



**2017—2022 Outer Continental Shelf Oil and Gas Leasing
Proposed Final Program
November 2016**



BOEM
BUREAU OF OCEAN ENERGY MANAGEMENT

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**2017–2022 OUTER CONTINENTAL SHELF
OIL AND GAS LEASING
PROPOSED FINAL PROGRAM**



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Table of Contents

Table of Contents	i
List of Tables	iv
List of Figures	v
Abbreviations and Acronyms	vii
Overview	ix
Summary of the Proposed Final Program Decision	S-1
S.1 Decision-Making Strategy.....	S-1
S.2 2017–2022 Proposed Final Program Lease Sale Schedule.....	S-4
S.2.1 Gulf of Mexico Region.....	S-4
S.2.2 Alaska Region.....	S-7
Part I: Regulatory Framework	1-1
Chapter 1 OCS Oil and Gas Leasing Program Development Process	1-1
1.1 Introduction.....	1-1
1.2 Energy Needs.....	1-3
1.2.1 Contribution of Oil and Natural Gas to the U.S. Economy.....	1-4
1.3 Program Development Process.....	1-9
1.3.1 Draft Proposed Program and Notice of Intent to Prepare a Programmatic Environmental Impact Statement.....	1-9
1.3.1 Proposed Program and Draft Programmatic EIS.....	1-11
1.3.2 Proposed Final Program and Final Programmatic EIS.....	1-12
1.3.3 Program Approval and Record of Decision.....	1-12
1.4 Landscape-scale Approach and Mitigation Hierarchy for the Preparation and Implementation of the Five-Year Oil and Gas Leasing Program.....	1-13
1.5 Lease Sale Process.....	1-15
1.6 Exploration and Development Process.....	1-16
Chapter 2 Section 18 Factors for Consideration and Balancing	2-1
2.1 BOEM’s Approach to Analyzing Program Areas.....	2-1
2.2 Section 18(a): Factors for Determining Size, Timing, and Location of Leasing.....	2-1
2.3 Section 18(a)(3): Balancing the Potential for Environmental Damage, Discovery of Oil and Gas, and Adverse Impact on the Coastal Zone.....	2-5
2.4 Section 18(a)(4): Assurance of Fair Market Value.....	2-6
2.5 Section 18(a): Energy Needs.....	2-6
2.6 Section 18(a)(1): Economic, Social, and Environmental Values.....	2-6
2.6.1 Economic Value.....	2-7
2.6.2 Social Value.....	2-7
2.6.3 Environmental Value.....	2-7
2.7 Judicial Guidance.....	2-8
Chapter 3 Outreach and Coordination	3-1
3.1 Program Outreach and Coordination.....	3-1

3.1.1	Request for Information and Comments	3-1
3.1.2	Public Meetings for the Programmatic EIS	3-2
Chapter 4 Background, Leasing History, and Status of OCS Program Areas		4-1
4.1	Program Areas History	4-1
4.1.1	Beaufort Sea.....	4-1
4.1.2	Chukchi Sea	4-2
4.1.3	Cook Inlet	4-3
4.1.4	Alaska Region Proposed Final Program Options.....	4-3
4.2	Gulf of Mexico Program Area History	4-6
4.2.1	Western Gulf of Mexico	4-8
4.2.2	Central Gulf of Mexico	4-8
4.2.3	Eastern Gulf of Mexico.....	4-8
4.2.4	Gulf of Mexico Region Proposed Program Options	4-8
4.3	Summary of Proposed Final Program Options Analyzed	4-11
Part II: Analysis of OCS Program Areas.....		1
Chapter 5 Valuation of Program Areas		5-1
5.1	Estimating Hydrocarbon Resources.....	5-1
5.2	Introduction to Hydrocarbon Resources on the OCS.....	5-2
5.2.1	Resource Commodities Assessed.....	5-4
5.2.2	Sources of Data and Information	5-4
5.2.3	Geophysical Data Collection (Seismic Surveys).....	5-5
5.2.4	Uncertainty in Resource Assessment.....	5-5
5.2.5	Resource Assessment Methodology and Output	5-6
5.2.6	Proposed Final Program and Anticipated Production	5-7
5.3	Net Benefits Analysis	5-11
5.3.1	Incremental Net Economic Value	5-14
5.3.2	Incremental Environmental and Social Costs	5-15
5.3.3	Domestic Economic Surplus.....	5-19
5.3.4	Incremental Net Benefits	5-20
5.4	Assessment of Climate Impacts	5-23
Chapter 6 Program Area Location Considerations		6-1
6.1	Introduction	6-1
6.2	National Energy Markets	6-1
6.2.1	Recent Developments in Oil Markets	6-1
6.2.2	Relevant Developments in Domestic Petroleum Markets.....	6-2
6.2.3	Relevant Developments in Domestic Natural Gas Markets.....	6-4
6.2.4	Oil and Natural Gas Consumption and Production Estimates	6-5
6.2.5	Future Unpredictability and Possible Policy Implications.....	6-6
6.2.6	The Contribution of OCS Oil and Natural Gas.....	6-7
6.3	Regional Energy Markets and the Location of the Program Areas.....	6-9
6.3.1	Regional Production and Consumption	6-10

