls even made their way onto Florida's beaches, devastating local communities, the tourism industry, and coastal environments, such as wetlands.	<p>BOEM understands that the <i>Deepwater Horizon</i> explosion, oil spill, and response had impacts on the Gulf of Mexico. However, the <i>Deepwater Horizon</i> explosion and oil spill was a catastrophic event, and a catastrophic oil spill is not part of a Proposed Action nor is it considered likely to occur. The return period of a catastrophic oil spill on OCS areas is estimated to be 165 years, with a 95% confidence interval between 41 years and more than 500 years (Ji et al. 2014). BOEM determined that, because a catastrophic event like the <i>Deepwater Horizon</i> explosion, oil spill, and response is not considered reasonably foreseeable as a result of a Proposed Action, the analysis should not be overly emphasized in this Supplemental EIS to avoid confusion over whether it is or is not part of a Proposed Action. This is allowed under CEQ's regulations that removed the requirement to analyze worst-case scenarios. However, BOEM has prepared a detailed analysis of reasonably foreseeable impacts associated with a low-probability catastrophic spill, such as the <i>Deepwater Horizon</i> explosion and oil spill. Please refer to the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p> <p>BOEM acknowledges that, even with stringent standards, risk is not wholly eliminated. For example, Table 3-17 of the 2017-2022 GOM Multisale EIS acknowledges that, even with application of these standards, certain small spills (<math>\geq 1,000</math> 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 compliance as related to pollution issues, please refer to Chapter 3.1.5.1 of the 2017-2022 GOM Multisale EIS.</p>
Michael Sauber	BOEM-2022- 0048-11087	History does have a way of repeating itself and to lease even more sales of oil and gas rigs in the Gulf is playing Russian Roulette with the fishing and tourism industries	
Sandra Hoover	BOEM-2022- 0048-27586	It is time to reduce the exploration for and production of oil. The remainder should be left in the ground! We must concentrate on sustainable, renewable sources of energy. Drilling in the arctic is fraught with opportunities for catastrophe. Any spill there, any kind of pollution is magnified because it is difficult to clean there. I remember hearing from wildlife rehabber friends about the birds and animals that died for years afterward because of the spilled tarry oil that couldn't be removed. This is a side issue but of concern as well. Why chance a problem that doesn't need to happen if we stop leasing and drilling in difficult areas — and then stop drilling completely.	
Maggie Frazier	BOEM-2022- 0048-1198	Did the disaster from the last rig explosion not teach anyone anything? I doubt the aftereffects of that have magically disappeared.	
S. Smith	BOEM-2022- 0048-1339	We are tired of greedy corporations polluting our waters and killing wildlife and destroying wetlands when the oil is leaked or a pipe breaks from cost cutting neglect. We saw what happened with the	

		Deepwater Horizon platform that leaked all that oil into the Gulf. The area is still trying to recover.	<p>The Natural Resource Damage Assessment studies are ongoing, but the Trustees' <i>Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement</i> (PDARP/PEIS) has been released and analyzed for relevant information (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016). With the release of the Trustees' PDARP/PEIS, our understanding of the environmental impacts of the <i>Deepwater Horizon</i> explosion, oil spill, and response has greatly increased; however, there are many ongoing long-term and monitoring studies that are not complete. Therefore, our understanding of the lasting effects or long-term recovery of the system is still incomplete and has data gaps, but the information is not essential to a reasoned choice among alternatives.</p> <p>Current baselines are described for all resources under their respective "Description of the Affected Environment" chapters in the 2017-2022 GOM Multisale EIS, from which this Supplemental EIS tiers. Specific to the PDARP/PEIS, the altered baseline in this Supplemental EIS already includes individual protected species directly affected by this unexpected unique catastrophic event. The injuries assessed within the PDARP/PEIS do not necessarily equate the baseline as defined in NEPA, but they were considered when determining the baseline for our impact determinations.</p> <p>Where gaps remained, BOEM's subject-matter experts exercised their best professional judgment to extrapolate baseline conditions and impact analyses using accepted methodologies based on credible information. BOEM's subject-matter experts have applied other scientifically credible information using accepted theoretical approaches and research methods, such as information on related or surrogate species. Moreover, BOEM will continue to monitor</p>
Krissa Dutton-Schandelmaier	BOEM-2022-0048-3317	The damage that will be inflicted when more oil and gas drilling is allowed is bad enough and can't be reversed once it happens.	
Merrill Shea	BOEM-2022-0048-16124	Considering the history of Gulf oil drilling, the likelihood is very high that, should these proposed leases lead to actual drilling and production, further damage to the Gulf ecosystem and coastal communities will occur.	
David Williams	BOEM-2022-0048-18115	There were balls of tar on the beaches of Galveston Island way back in 1977, long before the 2010 Deepwater Horizon disaster. A major oil spill would devastate the ecosystem. History shows us it's not a matter of "if" but "when". Hurricanes in the Gulf of Mexico can topple oil rigs... Every major spill response so far has seemed chaotic, starting with oil companies downplaying the problem and continuing with government agencies scrambling to respond once the magnitude of the problem begins to emerge.	
Linda S Barnes	BOEM-2022-0048-19052	The Gulf coast is still reeling from the effects of the Deepwater Horizon explosion and massive spill... Tar balls are still washing up on the shore. There are still repercussions from the Exxon Valdez spill and that's over 30 years ago. We don't need more of the accidents and they will occur if drilling is allowed.	
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS neglects to meaningfully consider recent, relevant research and studies assessing the impacts of Deepwater Horizon. The ecological disaster generated immense ecological, economic, and public health consequences that will last for generations.</p> <p>In addition to the harm caused by the spilled oil itself, the chemical dispersants used to clean up the spill exacted their own costs.</p>	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>In sum, the Deepwater Horizon spill caused both catastrophic immediate effects and long-lasting harms, with many of the latter continuing to this day and expected to last for decades to come. From contaminated water, seabeds, and beaches to diseased marine organisms that struggle to repopulate to human beings suffering long-term health impacts, the spill has proved to be a multigenerational catastrophe, the likes of which the Gulf of Mexico cannot afford again. If oil and gas drilling continues long-term in the Gulf, however, the question of another oil spill of significant magnitude is not if, but when. BOEM should update its analysis and take into consideration available scientific evidence on Deepwater Horizon.</p>	<p>these resources for effects caused by the <i>Deepwater Horizon</i> explosion, oil spill, and response, and will ensure that future BOEM environmental reviews take into account any new information that may emerge.</p> <p>As impacts from the <i>Deepwater Horizon</i> explosion, oil spill, and response continue to be assessed, additional analyses will be completed at the site-specific approval stage and in future Supplemental EISs.</p> <p>BOEM considers a key to managing risk is through implementing a rigorous regulatory regime to ensure that post-lease drilling activities are conducted in a safe manner. Refer to Appendix A of the 2017-2022 GOM Multisale EIS for information on BOEM and BSEE's rigorous post-lease processes.</p>
<p>Claudia Steiner (The Rachel Carson Council)</p>	<p>10.26.22 Virtual Public Hearing Comments</p>	<p>Another dire concern of theirs is environmental. Drilling for offshore oil is hazardous for employees, the marine ecosystem, and communities living on the Gulf Coast.</p>	<p>Safety measures and technologies have increased since the <i>Deepwater Horizon</i> oil spill. A fact sheet on research and regulatory reforms can be found on BOEM's website at <a href="http://www.boem.gov/2017-2022-GOM-Multisale-Public-Meeting-Handouts-Visuals/">http://www.boem.gov/2017-2022-GOM-Multisale-Public-Meeting-Handouts-Visuals/</a>.</p> <p>On October 20, 2022, BOEM sent a consistency determination (CD) for GOM Lease Sale 259 to the appropriate Florida Coastal Management Program (CMP). Pursuant to the Coastal Zone Management Act (CZMA), BOEM performs a consistency review and prepares a CD for each Gulf Coast State with a federally approved CMP prior to each lease sale. The CZMA requires 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 CMP (15 CFR part 930 subpart C). More information on how BOEM prepares CDs and</p>

			<p>how State CMPs review CDs submitted by BOEM is described in <b>Chapter 5.2</b> of this Supplemental EIS.</p> <p>In response to impacts of oil- and gas-related activities in Trinidad, that is out of the scope of this Supplemental EIS. This Supplemental EIS discloses the potential impacts of Lease Sales 259 and 261 in the GOM.</p>
Linda Lane	BOEM-2022-0048-2808	<p>After three major oil spills, Deepwater Horizon Oil Spill Still Detectable 10 Years Later, oil rig explosions, 11 deaths and at least four species of marine mammals have been killed by the oil spill, including bottlenose dolphins, spinner dolphins, melon-headed whales and sperm whales, as well as other animals and their food has been destroyed. IF this is not enough FACTS, to make you see the future of more Gulf oil damage, you can ask the land residents how they are doing from destroyed businesses and homes.</p>	<p>The potential impacts to marine mammals from oil spills is analyzed in the 2017-2022 GOM Multisale EIS (Chapter 4.9.1.2) and this Supplemental EIS (<b>Chapter 4.10.1</b>). Potential impacts to marine mammals from a catastrophic discharge event can be found in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p>
Gaylene Vasaturo	BOEM-2022-0048-8696	<p>As a resident of Florida, living on the gulf coast, and a person concerned about birds, in this case especially shorebirds and seabirds, I am concerned about oil spills. It has been shown and time again, that companies oil drilling in the Gulf of Mexico do not prevent leaks, and in some cases disasters. Gulf-wide leasing will significantly increase the risk of oil spills.</p>	<p>The potential impacts to birds from oil spills is analyzed in the 2017-2022 GOM Multisale EIS (Chapter 4.8.2) and this Supplemental EIS (<b>Chapter 4.9.2</b>). Potential impacts to birds from a catastrophic discharge event can be found in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p>
Leslie Edwards	BOEM-2022-0048-9181	<p>Wildlife is still trying to recover from the Deepwater Horizon spill. The dispersant used was untested in nature. I personally saw dispersed oil on Honeymoon Island off the coast of Dunedin Florida, approximately 500 miles away. It was orange and frothy, and this was confirmed to be dispersed oil by a Florida Wildlife officer who had worked in the Panhandle during the cleanup efforts. This is unacceptable - and not cleaning the spill... just out of sight, out of mind!</p>	<p>The potential impacts on wildlife are a major concern to BOEM. The impact analyses of oil and gas production on wildlife marine ecosystems, commercial resources, and recreational resources are discussed extensively in Chapter 4 in the 2017-2022 GOM Multisale EIS and are summarized in <b>Chapter 4</b> of this Supplemental EIS.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Betty Martin	BOEM-2022-008-12112	I am 78 years old and for over 55 years I have been opposed to these leases due to the potential damage to the marine ecosystem, marine animals and birds, recreation interests and the coastline from oil spills and such. It is not a question of if, but when these will happened as some certainly already have caused damage.	BOEM understands that the <i>Deepwater Horizon</i> explosion, oil spill, and response had impacts on the Gulf of Mexico. However, the <i>Deepwater Horizon</i> explosion and oil spill was a catastrophic event, and a catastrophic oil spill is not part of a Proposed Action nor is it considered likely to occur. For a detailed analysis of reasonably foreseeable impacts associated with a low-probability catastrophic spill, such as the <i>Deepwater Horizon</i> explosion and oil spill, refer to the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).
Coralie Pryde	BOEM-2022-0048-28949	Oil spills endanger the flora and fauna in the Gulf, while air pollution from oil refineries and the processing on natural gas poison humans and wildlife.	BOEM describes the impacts of onshore facilities or activities that contribute to air pollution in coastal communities as a part of the cumulative impacts analysis in <b>Chapter 4.15.3</b> (Social Factors). For an analysis of the impacts to air quality, refer to <b>Chapter 4.2</b> .
API/NOIA	BOEM-2022-0048-28953	In characterizing oil spill risks, the DSEIS 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 natural 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. 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	<p>Thank you for your comment. Spill response is discussed in Chapter 3.2.8 of the 2017-2022 GOM Multisale EIS and is incorporated by reference into this Supplemental EIS.</p> <p>BOEM considers a key to managing risk is through implementing a rigorous regulatory regime to ensure that post-lease drilling activities are conducted in a safe manner. Refer to Appendix A of the 2017-2022 GOM Multisale EIS for information on BOEM and BSEE's rigorous post-lease processes.</p> <p>Safety measures and technologies have increased since the <i>Deepwater Horizon</i> oil spill. A fact sheet on research and regulatory reforms can be found on BOEM's website at <a href="http://www.boem.gov/2017-2022-GOM-Multisale-Public-Meeting-Handouts-Visuals/">http://www.boem.gov/2017-2022-GOM-Multisale-Public-Meeting-Handouts-Visuals/</a>.</p>

		<p>American economy and meet domestic energy needs.</p> <p>Additionally, in partnership with federal, state and local governments, academic institutions and communities, the industry dedicates significant time and resources to preparing and planning for the unlikely case of an oil spill. This exhaustive preparation enables the industry to respond appropriately to a spill of any magnitude to minimize its impact on people and the environment.</p>	
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM'S oil spill risk analysis relies on outdated spill data, which fails to account for the significant increase in deep water and ultra-deepwater drilling.</p> <p>Increased drilling in deepwater and ultra-deepwater is reasonably foreseeable under leases that may be issued from Lease Sales 259 and 261. CEQ regulations require BOEM to consider significant new circumstances or information related to the impacts of a proposed action. The failure to incorporate ten years of updated oil spill data in risk modelling violates this requirement. Additionally, by failing to consider the shift towards deep and ultra-deepwater drilling in the GOM, BOEM neglects to analyze a central aspect of oil spill risk and impacts. BOEM's oil spill risks analysis therefore violates NEPA and the APA.</p>	<p>The oil-spill risk analysis (OSRA) modeling for the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS, is based on published spill occurrence rates from Anderson et al. (2012), which have since been updated in a report (ABS Consulting Inc 2016) that showed new spill rates that would have not altered the conclusions of the 2017-2022 GOM Multisale EIS and this Supplemental EIS. Additionally, the OSRA report used the 2017-2022 GOM Multisale and this Supplemental EIS (Ji et al. 2017) details the use of both high and low oil production scenarios in each alternative for the analysis and results.</p>
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS bases its oil spill analysis on historical oil spill trends without justification. BOEM's coastal spills analysis is flawed in several ways. First, BOEM does not assess the reasons that Louisiana has borne increased oil spill impacts compared to other GOM states. Second, BOEM does not explain what impact the "level of . . . recreational activities" in the GOM has on coastal oil spills. It is unclear which recreational activities are at issue and how recreational activities are relevant to oil spills from storage, transport, and processing facilities. Finally,</p>	<p>Data on historical oil-spill occurrence rates are a key input into the OSRA Model, which estimates the future probabilities of oil spills occurring under multiple scenarios. The oil-spill risks are estimated-based historical spill data, spill rates, and the oil volumes to be produced from the lease sales. Overall, BOEM has more than 50 years of OCS oil-spill data that provide comprehensive information for oil-spill risk analysis. The OSRA reports (e.g., Ji et al. 2017) provide detailed discussion on how these data are used.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		BOEM provides no support for its assertion that future activities will resemble past activity patterns.	
NRDC et al.	BOEM-2022-0048-28948	<p>The DSEIS fails to adequately consider the impacts of catastrophic discharge events. The information provided by BOEM provides only a cursory explanation of CDEs and fails to satisfy NEPA's hard look requirement. Instead, the DSEIS refers to the Gulf of Mexico Catastrophic Spill Event Analysis technical report, which evaluates the impacts of a CDE in the Gulf of Mexico. However, simply referring to the technical report does not satisfy BOEM's obligation under NEPA to take a hard look at the environmental impacts of the proposed action. The technical report provides only a "general review" and contains no analysis of the potential impacts of a CDE specific to Lease Sales 259 and 261.</p> <p>Finally, the DSEIS fails to analyze the impacts of CDEs on specific resources. For example, there is no analysis about impacts of a potential CDE on Rice's whale, one of the most endangered marine mammals in existence.</p>	<p>Thank you for your comment. BOEM identifies the potential risks for oil spills in <b>Chapter 3.3.1</b> and provides discussions of the potential impacts by resource in <b>Chapter 4</b>. A catastrophic oil spill is not part of a Proposed Action nor is it considered likely to occur. BOEM does include historical catastrophic discharge events (CDEs) to support the stakeholders' decisionmaking process. <b>Chapter 3.3.1</b> includes major events' influence on oil and gas policy and industry best practices in efforts to reduce the likelihood of a reoccurrence.</p> <p>The impacts of a catastrophic discharge event to marine mammals, including the Bryde's whale (now Rice's whale) are analyzed in the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d), which is incorporated by reference in this Supplemental EIS. The impact determination for marine mammals, including the Rice's whale, considers the impacts of catastrophic events (refer to <b>Chapter 4.10</b> of the Supplemental EIS).</p>

**TOPIC 7 – MITIGATION**

Topic 7 – Mitigation			
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM Should Consider and Adopt Stronger Mitigation Measures for the Critically Endangered Rice's Whale and Other Protected Marine Mammal Species</p> <p>BOEM should consider and adopt mitigation measures that strengthen the Protected Species Stipulation referenced in the DSEIS and the Proposed Lease Stipulations for Lease Sale 259 in the following ways:</p> <ol style="list-style-type: none"> <li>1. The proposed lease stipulations for sale 259 require lessees to follow shipstrike prevention</li> </ol>	<p>As described in <b>Chapter 2.3.3</b>, BOEM considers the use of mitigation, including measures to reduce vessel strikes and overall avoidance, at other stages of decisionmaking besides that for this lease sale decision. BOEM and BSEE's review of plans, permits, and/or authorizations at the post-lease stage includes review of any planned transits through the Rice's whale core habitat. At this time, critical habitat has not been identified for the Rice's whale. BOEM consults with NMFS and FWS to determine mitigating measures that are needed for protected species.</p>