6.3.2	Regional Transportation	6-11
6.3.3	Regional Energy Prices	6-15
6.3.4	Alaska Regional Energy Markets	6-15
6.3.5	Gulf of Mexico Regional Energy Markets	6-16
6.4	Possible OCS Production Substitutes	6-17
6.5	Energy Markets Conclusion.....	6-19
6.6	Other Uses of the OCS	6-19
6.6.1	Alaska Program Areas	6-20
6.6.2	Gulf of Mexico Program Area.....	6-23
Chapter 7 Environmental Consideration Factors and Concerns.....		7-1
7.1	Environmental Setting, Ecological Characteristics, and Potential Impacts on Environmental Resources.....	7-1
7.2	Relative Environmental Sensitivity and Marine Productivity	7-1
7.2.1	Summary of Methodology	7-1
7.2.2	Relative Environmental Sensitivity	7-1
7.2.3	Marine Productivity	7-11
Chapter 8 Equitable Sharing Considerations		8-1
8.1	Definition and Introduction	8-1
8.1.1	Developmental Benefits Overview	8-1
8.1.2	Environmental Risk Overview	8-3
8.1.3	Consideration of the No Sale Option	8-3
8.1.4	Consideration of Elements beyond the Secretary’s Control.....	8-3
8.1.5	Equitable Sharing Analysis for the Proposed Program	8-4
8.2	Methodology for the Equitable Sharing Analysis for the PFP.....	8-4
8.3	Results.....	8-6
8.3.1	Alaska OCS Region Benefits and Risks.....	8-6
8.3.2	Gulf of Mexico OCS Region Benefits and Risks	8-12
8.4	Widely Distributed Benefits and Risks	8-16
8.4.1	Widely Distributed Benefits	8-16
8.4.2	Widely Distributed Risks	8-21
8.5	Summary	8-22
Chapter 9 Industry Interest and Laws, Goals, and Policies of Affected States		9-1
9.1	Industry Interest.....	9-1
9.1	Laws, Goals, and Policies of Affected States.....	9-3
9.1.1	Alaska Region	9-3
9.1.2	Pacific Region States	9-3
9.1.3	Gulf of Mexico Region States	9-4
9.1.4	Atlantic Region States	9-4
Chapter 10 Assurance of Fair Market Value.....		10-1
10.1	Timing of OCS Lease Sales and Related Activities.....	10-2
10.1.1	Information and Uncertainty	10-3