	<p>measures—described in the Reasonable and Prudent Alternative, Reasonable and Prudent Measures, and implementing Terms and Conditions of the NMFS’ 2020 Biological Opinion (BiOp)—for vessels traveling through Rice’s whale habitat in the eastern Gulf. As described in section II(E) above, a five-year NOAA study recently identified areas in the central and western Gulf as persistent Rice’s whale habitat, and BOEM recently deconflicted these areas for offshore wind leasing. BOEM should require lessees to follow the ship-strike prevention measures in all areas of Rice’s whale habitat, including waters within the 100-400 meter isobath across the western, central, and eastern planning areas, with a minimum 10-kilometer buffer to account for whale movement.</p> <p>2. BOEM should prohibit oil and gas activities within Rice’s whale habitat, including: 1) the De Soto Canyon habitat in the eastern planning area identified in the 2020 BiOp,418 and 2) the area along the continental shelf break between the 100 and 400 meter isobaths, through waters off Louisiana and Texas. The prohibition should exclude vessel transits under the terms provided in item (1) above, but it should include the placement of structures, drilling rigs, pipelines, and anchoring.</p> <p>3. To mitigate noise impacts, BOEM should require that all industry vessels transiting through Rice’s whale habitat receive a quiet-vessel notation from an IACS-member ship-classification society.</p> <p>4. BOEM should 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.</p>	
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		5. BOEM should require the use of the best commercially available noise reduction technologies, such as marine vibroseis, modified airguns, and other 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" would be determined by BOEM.	
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM Should Consider and Establish a Lease Stipulation Documenting the Agency's Authority to Require Additional Bonding.</p> <p>Although these authorities exist independent of any lease stipulation, BOEM should both consider and establish a lease stipulation for Lease Sales 259 and 261 documenting the agency's authority to require additional bonding if lessees have: 1) a demonstrated record of failure to comply with lease terms or regulations, particularly those related to safety and environmental protection; or 2) a potential inability to meet present and future financial obligations, such as oil spill liability or decommissioning costs. Supplemental financial assurance can help defray the costs imposed on BOEM and the public through environmental damage, failure to properly decommission wells, and oil spills or leaks.</p>	<p>Thank you for your comment. Your comment addresses BOEM's authority to require additional supplemental bonding and oil-spill financial responsibility as described in 30 CFR parts 556 and 553, respectively. While BOEM appreciates the concern that lease terms contain the right for BOEM to demand additional financial assurance and oil-spill financial responsibility, BOEM's power is described fully in the regulations, and regulated entities are presumed to know the laws and regulations that they operate under. Therefore, placing the aforementioned regulatory requirements in the lease terms would be duplicative and superfluous.</p>
NRDC et al.	BOEM-2022-0048-28948	<p>BOEM Should Both Consider and Incorporate Stronger Mitigation Measures for EJ Communities.</p> <p>BOEM should solicit opposing views from minority and low-income populations regarding the Lease Sales' impact on the environment and analyze them in the FSEIS.</p> <p>BOEM should update the proposed mitigation measures to highlight the interests and concerns of vulnerable coastal communities.</p>	<p>Thank you for your comment. These comments and recommendations are useful in planning for future analyses and will be taken into consideration.</p> <p>The analysis performed for this Supplemental EIS and for the 2017-2022 GOM Multisale EIS considered the potential effects of the Proposed Action(s) and a range of alternatives. At this stage, site-specific and project-specific information is not known and, therefore, further analysis is conducted when those details become known. Throughout the environmental</p>

		<p>Relevant guidance suggests agencies apply the following five mitigation methods when considering potential impacts to EJ communities:</p> <ol style="list-style-type: none"> <li>1. Avoiding an impact by not taking a certain action or parts of an action.</li> <li>2. Minimizing an impact by limiting the degree or magnitude of the action and its implementation.</li> <li>3. Rectifying an impact by repairing, rehabilitating, or restoring the affected environment.</li> <li>4. Reducing or eliminating an impact's frequency over time, such as through preservation and maintenance operations during the life of the action.</li> <li>5. Compensating for an impact by replacing or providing substitute resources or environments.</li> </ol> <p>BOEM should reevaluate potential impacts to EJ communities using the above five mitigation methods and re-issue mitigation measures that appropriately consider impacts to these communities</p>	<p>review processes, BOEM routinely requests comment and engages cooperating agencies when appropriate. It is understood that some BOEM-authorized OCS activities may be indirectly related to onshore activities authorized or regulated by other Federal and State agencies, and BOEM assumes that those activities are conducted in accordance with the overarching statutes and regulations governing those processes.</p> <p>Given the existing extensive and widespread network of supporting industries and infrastructure for the offshore oil- and gas-related industry and its associated labor force, the impacts of routine activities related to a single OCS lease sale are expected to be negligible, widely distributed, and to have little impact. Impacts from routine activities reasonably expected to result from a single lease sale would be incremental in nature, not expected to change existing conditions, and expected to contribute to the sustainability of current industry, related support services, and associated employment. BOEM agrees that conditions of approval on site- or project-specific plans in relation to environmental justice concerns warrants future consideration, but it is outside the scope of this Supplemental EIS.</p> <p>BOEM's demographic analysis highlights minority and low-income percentages at the county level. Additional information at the county scale, across the 133-county region, provides limited usefulness. Meaningful engagement with environmental justice communities in the GOM is important. BOEM is currently conducting technical workshops with external parties to find ways to improve analysis and engagement. Regionally, BOEM continues to develop strategies to better understand community impacts and identify potential solutions.</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

**TOPIC 8 – REGULATIONS AND SAFETY**

Topic 8 – Regulations and Safety			
<p>Brady Bradshaw (Center for Biological Diversity)</p>	<p>10.26.22 Virtual Public Hearing Comments</p>	<p>Fortunately, Interior still has authority under OCSLA to counteract some of these horrific mandates that the IRA has set forth. First, the Biden Administration holds the authority to set production rates, so BOEM should set lease terms that plan for a managed decline on new and existing leases and develop a comprehensive schedule that will result in a nationwide phase out of fossil fuel production across all offshore leases by 2035 at the latest. In addition, BOEM should ensure that lease terms prohibit offshore fracking.</p>	<p>The IRA requires that, as conditions for issuing any “lease for offshore wind development,” the Department hold “an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development” and “the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres” (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.</p> <p>Oil from the Gulf of Mexico OCS contributes to meeting domestic demand and enhances national economic security. However, 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. Therefore, a phase out of OCS oil and gas production is not currently practical, and not realistic, particularly in relation to the requirements of the IRA. Refer to Chapter 3.1 and Figure 3-3 of the 2017-2022 GOM Multisale EIS for more detail on the timing of lease activities.</p> <p>The IRA increases the minimum royalty rate for future oil and gas leases on the OCS from 12.5% to a minimum of 16.67%. For 10 years after the passage of the Act, the IRA creates a maximum rate of 18.75%. BOEM analyzed this change in royalty rates in the Supplemental EIS.</p> <p>The 2017-2022 GOM Multisale EIS analyzed the potential impacts of hydraulic fracturing on the Gulf of</p>