10.1.2	Hurdle Prices	10-13
10.2	Leasing Framework	10-16
10.2.1	Size of a Lease Sale.....	10-16
10.2.2	Frequency of Lease Sales	10-17
10.3	Other Components of FMV.....	10-18
10.3.1	Bidding Systems	10-18
10.3.2	Fiscal and Lease Terms.....	10-19
10.4	Conclusion.....	10-23
Part III: Proposed Final Program and Lease Sale Options		1
Chapter 11 Proposed Final Program and Lease Sale Options		11-1
11.1	Alaska Region	11-1
11.1.1	Beaufort Sea.....	11-2
11.1.2	Chukchi Sea	11-2
11.1.3	Cook Inlet	11-3
11.2	Gulf of Mexico Region.....	11-3
11.3	Secretarial Proposed Final Program Decision	11-5
11.4	Appropriations and Staffing Estimates	11-5
Chapter 12 References.....		12-1
Chapter 13 Glossary.....		13-1
Appendix A Summaries of Comments by Commenter Category		A-1

List of Tables

Table S-1: 2017–2022 Proposed Final Program Lease Sale Schedule.....	4
Table 1-1: Environmental (NEPA) Assessments Conducted for the OCS Oil and Gas Leasing Program 1-12	
Table 3-1: Public Meetings for the 2017–2022 Draft Programmatic EIS	3-3
Table 4-1: Description of Environmentally Important Areas Analyzed in the Programmatic EIS.....	4-7
Table 4-2: Proposed Lease Sales by Year for the Modified Traditional Leasing Option	4-10
Table 4-3: 2017–2022 Proposed Program Lease Sale Schedule	4-11
Table 4-4: Options Analyzed in this PFP Decision Document	4-12
Table 5-1: Price Case Scenarios for the Proposed Final Program	5-9
Table 5-2: Anticipated Production by Program Area	5-10
Table 5-3: Overlap of Environmentally Important Areas with Geologic Plays.....	5-11
Table 5-4: Incremental NEV by Program Area	5-15
Table 5-5: Incremental Environmental and Social Costs by Program Area	5-19
Table 5-6: Domestic Economic Surplus by Program Area.....	5-20
Table 5-7: Incremental Net Benefits by Program Area	5-20
Table 5-8: Incremental Net Benefits for Proposed Final Program Options	5-22
Table 6-1: 2015 Petroleum Product Shipments by Tanker, Pipeline, Barge and Rail (million barrels)..	6-14
Table 6-2: 2015 Crude Oil Shipments by Tanker, Pipeline, Barge and Rail (million barrels)	6-14

Table 6-3: Energy Market Substitutions in Absence of New OCS Program	6-17
Table 7-1: Crosswalk of BOEM Ecoregions and Program Areas.....	7-3
Table 7-2: Scoring of Anticipated Climate Change Effects for BOEM Ecoregions.....	7-8
Table 7-3: Environmental Sensitivity Score by BOEM Ecoregion.....	7-8
Table 7-4: Rates of NPP for the GOM Region-wide Leasing Option	7-12
Table 7-5: Rates of NPP for the GOM Modified Traditional Leasing Option	7-12
Table 8-1: Historical 8(g) Revenues in Alaska	8-8
Table 8-2: Location of Substitute Energy Sources in Absence of Alaska Sales	8-10
Table 8-3: FY 2015 8(g) and GOMESA Revenue Sharing	8-13
Table 8-4: Location of Substitute Energy Sources in Absence of GOM Sales	8-15
Table 8-5: Total Economic Impacts from FY 2015 OCS Activity	8-17
Table 8-6: Mid-Price Case—Regional vs. National Allocation Comparison (\$ millions).....	8-20
Table 9-1: Summary of Energy Exploration and Production Industry Comments	9-2
Table 9-2: Proposed Program Comment Summaries from Governor and State Agencies.....	9-3
Table 10-1: NSV Hurdle Prices.....	10-15
Table 10-2: Forecast Market BOE Prices in 2017	10-15
Table 11-1: Summary of Proposed Final Program Leasing Options.....	11-1
Table 11-3: Appropriations and Staffing Estimates (by Fiscal Year)	11-6

List of Figures

Figure S-1: 2017–2022 Proposed Final Program Gulf of Mexico Region Program Area.....	S-6
Figure S-2: 2017–2022 Proposed Final Program Cook Inlet Program Area	S-11
Figure 1-1: OCS Lower 48 States Planning Areas	1-2
Figure 1-2: OCS Alaska Planning Areas	1-2
Figure 1-3: Historical and Forecasted U.S. Crude Oil Production by Region	1-7
Figure 1-4: Historical and Forecasted U.S. Natural Gas Production by Region.....	1-7
Figure 1-5: OCS Oil and Gas Leasing Program Development Process.....	1-10
Figure 3-1: Proposed Program Comment Letters by Commenter Category.....	3-2
Figure 3-2: Locations of Draft Programmatic EIS Public Meetings	3-3
Figure 4-1: 2017–2022 PFP Options for the Beaufort Sea Program Area.....	4-4
Figure 4-2: 2017–2022 PFP Options for the Chukchi Sea Program Area	4-4
Figure 4-3: 2017–2022 PFP Options for the Cook Inlet Program Area	4-5
Figure 4-4: 2017–2022 PFP Options for the GOM Program Area	4-9
Figure 5-1: Geologic Plays in the Beaufort Sea and Chukchi Sea Program Areas	5-3
Figure 5-2: Geologic Plays in the Cook Inlet Program Area	5-3
Figure 5-3: Geologic Plays in the Gulf of Mexico Program Area	5-4
Figure 5-4: Conceptual Workflow Showing Transition from UTRR to Anticipated Production	5-8
Figure 5-5: Net Benefits Analysis Calculation	5-13
Figure 6-1: U.S. Crude Oil Imports by Grade.....	6-4
Figure 6-2: Historical and Forecasted U.S. Energy Consumption by Fuel Type	6-6

Figure 6-3: Petroleum Administration Defense Districts	6-11
Figure 6-4: Contribution to Oil Production by PADD	6-12
Figure 6-5: Contribution to Marketed Natural Gas Production by PADD	6-12
Figure 6-6: Oil Consumption by PADD	6-12
Figure 6-7: Natural Gas Consumption by PADD.....	6-12
Figure 6-8: U.S. Refining Capacity by PADD, 2015	6-13
Figure 6-9: U.S. Crude Oil and Petroleum Production and Import/Export by Region, 2015	6-13
Figure 7-1: Relative Environmental Sensitivity for the GOM Program Area.....	7-4
Figure 7-2: Relative Environmental Sensitivity for the Alaska Program Areas	7-4
Figure 7-3: Environmental Sensitivity Index Methodology.....	7-9
Figure 7-4: Aggregated Sensitivity Scores by Program Area.....	7-10
Figure 8-1: Distribution of Total Jobs Supported by FY 2015 OCS Activity	8-18
Figure 11-1: Cook Inlet Program Area.....	11-3
Figure 11-2: GOM Region Program Area	11-4

Abbreviations and Acronyms

§	Section
2-D	two-dimensional
3-D	three-dimensional
2016 National Assessment	<i>Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2016</i>
AEO	Annual Energy Outlook
Area ID	Area Identification
bbbl	barrels of oil
BBO	billion barrels of oil
BOE	barrel of oil equivalent
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
Btu	British thermal units
<i>California I</i>	California v. Watt, 688 F.2d 1290 (D.C. Cir. 1981)
<i>California II</i>	California v. Watt, 712 F.2d 584 (D.C. Cir. 1983)
CSE	Center for Sustainable Economy
CZM	Coastal Zone Management
D.C.	District of Columbia
Department	United States Department of the Interior
DOD	Department of Defense
DOE	Department of Energy
DPP	Draft Proposed Program
DPS	distinct population segment
E&D scenario	exploration and development scenario
EA	environmental assessment
EEZ	Exclusive Economic Zone
EIA	Energy Information Administration
EIS	environmental impact statement
ESA	Endangered Species Act
ESI	environmental sensitivity index
ESP	Environmental Studies Program
ESPIS	Environmental Studies Program Information System
FMV	fair market value
FNOS	Final Notice of Sale
FY	fiscal year
G&G	geological and geophysical
GDP	gross domestic product
GHG	greenhouse gas
GOM	Gulf of Mexico
GOMESA	Gulf of Mexico Energy Security Act of 2006
GRASP	Geologic Resource Assessment Program
LME	Large Marine Ecosystem