			<p>Mexico OCS. Chapter 3.1.3.1 (“Development and Production Drilling”) of the 2017-2022 GOM Multisale EIS provides detailed information on hydraulic fracturing on the Gulf of Mexico 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.” Chapter 3.1.5.1 (“Operational Wastes and Discharges Generated by OCS Oil- and Gas- Related Facilities”) of the 2017-2022 GOM Multisale EIS details information on discharges and regulations on OCS oil and gas discharges. Chapter 4.2 (Water Quality) of the 2017-2022 GOM Multisale EIS has detailed language on operational discharges and wastes, including those from hydraulic fracturing. 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.</p>
<p>Earthjustice et al.</p>		<p>In 2015, the Government Accountability Office (GAO) found that BOEM’s and the Bureau of Safety and Environmental Enforcement’s (BSEE) existing financial assurance regulations and procedures for decommissioning liability posed significant financial risks to the federal government and taxpayers, and identified several important actions to improve the system. The GAO found that the federal government did not have sufficient assurances to cover the costs of outstanding decommissioning liabilities.</p> <p>In the Gulf of Mexico alone, \$2.3 billion in decommissioning liabilities may not be covered by adequate financial assurances, and less than 8% of an estimated \$38.2 billion in decommissioning liabilities were covered by financial assurance mechanisms such as bonds. As a result, the federal government could be forced to cover billions</p>	<p>The GAO’s 2015 audit of the U.S. Department of the Interior’s oversight of decommissioning liabilities (Report No. GAO-16-40) assessed BOEM and BSEE’s regulations and policies associated with obtaining and maintaining sufficient financial assurances to avoid having the Federal Government and taxpayers from incurring the costs, should lessees fail to conduct their decommissioning obligations and become insolvent. The report, <i>Actions Needed to Better Protect Against Billions of Dollars in Federal Exposure to Decommissioning Liabilities</i>, outlines six recommendations including that BSEE (1) collects all relevant data associated with decommissioning from lessees, (2) establish documented procedures for estimating decommissioning liability, (3) develop a plan and set a timeframe to ensure that Interior’s data system for managing offshore oil and gas activities includes processes to accurately and completely record-estimated decommissioning liabilities, and</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>of dollars in decommissioning costs using taxpayer dollars.</p> <p>According to the GAO, BOEM and BSEE face data limitations that prevent them from being able to effectively track decommissioning liabilities. Specifically, BSEE was unable to collect accurate information on decommissioning costs from operators, it was relying on an outdated system to estimate decommissioning costs, and it lacked documented procedures for identifying and tracking lease infrastructure in need of decommissioning.</p>	<p>(4) ensure that the system will be able to identify, capture, and distribute data on decommissioning liabilities and financial assurances in a timely manner, and that BOEM (5) completes its plan to revise its financial assurance procedures, including the use of alternative measures of financial strength, and (6) revise its regulations to establish a clear deadline for the reporting of transfers to require that lessees report the transfer of rights to lease production revenue.</p> <p>Both BOEM and BSEE have been working together to revise their respective regulations and develop policy to best address the recommendations. 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, <i>Reporting Requirements for Decommissioning Expenditures on the OCS</i>, 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 government will incur the costs or require more financial assurance than necessary to cover future decommissioning liabilities. The shared database systems that BOEM and BSEE use for tracking infrastructure, permitting, and decommissionings have been updated to meet/exceed the GAO recommendations. Additionally, BOEM and BSEE are working on regulatory revisions that would help ensure that predecessor lessees are situated to assume responsibility, should the current lessees or grant</p>
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			<p>holders fail to fulfill their decommissioning obligations, and should there not be any remaining predecessors, the bureaus will also be able to work together to use funds secured under BOEM's financial assurance program to contract for decommissioning work without passing the burden to the taxpayers.</p> <p>After independently reviewing the GAO report and the updates on the GAO website closing out the recommendations, BOEM has determined that the GAO report and the recommendations that have now been implemented by the bureaus do not change the reasonably foreseeable environmental impacts that may result from an oil and gas lease sale. BOEM has also determined that the GAO report or implementation of the recommendations does not affect BOEM's conclusions regarding impacts reasonably foreseeable from the proposed activities.</p>
<p>Earthjustice et al</p>		<p>Just last year, the GAO found that "BSEE does not have a robust process to address the environmental and safety risks posed by leaving decommissioned pipelines in place on the seafloor due to the cumulative effects of oversight gaps before, during, and after the decommissioning process." And in its 2022 Fiscal Year Budget Justification request, BSEE describes orphaned liabilities as a growing area of oversight and obligation. This all adds up to establish that inadequate decommissioning is likely to result from a lease sale. Wells and infrastructure will be abandoned, orphaned, or decommissioned in a substandard manner.</p> <p>BOEM must assess how this foreseeable result will affect the environment. For instance, ineffectively decommissioned wells can result in long-term leaks of oil and methane and can create use conflicts for future development of offshore wind or other infrastructure in the region. BOEM has embarked on a research effort to better understand the impact</p>	<p>As addressed in Report No. GAO-16-245, <i>Interior's Bureau of Safety and Environmental Enforcement Restructuring Has Not Addressed Long-Standing Oversight Deficiencies</i>, the GAO reviewed laws, regulations, and policies related to BSEE's restructuring and oversight activities. In the report, the GAO had nine recommendations, including that BSEE (1) complete and update its investigative policies and procedures, (2) conduct and document a risk analysis of the regional-based reporting structure, and (3) develop procedures for enforcement actions. The BSEE began addressing the recommendations in 2016 and, according to GAO, as of 2021, all recommendations related to BSEE's restructuring and offshore oil and gas oversight have been closed and implemented. The GAO removed the segment from its High Risk Series in 2021.</p> <p>Additionally, the GAO's 2021 audit of BSEE's management of offshore oil and gas pipelines (Report No. GAO-21-293), <i>Updated Regulations Needed to</i></p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>of abandoned oil and gas wells on air and water quality in the Gulf. It states, "The GOM has thousands of abandoned oil and gas wells with some dating back to the 1960s." And it acknowledges that there are concerns about the potential for oil leaks from abandoned wells to contaminate regional areas. The use of abandoned wells for carbon storage will create another environmental risk, as pressurizing those formations could increase the likelihood and magnitude of pollutants escaping from inadequately plugged wellbores. By not assessing these issues, the SEIS effectively assumes wells do not leak once they are decommissioned. That assumption is plainly false and must be addressed. BOEM cannot rationally choose an alternative that would result in thousands of additional abandoned, orphaned, or inadequately decommissioned wells, without considering that those wells are likely to cause water pollution.</p> <p>BOEM similarly must consider evidence that decommissioned, abandoned, and orphaned pipelines leak hydrocarbons and cause other environmental harms. It cannot assume there will be no effects because all pipelines are decommissioned.</p>	<p><i>Improve Pipeline Oversight and Decommissioning</i>, looked at regulations, policies, and processes for (1) ensuring active pipeline integrity and (2) addressing safety and environmental risks associated with decommissioned pipeline infrastructure. The GAO identified several concerns and proposed one recommendation for BSEE's Director to further develop, finalize, and implement updated pipeline regulations to address integrity and risks. To best ensure integrity and help assess risks, BSEE has dedicated personnel and resources towards updating its pipeline regulations, which have been shared with BOEM for review, recommendations, and critical input. The draft rule is in its final stages of review at the time of this writing, and BSEE anticipates publishing a final rule in early 2023. The revised regulations are expected to include new requirements for complete removal of most pipeline segments, site-clearance verification for remaining infrastructure, and increased information requirements for pipeline permit applications that will improve the site-specific NEPA analyses, coordinated by BOEM on behalf of BSEE. Just as BSEE is assisting/helping fund the BOEM research effort on the impacts of decommissioned wells noted in the comment, BOEM is staged to support a similar study currently under development by BSEE to assess the potential environmental risks associated with decommissioned pipelines and pipeline infrastructure. Findings from the pipeline research will be incorporated into additional policy as referenced in subsequent, permit-specific NEPA analyses.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM's track record of insufficient offshore oversight and enforcement also render its DSEIS inadequate. For example, BSEE "does not have a robust oversight process for ensuring the integrity of approximately 8,600 miles of active offshore oil and gas pipelines located on the seafloor of the Gulf of Mexico." It noted that the agency "does not generally conduct or require any subsea inspections of active pipelines." Rather, it "relies on monthly surface observations and pressure sensors to detect leaks. However, officials told us that these methods and technologies are not always reliable for detecting ruptures." The report also noted that</p>	<p>After independently reviewing the GAO reports and updates on the GAO website, BOEM has determined that the GAO recommendations from Report No. GAO-16-245 have now been implemented by BSEE. Additionally, BOEM has continued to work with BSEE on the revisions to the pipeline regulations</p>