LNG	liquefied natural gas
LWCF	Land and Water Conservation Fund
<i>MarketSim</i>	Market Simulation Model
mcf	thousand cubic feet
MMS	Minerals Management Service
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act of 1969
NEV	net economic value
nm	nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPP	net primary productivity
NRDC	Natural Resources Defense Council
NSV	Net Social Value
OCS	Outer Continental Shelf
OECM	Offshore Environmental Cost Model
OPEC	Organization of the Petroleum Exporting Countries
P.L.	Public Law
PADD	Petroleum Administration for Defense District
Programmatic EIS	<i>2017–2022 OCS Oil and Gas Leasing Program Draft Programmatic Environmental Impact Statement</i>
PFP	Proposed Final Program
PNOS	Proposed Notice of Sale
RFI	Request for Information and Comments
ROD	Record of Decision
Secretary	Secretary of the Interior
TAPS	Trans-Alaska Pipeline System
Tcf	trillion cubic feet
$t\ C\ km^{-2}\ yr^{-1}$	metric tons of carbon per square kilometer per year
UERR	undiscovered economically recoverable resources
U.S.	United States
U.S.C.	United States Code
USDOJ	United States Department of the Interior
USGS	United States Geological Survey
UTRR	undiscovered technically recoverable resources
VGPM	Vertically Generalized Production Model
WEB2	When Exploration Begins, version 2
WTI	West Texas Intermediate

Overview

Management of the oil and gas resources of the Outer Continental Shelf (OCS) is governed by the OCS Lands Act (43 U.S. Code [U.S.C.] 1331 et seq.), which sets forth procedures for leasing, exploration, development, and production of those resources. Section 18 of the OCS Lands Act calls for the preparation of a nationwide offshore oil and gas leasing program, setting forth a five-year schedule of lease sales designed to best meet the Nation’s energy needs. The Bureau of Ocean Energy Management (BOEM) within the U.S. Department of the Interior (USDOl or Department) is responsible for implementing the requirements of the OCS Lands Act related to preparing the leasing program.

BOEM is in the process of preparing a national OCS oil and gas leasing program (generally referred to as the “Five-Year Program” or “Program”) for 2017–2022 to succeed the current 2012–2017 OCS Oil and Gas Leasing Program. Throughout this document, you will see the 2017–2022 OCS Oil and Gas Leasing Program title shortened to the 2017–2022 Program and past Five-Year Programs referred to in a variation of this short-hand (e.g., 2007–2012 Program). This Proposed Final Program (PFP) for OCS oil and gas leasing is the third and final in a series of three decision documents developed pursuant to the OCS Lands Act, and required before the Secretary of the Interior (Secretary) may take final action to approve a 2017–2022 Program (43 U.S.C. 1344).

The PFP phase provides a final national analysis of the potential lease sales in the 2017-2022 Program, which the Secretary can consider in making future decisions. See Chapter 1 for further information regarding the OCS oil and gas leasing program development process. This PFP decision document consists of the following parts:

Summary of the PFP Decision describes the rationale behind the Secretary’s PFP decision and presents, in summary fashion, the lease sale schedule and program areas proposed to be included in the 2017–2022 Program.

Part I: Regulatory Framework describes the framework for developing a new Program. It discusses the substantive and procedural requirements that are in place for preparing a Program under Section 18 of the OCS Lands Act and describes BOEM’s approach to meeting those requirements. This includes a discussion of the criteria relating to OCS oil and natural gas resources and environmental, economic, and social considerations that Section 18 requires be taken into account in deciding where and when to propose lease sales. Also included is a summary of the judicial guidance from the court decisions regarding the Program.

Part II: Analysis and Results presents the Section 18 analyses of the program areas proposed for the 2017–2022 Program and their results. BOEM prepared and used the Section 18 analyses to develop the PFP Options presented to the Secretary.

Part III: Lease Sale Options presents the PFP Options that BOEM prepared based on its analysis of the Proposed Program decision and OCS Lands Act Section 18 criteria. This part also presents the Secretarial PFP decision. See Figure 1-5: OCS Oil and Gas Leasing Program Development Process for a diagram of BOEM’s leasing process.