		<p>“BSEE does not have a robust process to address the environmental and safety risks posed by leaving decommissioned pipelines in place on the seafloor due to the cumulative effects of oversight gaps before, during, and after the decommissioning process” despite the fact that it has allowed 97 percent of pipelines to be decommissioned in place.</p>	<p>and will partner with BSEE on the research to assess environmental impacts from decommissioned pipeline infrastructure. These improvements do not change the reasonably foreseeable environmental impacts that may result from an oil and gas lease sale. Additionally, BOEM has also determined the GAO report’s implementation of the recommendations, and the improvements to pipeline oversight, does not affect BOEM’s conclusions regarding impacts reasonably foreseeable from the proposed activities.</p>
Earthjustice et al.	BOEM-2022-0048-28951	<p>Finally, BOEM must account for the likelihood that energy market trends, including those spurred by the IRA’s climate policies, are likely to lead to stranded assets on the OCS. As oil demand declines, OCS production would also decline and lead to more idle iron that must be decommissioned. At the same time, companies operating in the OCS would be earning less revenue from oil and gas as demand declines, increasing the likelihood that lessees will not be financially able to cover their decommissioning responsibilities. These issues together are likely to increase the proportion of leases with unaddressed decommissioning, so would increase the effects to the environment that occur when OCS operations are not decommissioned promptly or adequately.</p>	<p>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 <i>et seq.</i> Most notably, in determining if and when additional financial assurance is required, the regulations allow for BOEM to assess, among other criteria, a company’s financial strength and capacity to satisfy all existing and future lease obligations, including obligations to fully satisfy decommissioning performance. Given these regulatory and financial safeguards, the environmental impacts are not expected to increase.</p>
Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM’s meager treatment of oil spills in the DSEIS is inadequate. The DSEIS’s perfunctory reference to a catastrophic oil spill analysis fails to actually grapple with the true impacts of oil spills that routinely occur from offshore drilling. The DSEIS improperly assumes the efficacy of regulations and inspections and the ability to clean-up an oil spill, which artificially skews its analysis. Most of the hundreds of recommendations by the Deepwater Horizon Commission have never been implemented, including BOEM’s continued reliance on categorical exclusions to evade site-specific</p>	<p>BOEM does conduct site-specific environmental analyses for each exploration and development plan. The ones that are categorically excluded are categorically excluded with review analysis (CERA). Many of the plans that are reviewed are for minor changes such as equipment changes, change in operator, vessel changes, updating air quality spreadsheets, etc. These types of changes would only require an Air Quality Review. In this case, a CERA would be issued. The analysis having been the Air Quality Review.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>NEPA review of most exploration and development plans in the Gulf of Mexico.</p> <p>The DSEIS relies on a low probability of a &gt;1,000 bbl oil spill without an adequate description of what the environmental impacts of that spill would be plus the thousands of small spills that it projects to occur from its lease sale. BSEE's Incident Data reporting indicates that spills and accidents in the offshore oil and gas industry are routine. For example, in 2020 there were six fatalities, 160 injuries, 87 fires, one explosion, 73 gas releases, seven collisions, one loss of well control and 11 spills of oil, drilling muds, and other chemicals. The year 2019 saw a similar number of incidents, with six fatalities, 222 injuries, 84 fires, four explosions, 20 gas releases, 10 collisions, two losses of well controls, and 14 spills. The DSEIS should also analyze the cumulative impacts of decades of lease sales. One large oil spill from each of the 50+ Gulf of Mexico lease sales over the past decades add up with impacts that need to be evaluated here.</p> <p>BOEM should additionally incorporate impacts and recommendations from the best available science on oil spills.</p>	<p>A new lease with new wells being drilled in deep water would need a full suite of site-specific reviews and a site-specific environmental assessment.</p> <p>BOEM's analysis in this Supplemental EIS 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 <b>Chapter 3.3</b>. Oil spills are discussed in Chapter 3.2.1 of the 2017-2022 GOM Multisale EIS, which is incorporated by reference into this Supplemental EIS. The fate of spilled oil, including tarballs, is discussed in Chapter 3.2.1.3 of the 2017-2022 GOM Multisale EIS, with response strategies discussed in Chapter 3.2.8.2. Spill treating agents (e.g., dispersants) are discussed in Chapter 3.2.8.2.2 of the 2017-2022 GOM Multisale EIS. Furthermore, information on oil spills is summarized and updated in <b>Chapter 3.3.1</b> of this Supplemental EIS. BOEM's subject-matter experts continually update their analysis considering the best available peer-reviewed and government research.</p> <p>Potential impacts from these activities are analyzed in each resource chapter of <b>Chapter 4</b> in the "Accidental Events" chapters, and other spills (e.g., in State waters or from other sources on the OCS) are analyzed in the "Cumulative Impacts" chapters. 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 Gulf of Mexico. 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 of the 2017-2022 GOM Multisale EIS and this Supplemental EIS.</p>
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			<p>BOEM understands that the <i>Deepwater Horizon</i> explosion, oil spill, and response had impacts on the Gulf of Mexico. However, the <i>Deepwater Horizon</i> explosion and oil spill was a catastrophic event, and a catastrophic oil spill is not part of a Proposed Action nor is it considered likely to occur. The return period of a catastrophic oil spill on OCS areas is estimated to be 165 years, with a 95% confidence interval between 41 years and more than 500 years (Ji et al. 2014). BOEM determined that, because a catastrophic event like the <i>Deepwater Horizon</i> explosion, oil spill, and response is not considered reasonably foreseeable as a result of a Proposed Action, the analysis should not be overly emphasized in this Supplemental EIS to avoid confusion over whether it is or is not part of the Proposed Action. This is allowed under CEQ's regulations that removed the requirement to analyze worst-case scenarios. For a detailed analysis of reasonably foreseeable impacts associated with a low-probability catastrophic spill, such as the <i>Deepwater Horizon</i> explosion and oil spill, refer to the <i>Catastrophic Spill Event Analysis</i> technical report (BOEM 2021d).</p> <p>BOEM acknowledges that, even with stringent standards, risk is not wholly eliminated. For example, Table 3-17 of the 2017-2022 GOM Multisale EIS acknowledges that, even with application of these standards, certain small spills (<math>\geq 1,000</math> 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 compliance as related to pollution issues, please refer to Chapter 3.1.5.1 of the 2017-2022 GOM Multisale EIS.</p> <p>The Natural Resource Damage Assessment studies are ongoing, but the Trustees' PDARP/PEIS has been</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			<p>released and analyzed for relevant information (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016). With the release of the Trustees' PDARP/PEIS, our understanding of the environmental impacts of the <i>Deepwater Horizon</i> explosion, oil spill, and response has greatly increased; however, there are many ongoing long-term and monitoring studies that are not complete. Therefore, our understanding of the lasting effects or long-term recovery of the system is still incomplete and has data gaps, but the information is not essential to a reasoned choice among alternatives.</p> <p>Current baselines are described for all resources under their respective "Description of the Affected Environment" chapters in the 2017-2022 GOM Multisale EIS, from which this Supplemental EIS tiers. Specific to the Trustees' PDARP/PEIS, the altered baseline in this Supplemental EIS already includes individual protected species directly affected by this unexpected, unique catastrophic event. The injuries assessed within the PDARP/PEIS do not necessarily equate the baseline as defined in NEPA, but they were considered when determining the baseline for our impact determinations.</p> <p>Where gaps remained, BOEM's subject-matter experts exercised their best professional judgment to extrapolate baseline conditions and impact analyses using accepted methodologies based on credible information. BOEM's subject-matter experts have applied other scientifically credible information using accepted theoretical approaches and research methods, such as information on related or surrogate species. Moreover, BOEM will continue to monitor these resources for effects caused by the <i>Deepwater Horizon</i> explosion, oil spill, and response, and will ensure that future BOEM environmental reviews take into account any new information that may emerge.</p>
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			As impacts from the <i>Deepwater Horizon</i> explosion, oil spill, and response continue to be assessed, additional analyses will be completed at the site-specific approval stage and in future NEPA documents.
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**TOPIC 9 – SCENARIO**

Topic 9 – Scenario			
Center for Biological Diversity	BOEM-2022-0048-28954	<p>BOEM’s assumption that there will be at most one pipeline that makes landfall due to the lease sales is insufficiently supported, actually there will likely be additional pipelines and infrastructure. This ignores the anticipated growth in offshore oil and gas pipeline construction predictions in the market. For example, market analysis predicts significant growth in the near future in pipeline construction in the Gulf of Mexico.</p> <p>Moreover, the DSEIS fails to consider the prolonged use of existing pipelines and the risks associated with that. Aging poses risks of corrosion, erosion and fatigue stress to subsea pipelines. Subsea pipeline corrosion appears to accelerate over time, and can act synergistically with fatigue stress to increase the rate of crack propagation. Marine environments are especially known to produce significant corrosion on steel surfaces, and when a steel structure is at or beyond its elastic limit, the rate of corrosion increases 10–15 percent. 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 percent to 100 percent per year. Another study covering 1996–2010 found that accident incident rates, including spills, increased significantly with the age of infrastructure. Federal records show that between 2011 and 2020, U.S. pipelines had an average of</p>	<p>Thank you for your comment. The forecasted exploration and development activity scenarios described in <b>Chapter 3.2</b> do not predict future OCS oil- and gas-related activities with absolute certainty, even though they were formulated using historical information and current trends in the oil and gas industry. These scenarios are only approximate since future factors such as the contemporary economic marketplace, the availability of support facilities, and pipeline capacities are all unknowns. BOEM continues to evaluate industry trends to enhance our NEPA analysis, coupled with historic data to produce a reasonably foreseeable activity forecast.</p> <p>As noted in a previous response, BSEE is updating its pipeline regulations, which is in its final stages of review at the time of this writing, and BSEE anticipates publishing a final rule in early 2023. The revised regulations are expected to include new requirements for the complete removal of most pipeline segments, site-clearance verification for remaining infrastructure, and increased information requirements for pipeline permit applications that will improve the site-specific NEPA analyses, coordinated by BOEM on behalf of BSEE.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>298 significant incidents per year that involved death, injury and property or environmental damage.</p> <p>Another flaw in the DSEIS that results in an underestimation of the impacts of the lease sales is the assumption that there will only be one structure in &gt;1600 m. Offshore oil and gas developments have increasingly gone into deeper water and shallow water is on the decline. Indeed, recently a majority of the offshore production has been from deepwater developments. Here, that means that there is greater possibility for FSPOs and the potential need for tankering to refinery ports or LOOP than the DSEIS acknowledges, the impacts of which need to be examined.</p>	
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**TOPIC 10 – INFLATION REDUCTION ACT OF 2022**

Topic 10 – Inflation Reduction Act of 2022			
Earthjustice et al.	BOEM-2022-0048-28951	<p>BOEM states several times in the SEIS that the Inflation Reduction Act (IRA) limits its discretion with regard to Lease Sales 259 and 261. While that is true to a certain extent, BOEM improperly overstates the degree to which its discretion is limited. The IRA constrains BOEM's discretion only on whether and when to hold Lease Sales 259 and 261, not how to hold them.</p> <p>The legislation does not dictate the size, location, or terms of the sales, nor does it excuse the sales from compliance with NEPA or other environmental laws. BOEM's misinterpretation of the IRA has apparently caused BOEM to arbitrarily disregard reasonable mitigation measures and alternatives that would offer smaller areas for lease to minimize impacts to Gulf communities and the environment...</p> <p>Neither the 2017–2022 Program nor its Record of Decision commits Interior to offering all unleased acreage in the Western Planning Area, Central</p>	<p>The IRA requires the Secretary of the Interior to conduct Lease Sales 259 and 261 in 2023. Due to the level of interest in the IRA and how it relates to OCS oil and gas leasing, we have expanded the discussion of the IRA in <b>Chapter 1.3</b> of this Supplemental EIS.</p> <p>BOEM has been conducting areawide lease sales since 1983 and regionwide sales since 2017. In this time, our environmental analyses have not identified justifiable reasons to restrict the lease sale area and believe that our stipulations and mitigations provide adequate environmental protection while at the same time supporting the offshore oil and gas industry. As described in the 2017-2022 GOM Multisale EIS, any individual lease sale could be scaled back during the prelease sale process to offer a smaller area should circumstances warrant. BOEM is also considering potential space-use conflicts between OCS oil- and gas-related activities, OCS offshore wind activities,</p>

	<p>Planning Area, or both for lease. And neither document commits Interior to considering only those options in this SEIS. It is well established that a five-year program does not commit Interior to holding the sales at the size proposed in the program or even holding them at all.</p> <p>Interior’s ultimate decisions about leasing at this stage are not required to match the leasing proposed in a five-year program: “while an area excluded from the leasing program cannot be leased . . . or developed, an area included in the program may be excluded at a latter stage.” That framework enables Interior to scale back proposed lease sales based on new information and other considerations that develop after the program is approved; for example, new information on environmental impacts, wildlife populations, climate concerns, or decreased need for new leasing.</p> <p>The 2017–2022 Program reflects this legal framework and explicitly provides that the proposed lease sales may be “scaled back,” “reduce[d],” “limit[ed],” or “cancelled.” Conducting Lease Sales 259 and 261 as “described” by the Program therefore would mean scaling back, reducing, or limiting the area offered for lease when appropriate. Although, the Record of Decision does not contain similar language, it states that it “select[s] the 2017-2022 Program as described in the PFP”; in other words, it adopts the Program, including the Program’s discretion to cancel or scale back proposed sales at the lease sale stage. The Record of Decision also expressly states that “site- or resource-specific mitigation measures [in Appendix I of the Final Programmatic EIS] should be considered” at the lease sale stage, and that “[a]dditional specific mitigation measures may also be developed and applied, as appropriate.” So</p>	<p>and OCS sediment dredging activities. BOEM has provided additional analysis in <b>Chapter 2.3.4</b> of this Supplemental EIS for the decisionmaker to consider in her determination of the final lease sale area. For these reasons, BOEM does not believe it has unreasonably constrained its range of alternatives or its consideration of mitigation.</p> <p>Finally, while BOEM has no discretion on whether to hold these lease sales, BOEM is preparing this Supplemental EIS to follow its normal leasing process to the fullest extent possible and to inform the decisionmaker in reaching individual decisions on GOM oil and gas Lease Sales 259 and 261. BOEM will comply with all statutory and regulatory requirements, including, but not limited to, NEPA and the Inflation Reduction Act of 2022, in conducting Lease Sales 259 and 261.</p>
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>conducting Lease Sales 259 and 261 “in accordance with” the Record of Decision simply means implementing the Program, including exercising the lease sale stage discretion that the Program provides, and potentially developing additional mitigation. Indeed, Interior recently argued in briefing defending President Biden’s leasing pause that the agency has significant discretion under both OCSLA and the 2017–2022 Program to cancel a proposed sale or change its size at the lease sale stage.</p> <p>Even if the IRA arguably constrains BOEM’s discretion as to “whether” to hold Lease Sales 259 and 261, it in no way limits the discretion to reduce the size of the sales as proposed in the Program or to develop and impose additional mitigation measures that minimize harm to species and the environment. Yet in the SEIS, BOEM declined to consider an alternative that scaled back acreage offered for leasing because it apparently believes the IRA bars the agency from holding a sale that is smaller than “regionwide.” That position is inconsistent with the IRA’s plain text. It is also inconsistent with OCSLA and with Interior’s litigation position that implementing the 2017–2022 Program allows the agency to scale back lease sale areas as appropriate. It is arbitrary and capricious for BOEM to interpret the IRA to bar it from considering or holding lease sales that are smaller than regionwide.</p> <p>Finally, the SEIS contains some statements suggesting that BOEM does not believe NEPA compliance is required for Lease Sales 259 and 261 under the IRA. But the IRA did nothing to eliminate the requirements that BOEM must comply with NEPA, the Endangered Species Act, and other relevant statutes before holding a lease sale. As just</p>	
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		<p>discussed, BOEM retains discretion under the IRA to decide which Gulf planning areas and how much acreage to offer for lease and which mitigation measures to require. NEPA compliance is required whenever an agency has discretion over how to carry out an action. That is clearly the case here: the IRA in no way exempts Lease Sales 259 or 261 from compliance with NEPA or other environmental laws.</p>	
<p>Center for Biological Diversity</p>	<p>BOEM-2022-0048-28954</p>	<p>Yet, under Lease Sales 259 and 261, BOEM would offer up nearly the entire Gulf region available to leasing, thereby perpetuating the very approach Interior recently recommended abandoning. BOEM erroneously claims that it cannot take anything but a regionwide lease sale approach because the Inflation Reduction Act requires BOEM to hold these lease sales “in accordance with the Record of Decision approved by the Secretary on January 17, 2017” for the 2017–2022 OCS Oil and Gas Leasing Program.</p> <p>However, as noted above, the 2017–2022 Program stated that “any individual sale could be scaled back during the pre-lease sale process to conform more closely to the traditional separate planning area model should circumstances warrant.” And the Record of Decision itself stated that “[a]dopting all the mitigation measures in Appendix I at the Program state of the planning process is impracticable because most measures are developed for and individually applied to specific circumstances associated with each lease sale offering and subsequent site-specific plan approvals.” It went on to say that while BOEM was not adopting these measures at the Program stage “they should be considered . . . as appropriate, during subsequent stages.</p> <p>Additional specific mitigation measures may also be developed and applied, as appropriate.” In other</p>	<p>The U.S. Department of the Interior’s November 2021 report on the Federal Oil and Gas Leasing Program recommended that, for future National OCS Oil and Gas Leasing Programs, BOEM should consider advancing alternatives to the practice of areawide leasing, under which the entire planning area is offered with few exclusions for a lease sale. The IRA instructed Lease Sales 259 and 261, to be held notwithstanding the expiration of the 2017-2022 leasing program, no later than March 31 and September 30, 2023, respectively. Due to the level of interest in the IRA and how it relates to OCS oil and gas leasing, we have expanded the discussion of the IRA in <b>Chapter 1.3</b> of this Supplemental EIS. As the commenter noted, according to the Record of Decision for the Programmatic EIS, the Secretary may decide upon a smaller area. New information regarding space-use conflicts or competing interests have been identified and included in <b>Chapter 2.3.4, Issues Identified</b>, which the secretary may use in her final decision for Lease Sales 259 and 261.</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		words, both the 2017–2022 Program and the Record of Decision itself specifically contemplated that BOEM would apply additional restrictions on the scope of lease sales at the leasing stage, which could include scaling back the geographic area offered for lease. BOEM's DSEIS—which ignores these statements and myopically focuses on the fact the 2017–2022 Program established regionwide lease sales—is wholly arbitrary.	
Form Letter 1	BOEM-2022-0048-0422	The Inflation Reduction Act does not require the administration to lease the entire Western and Central Gulf. Nor does it mandate any particular results from those sales. Rather, Congress, through both the IRA and the Outer Continental Shelf Lands Act, empowered Interior to determine the size, location, and conditions for offshore leasing sales and preserved Interior's authority to decide whether to issue a lease. And BOEM has the obligation to make those decisions based on a full evaluation of the environmental effects that leasing will cause – including climate pollution, oil spills, and harms to the critically endangered Rice's whale.	The Secretary of the Interior oversees the National OCS Oil and Gas Program and is required to balance orderly resource development with protection of the human, marine, and coastal environments while simultaneously ensuring that the public receives an equitable return for these resources and that free-market competition is maintained. It is usually the Secretary of the Interior's decision whether or not to proceed with a lease sale; however, the Inflation Reduction Act of 2022 (Public Law No. 117-169, enacted August 16, 2022) requires BOEM to hold Lease Sale 259 by the end of March 2023 and Lease Sale 261 by the end of September 2023. Only Congressional action would allow for the choice of the No Action Alternative. While BOEM or the Secretary of the Interior has no discretion on whether to hold these lease sales, BOEM has prepared this Supplemental EIS to follow its normal leasing process to the fullest extent possible. Climate change, pollution, oil spills, and the Rice's whale have all been considered in this Supplemental EIS.
Hunter Miller (Senior Florida Field Representative for Oceana)	10.26.22 Virtual Public Hearing Comments	The recent passage of the Inflation Reduction Act will make major strides towards reducing emissions, but the two mandated offshore drilling leases are a risk that we shouldn't have to take. President Biden may be mandated to hold these lease sales, but what the Administration does have power over is the 5-year offshore oil and gas drilling plan.	Although BOEM or the Secretary has no discretion on whether to hold these lease sales, public input on the Draft Supplemental EIS will enable BOEM and the U.S. Department of the Interior to receive information necessary to conduct a thorough consideration of the alternatives and potential impacts of the Proposed Action prior to making a final decision on the alternative chosen.