Appendix A: Summaries of Public Comments contains summaries of the comments BOEM received in response to its March 18, 2016, *Federal Register* Notice (81 FR 14881) requesting comments from all interested parties.

Summary of the Proposed Final Program Decision

S.1 Decision-Making Strategy

The Bureau of Ocean Energy Management (BOEM) is responsible for administering the leasing program for oil and gas resources on the Outer Continental Shelf (OCS) and developing a five-year schedule of lease sales designed to “best meet national energy needs for the five-year period following [the schedule’s] approval...” as described in Section 18 of the OCS Lands Act, 43 U.S.C. 1344. On January 29, 2015, BOEM published the 2017–2022 Draft Proposed Program (DPP), the first stage of lease sale schedule development. The DPP analysis included all 26 OCS planning areas and was informed by more than 500,000 comments received in response to the June 16, 2014, Request for Information and Comments. The Secretary of the Interior (Secretary), in accordance with Section 18 of the OCS Lands Act, considered all eight of the Section 18(a)(2) factors (described in Chapter 2) to develop a draft schedule of potential lease sales in the DPP. Over one million public comments were received on the DPP.

The next stage in the development of the 2017–2022 OCS Oil and Gas Leasing Program (2017–2022 Program) resulted in the 2017–2022 Proposed Program, which was published on March 18, 2016. The Proposed Program, the second of three proposals required to develop the 2017–2022 Program, was informed by both the DPP analysis and public comments received on the DPP. BOEM received approximately 1.83 million comments on the Proposed Program. With the Proposed Program, BOEM concurrently published a Draft Programmatic Environmental Impact Statement (EIS).

The Proposed Final Program, the last of the three program proposals, is an analysis of the lease sale options identified by the Secretary in the Proposed Program. The development of the Five Year Program is a winnowing process; thus, only those areas that the Secretary decided were appropriate to include in the Proposed Program were analyzed for the Proposed Final Program and the associated Final Programmatic EIS (for more details, see Chapter 4). Sixty days after the issuance of the Proposed Final Program, the Secretary may approve the 2017–2022 Program. The inclusion of an area in the Proposed Final Program or an approved program, however, does not necessarily mean that a lease sale will be held in that area. Each lease sale that is scheduled in the approved 2017–2022 Program will be subject to a prelease evaluation and decision process whereby interested and affected parties will have multiple opportunities to participate (see Chapter 1).

The Five Year Program is an important component of the President’s energy strategy to allow for safe and responsible domestic oil and natural gas production as a means to support economic growth and job creation and enhance energy security. In 2015, the United States produced 52 quadrillion British thermal units (Btus) of oil and gas, the highest level of annual oil and gas production in U.S. history (EIA 2016). Even as the United States experiences a rapid increase in unconventional onshore oil and gas production, OCS production remains an important source of oil and gas and will continue to be for decades to come. While offshore oil and gas exploration and development will never be totally risk-free, since the 2010 *Deepwater Horizon* blowout and oil spill, the U.S. Department of the Interior (USDOJ) has made, and is continuing to make, substantial reforms to improve the safety and reduce the environmental impacts of OCS oil and gas activity. Working with a host of stakeholders, USDOJ has developed and implemented reforms and improvements designed to reduce the risk of another loss of well control in our oceans, and

enhance our collective ability to respond to such incidents. With strong regulatory oversight and appropriate measures to protect human safety and the environment, offshore oil and gas development can be conducted safely and responsibly.

As part of the Administration's energy strategy, the Proposed Final Program is designed to best meet the Nation's energy needs. It represents the result of the balancing of the potential for the discovery of offshore oil and gas resources with the potential for environmental damage and the potential for adverse impact on the coastal zone, as required by Section 18(a)(3). In weighing the Section 18 factors to develop a nationwide program, region-specific considerations were taken into account, including information about resource potential, the status of resource development and infrastructure to support oil and gas activities and emergency response capabilities, industry interest, and regional interests and policies of affected states. Through the Five-Year Program winnowing process, the Secretary gathers information to determine the timing of lease sales and the combination of offshore areas that will, if leased, best meet the energy needs of the Nation while protecting against environmental damage and adverse impact to the coastal zone.