			<p>In response to the evaluation of environmental effects, BOEM has addressed climate change, oil spills, and marine mammals, including the critically endangered Rice’s whale, in this Supplemental EIS. Climate change is addressed in <b>Chapter 4.0.2.1</b> of this Supplemental EIS, as well as in the cumulative impacts analysis of each resource analysis. It is also addressed in Chapter 3.3.2.9.4 of the 2017-2022 GOM Multisale EIS, summarized in Chapter 3.3.2.2 of the 2018 GOM Supplemental EIS, and incorporated by reference into this Supplemental EIS. Oil spills are discussed in <b>Chapter 3.3</b>, Accidental Events, of this Supplemental EIS and discussed in detail in Chapter 3.2 of the 2017-2022 GOM Multisale EIS and summarized in Chapter 3.2 of the 2018 GOM Supplemental EIS. The impacts of OCS oil and gas leasing to marine mammals, including the Rice’s whale, are summarized in <b>Chapter 4.10.1</b> of this Supplemental EIS, summarized in Chapter 4.9.1 of the 2018 GOM Supplemental EIS, and discussed in detail in Chapter 4.9.1 of the 2017-2022 GOM Multisale EIS.</p> <p>In reference to the 2023-2028 National OCS Oil and Gas Program, BOEM is currently working on the Final 2023-2028 National OCS Oil and Gas Program, but no decisions have been made for the Program, i.e., which areas will be available for lease and how many lease sales may occur. A decision on that Program is expected in late 2023.</p>
<p>Dorothy Peña (Indigenous Peoples of the Coastal Bend)</p>	<p>10.26.22 Virtual Public Hearing Comments</p>	<p>IRA goes against Biden’s executive orders for environmental justice communities.</p>	<p>BOEM has evaluated social factors, including environmental justice, in <b>Chapter 4.15.3</b> of this Supplemental EIS. In addition, in accordance with Executive Order 12898, post-lease activities will be evaluated for any disproportionately high and adverse impacts to a resource on which an environmental justice community depends, using NEPA conclusions to inform assessment, where a major (significant)</p>

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

			<p>impact has potential for disproportionately high and adverse impacts.</p>
<p>Zainab Mirza (Center for American Progress)</p>	<p>10.26.22 Virtual Public Hearing Comments</p>	<p>Oil and gas companies have been paying below market value for leases, and in some cases royalties have been waved, causing the U.S. to miss out on about \$18 billion in revenue through 2018.</p>	<p>The OCSLA grants the Secretary of the Interior the authority to issue leases on the OCS. Section 18(a)(4) of the OCSLA states that "Leasing activities shall be conducted to assure receipt of fair market value for the lands leased and the rights conveyed by the Federal Government." Lessees pay bonuses, rentals, and royalties reflecting the value of the rights to explore and potentially develop and produce OCS oil and gas resources. BOEM follows procedures as outlined in its bid adequacy analysis.</p> <p>The IRA increases the minimum royalty rate for future oil and gas leases on the OCS from 12.5% to a minimum of 16.67%. For 10 years after the passage of the Act, the IRA creates a maximum rate of 18.75%. The IRA makes no change to the royalty rates on existing leases. For more than a decade in the Gulf of Mexico, BOEM has offered deepwater leases with an 18.75% royalty rate. More recently, BOEM has offered shallow-water leases with a 12.5% royalty rate, which will be changed for these lease sales. BOEM is committed to ensuring receipt of a fair market value for its oil and gas leases.</p> <p>The Government Accountability Office estimated that the lost royalties resulting from a price threshold issue associated with Congress' passage of the Deep Water Royalty Relief Act was approximately \$18 billion through 2018. However, BOEM notes that, at the time of the lease sale, lessees would have assumed their royalty relief was conditional on price thresholds. A court decision, made well after the leases were issued, eliminated the price thresholds, resulting in more forgone royalty than would have been expected (GAO 2019).</p>

Merrill Shea	BOEM-2022-0048-16124	Contrary to common belief, the Inflation Reduction Act doesn't require the BOEM to proceed with the leasing of these sites.	The IRA requires that the Interior must conduct Lease Sale 259 by March 31, 2023, and Lease Sale 261 no later than the end of the FY2023.
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**TOPIC 11 – OUT OF SCOPE**

**Out of Scope**

Topic 11 – Out of Scope			
Energy Policy and Programs Unrelated to the Draft Supplemental EIS for Lease Sales 259 and 261			
API/NOIA	BOEM-2022-0048-28953	<p>To achieve this, policymakers must put in place policies, including holding OCS lease sales like 259 and 261 and prompt development of the 2023-2028 OCS National Leasing Program, that support energy investment, create new access, and keep regulation from unnecessarily restricting energy growth.</p> <p>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 thus depends on duly holding OCS lease sales as proposed in this DSEIS and the expeditious development and implementation of a new national OCS Five-Year Leasing Program that includes annual sales in the Gulf of Mexico.</p>	The Inflation Reduction Act requires that the U.S. Department of the Interior must conduct Lease Sale 259 by March 31, 2023, and Lease Sale 261 by September 30, 2023, which the Department is moving forward with. On July 1, 2022, the U.S. Department of the Interior announced the availability of the <i>Proposed Program for the 2023-2028 National Outer Continental Shelf Oil and Gas Leasing Program</i> (National OCS Oil and Gas Program), as well as the Draft Programmatic Environmental Impact Statement for the 2023-2028 Program for public comments. BOEM is currently considering the public comments received to develop the Proposed Final Program.
Grant Bixby (Business Alliance for Protecting the Pacific Coast)	10.26.22 Virtual Public Hearing Comments	We're an 8,100+ business movement opposing offshore oil and gas drilling. We're a sister organization to the Atlantic Coast Alliance and the Florida Gulf Coast Business Coalition, and together our three organizations total over 55,000	

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		businesses, all in opposition to offshore oil and gas development. So I'm here today to urge BOEM to issue a 5-year OCS plan that includes no new leases, and in your terminology today, a no action recommendation... So I want to thank you for the opportunity to speak and, once again, urge BOEM to approve a 5 -year plan with no new leases, a no action recommendation.	
Carolyn McCall	BOEM-2022-0048-25320	LFTRs (Liquid Fluoride Thorium Reactors) are the future. This country has massive stockpiles of thorium! It is the cheapest, safest, fastest and cleanest of all the energy solutions. Use your considerable influence to change the course of history while you can. Read Richard Martin's book "Super Fuel" to get a thorough understanding of this resource.	Thank you for your comment. The consideration of LFTRs is outside the scope for this Supplemental EIS. This Supplemental EIS analyzes the potential impacts of OCS oil and gas Lease Sales 259 and 261.

**Out of Scope: Other**

Other			
Krissa Dutton-Schandelmaier	BOEM-2022-0048-3317	The Inflation Reduction Act is a huge disappointment in the, for lack of a better word, attack it has opened up on so many wild places, many that are actually protected.	Thank you for your comment. This comment is outside the scope for this Supplemental EIS. This Supplemental EIS analyzes the potential impacts of OCS oil and gas Lease Sales 259 and 261.
Glen Anderson	Center for Biological Diversity Form Letter Comments	After taking office, BIDEN HAS BEEN PROMOTING MORE OIL DRILLING -- INCLUDING IN OFFSHORE!!!!!!!!!!!!!!!!!!!!!!	
Mark Gillono	BOEM-2022-0048-1312	"The human appetite for animal flesh is a driving force behind virtually every major category of environmental damage now threatening the human future - deforestation, erosion, fresh water scarcity, air and water pollution, climate change, biodiversity loss, social injustice, the destabilization of communities and the spread of disease." - The World Watch Institute	

Mike and Kathy Sherman	BOEM-2022- 0048-0673	A huge benefit would come from a national project, long term; expand and modernize Freight Rail and develop national High Speed Passenger Rail- would take a few generations.... BUT HUGE Economic, Environmental, and Employment impact- like Eisenhower's Interstate Highway program....	
Tara Wheeler	BOEM-2022- 0048-12021	I'm trying, but I think we could do more to encourage others around the world. Including setting a good example ourselves. I'm not sure Trump did the wrong thing. I was not in favor of the Paris Agreement for my own reasons, and I am a tree hugger. I also love this planet & all in it. but the nuclear option could blow it for all of us. (making it worse than it could ever get—because nuclear energy is very dangerous) I sometimes wonder about people who are pushing for the nuclear option. Do they just not know the past mishaps? do they have too much trust in humanity? do they not think of terrorism or other such deeds? Not to mention natural disasters?, etc . . . I think that was a mistake. It, nuclear energy, should not have been included in the answer to our problems. & I worry that this is buried in this Green New Deal as well.	
Maria Balbuena	BOEM-2022- 0048-23443	There has not been enough research on the effects this [lease sale] will have on NM [New Mexico] human population	Thank you for your comment. BOEM has evaluated social factors in Gulf of Mexico communities that could be affected by the Proposed Action, including environmental justice, in <b>Chapter 4.16.3</b> of this Supplemental EIS. Communities in New Mexico do not fall within the communities analyzed in this Supplemental EIS, as they are too far removed from the Proposed Action. An analysis of New Mexico communities is out of scope for this Supplemental EIS. This Supplemental EIS analyzes the potential impacts of OCS oil and gas Lease Sales 259 and 261.

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

Chris Phelan	10.26.22 Virtual Public Hearing Comments	Strategically it does not make sense for us to put more assets in the Gulf. We're getting into a very belligerent of time in the world affairs and assets in the Gulf of Mexico are strategically vulnerable to attack by even a low-tech nations like North Korea to go and wreak havoc in our Gulf with a Diesel powered submarine.	As required by the Homeland Security Act of 2002, the U.S. Department of the Interior has developed an Emergency Management Program. This plan includes response to incidents that are defined as an occurrence or event, natural or human-caused, that requires an emergency response to protect life or property. Incidents can, for example, include major disasters, emergencies, terrorist attacks, terrorist threats, and wildland and urban fires, among many other occurrences requiring emergency response. It should be noted that oil and gas structures on the OCS are not owned by the U.S. Government. However, BSEE does work with the U.S. Coast Guard's Maritime Security Response Team (MSRT) and has supported their training since 2009. The MSRT is a tactical unit within the U.S. Coast Guard that focuses on maritime counter terrorism and high-risk law enforcement. The program currently has two teams that are trained to board and secure vessels and other facilities and manage situations such as terrorist actions, hostage events, and other incidents that require a tactical response. The BSEE has been working with the U.S. Coast Guard's MSRT, helping identify OCS facilities that could provide training platforms from which to practice their boarding and tactical techniques. The BSEE helps provide information on both active and inactive facilities that have sufficient decks and outbuildings that would allow MSRT to conduct scenario-driving training exercises. Once the desired platforms are selected, BSEE assists with coordination with the lessees and operators to acquire permissions, establish incident waivers, and set up schedules.
Alan Benford	BOEM-2022-0048-12808	ANY INVESTMENT IN SUBSIDIZING, EXPLORATION, EXTRACTION, PROCESSING, TRANSPORTING OR USING FOSSIL FUELS SHOULD BE REDIRECTED INTO SUSTAINABLE/RENEWABLE SOURCES OF ENERGY.	Thank you for your comment. This comment is outside the scope for this Supplemental EIS. This Supplemental EIS analyzes the potential impacts of an OCS oil and gas Lease Sales 259 and 261.

			<p>In reference to clean energy, BOEM also has a Renewable Energy Program that facilitates the responsible development of renewable energy resources on the OCS as noted in <b>Chapter 4.0.2.1</b> of this Supplemental EIS. In that way, BOEM is transitioning to clean energy in the Gulf of Mexico. In addition, the IRA requires that, as conditions for issuing any “lease for offshore wind development,” the Department hold “an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development” and “the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres” (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Refer to <b>Chapter 1.3</b> for more detail.</p>
David Williams	BOEM-2022-0048-18115	Bases from which to mount a clean-up are all but non-existent in the arctic, where extreme cold makes all work difficult.	Lease Sales 259 and 261 would occur in the Gulf of Mexico, not the Arctic.
Center for Biological Diversity	BOEM-2022-0048-28954	Ocean warming caused by greenhouse gas pollution is wreaking havoc on reef ecosystems worldwide. The world’s oceans have absorbed more than 90 percent of the excess heat caused by climate change, resulting in average sea surface warming of 0.7°C (1.3°F) per century since 1900. Global average sea surface temperature is projected to rise by 2.7°C (4.9°F) by the end of this century under a higher emissions scenario. In addition, climate change contributes to marine heat waves—periods of extreme warm surface temperatures—which have become longer-lasting and more frequent in recent decades. The number of heat wave days doubled between 1982 and 2016 and is projected to increase 23 times under 2°C warming. At present, 87 percent of marine heat	A consideration of the potential impact of global climate change to coral and coral communities is outside the scope and purpose of this Supplemental EIS.

Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>waves are attributable to human-induced warming. These heat waves alongside base ocean warming are expected to contribute to coral demise.</p> <p>Scientific research definitively links anthropogenic ocean warming to the catastrophic, mass coral bleaching events that have been documented since 1980 and are increasing in frequency alongside increasing atmospheric CO2 concentrations. These bleaching events occur when the thermal stress of rising ocean temperatures disrupts the relationship between corals and their algal symbionts. When the corals expel these symbionts, they lose their color and suffer nutritional stress and physiological damage. Prolonged bleaching often results in high levels of coral mortality as well as sublethal stress with implications for reproduction and reef resilience. Severe bleaching has increased five-fold in the past several decades and now occurs every six years on average, which is too frequent to allow corals to fully recover between bleaching events. Most reefs worldwide will suffer annual bleaching scenarios by 2050, and such events may occur sooner—perhaps in the next decade—in the Florida Keys.</p> <p>The global coral bleaching event that lasted from 2014 to 2017 was the longest, most widespread, and likely most destructive on record, affecting more reefs than any previous mass bleaching event and causing bleaching at previously sheltered reef sites. A 2017 scientific review concluded that “unless rapid advances to the goals of the Paris Climate Change Agreement occur over the next decade,” coral reefs will likely “degrade rapidly over the next 20 years, presenting fundamental challenges for the 500 million people who derive food, income, coastal protection, and a range of other services from” these ecosystems. Emerging evidence indicates it is</p>	
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	<p>increasingly unlikely that the world will curb greenhouse gas enough to meet the Paris Agreement goals.</p> <p>More frequent, strong El Niño events also trigger coral bleaching. Unfortunately, high sea surface temperatures are no longer restricted to El Niño years; in fact, “tropical sea surface temperatures are warmer now during current La Niña conditions that they were during El Niño events three decades ago.” Additionally problematic to long-term health and persistence of corals are the permanently elevated sea surface temperatures associated with climate change.</p> <p>Scientists have found that sea surface temperatures only 1-2°C above ambient can induce bleaching in corals; global sea surface temperature increases since pre-industrial times have already approached 1°C. Elevated temperatures have been shown to cause “complete larval mortality and inhibited ... settlement of <i>O. faveolata</i>.” Langdon et al. (2018) predict that, under current warming, <i>Acropora cervicornis</i> is unlikely to persist beyond 2035 in the Florida Reef Tract. Scientists predict that ocean warming in the tropics will make life for corals physiologically impossible in the next 20-50 years.</p> <p>Exacerbating the harms from rising temperatures is ocean acidification. The global ocean has absorbed more than a quarter of the CO<sub>2</sub> emitted to the atmosphere by human activities, which has increased its surface acidity by more than 30 percent. This increase has occurred at a rate likely faster than anything experienced in the past 300 million years. Ocean acidity could increase 150 percent by the end of the century if CO<sub>2</sub> emissions continue unabated. By reducing the availability of key chemicals (namely, aragonite and</p>	
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Table C-1. Public Comments and BOEM's Response Matrix. (continued)

		<p>calcite), ocean acidification negatively affects a wide range of calcifying marine creatures like corals by hindering their ability to build skeletons and by disrupting metabolism and critical biological functions. The adverse effects of ocean acidification already are reducing calcification rates in coral reefs worldwide, leading to reef bioerosion and dissolution. The synergistic impacts of warming and acidification accelerate coral reef decline.</p> <p>Climate change also exacerbates coral disease, leading to widespread declines of threatened and endangered species. The more than 30 diseases identified in Caribbean corals are a major factor in reef decline. For example, white-band disease led to precipitous declines (up to 92-97 percent) of once-abundant reef-building elkhorn (<i>Acropora palmata</i>) and staghorn (<i>A. cervicornis</i>) corals. Research indicates that these disease outbreaks were driven by heat stress from rising ocean temperatures.</p> <p>Pillar corals (<i>Dendrogyra cylindrus</i>), which have suffered catastrophic declines in Florida in recent years, succumbed to black band disease that first emerged following bleaching events in 2014 and 2015 spurred by abnormally high water temperatures. Scientists forecast that an increasing frequency of warm water events, coupled with associated disease outbreaks, will lead to the local extinction of <i>D. cylindrus</i> in the Florida Keys in modern times. Such extinctions will have ecosystem-wide ramifications, destabilizing communities and degrading ecosystem function.</p> <p>Climate change intensifies storms including hurricanes, with implications for coral reefs. Both frequency and intensity of Atlantic hurricanes has increased between 1851-2017. Hurricanes can</p>	
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		cause mechanical damage to reefs (e.g., tissue damage, dislodging of colonies), induce stress that slows recovery from bleaching events, and lead to long-term ecosystem decline. Climate change additionally leads to sea level rise, which recent research suggests will outpace corals' ability to regenerate. Finally, warming ocean waters coupled with local eutrophication are leading to hypoxic conditions that threaten coral reefs.	
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Table C-2. Names Associated with Each Form Letter.

Form Letter	Number of Signatures on Letter
Form Letter 1 (BOEM-2022-0048-0422)	28,741
Form Letter 2 (BOEM-2022-0048-0035)	9
The Climate Reality Project (BOEM-2022-0048-25262)	7,039
Center for Biological Diversity Form Letter	20,047
Friends of the Earth (BOEM-2022-0048-28862)	19,850

Table C-3. Signatory Organizations on Letters.

Organization Letter	Signatory Organizations on Letter
NRDC et al. (BOEM-2022-0048-28948)	Natural Resources Defense Council (NRDC), Earthjustice, Oceana, and Sierra Club
Earthjustice et al. (BOEM-2022-0048-28951)	Earthjustice, Healthy Gulf, Friends of the Earth, Sierra Club, and Bayou City Waterkeeper





### **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 the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

### **The Bureau of Ocean Energy Management Mission**

The Bureau of Ocean Energy Management (BOEM) is responsible for managing development of U.S. Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way.