Grounded in the above principles, and after careful consideration of public input and the OCS Lands Act Section 18(a)(2) factors, the Proposed Final Program proposes a lease sale schedule of 11 lease sales, 10 in those portions of three OCS planning areas in the Gulf of Mexico that are not subject to moratorium and one in the Cook Inlet offshore Alaska. These areas have high resource potential, existing infrastructure and Federal or state leases, and more manageable potential environmental and coastal conflicts with development as compared to other OCS areas that are not included in the Proposed Final Program. In total, the Proposed Final Program makes available approximately 70 percent of the resources that are economically recoverable at an oil price of \$40 per barrel and nearly one half of the estimated undiscovered technically recoverable OCS oil and gas resources. Following the principles outlined in Section 18 of the OCS Lands Act, the Proposed Final Program presents a balanced approach that meets the energy needs of the Nation.

The Gulf of Mexico is known to contain significant oil and gas resources and already has world-class, well-developed infrastructure, including established spill response capability. The Proposed Final Program schedules 10 region-wide lease sales in the areas of the Gulf of Mexico that are not under Congressional moratorium or otherwise unavailable for leasing. In the Gulf of Mexico, infrastructure is mature, industry interest and support from affected states and communities is strong, and there are significant oil and gas resources available. To take advantage of these incentives to OCS activity, the region-wide sale approach makes the entire leasable Gulf of Mexico OCS area available in each lease sale.

The Proposed Final Program also schedules one sale in Cook Inlet offshore Alaska, where there is existing infrastructure currently supporting State leasing activities. Unlike much of the Arctic, the Cook Inlet Program Area is close to an energy market in Anchorage, the largest energy market in Alaska. While the Beaufort has some existing infrastructure, the harsher environment and more difficult coast conflicts weigh in favor of a Cook Inlet sale.

After careful consideration of the Section 18 factors and robust stakeholder input, including from Alaska Native communities and the State of Alaska, the Proposed Final Program does not include the Chukchi Sea and Beaufort Sea lease sales analyzed in the Proposed Program. The State of Alaska recommended

these lease sales be included in the 2017-2022 Program and that area-wide leasing be offered in all three Alaska program areas. The Secretary's decision recognizes and considers the support for Arctic lease sales that has been expressed by industry, the State of Alaska, and several of the Arctic communities since the publication of the 2017-2022 Draft Proposed Program. However, based on, among other factors, current market conditions, evidence of a lack of industry interest, and the recent increase in onshore oil and gas production, the Secretary decided that Arctic lease sales are not needed in the 2017-2022 Program to best meet the Nation's energy needs.

The Secretary's balancing, under Section 18(a)(3), determined that the Nation's energy needs do not warrant further leasing during the 2017-2022 Program in the unique and vulnerable Arctic region and recent industry trends indicate that interest in Arctic leasing has significantly declined. Approximately one month before the publication of the 2017-2022 Proposed Program in March of 2016, industry held 527 leases in the Beaufort Sea and Chukchi Sea Planning Areas. Since that time, industry has relinquished more than 90 percent of those Arctic OCS leases, thereby demonstrating that industry investments in the region have been significantly constrained and indicating interest has dramatically decreased. While oil prices limit the attractiveness of new investments in the near term, the existing Arctic leases provide an opportunity for development of the region's OCS oil and gas resources that will not be impacted by the Secretary's decision to exclude Arctic lease sales from the 2017-2022 Proposed Final Program. As the Nation refrains from new leasing in the Arctic over the next five years, the existing Arctic OCS activity will provide industry, the State, and the North Slope communities some opportunity for continued exploration and development, such as the Development and Production Plan for the Liberty Prospect near Prudhoe Bay, which is now under review by BOEM, and ongoing Federal production at the Northstar facility.

Equally important to the Secretary's decision is the ongoing science and integrated planning that are constantly improving our understanding of the unique, complex, and changing Arctic environment. The Secretary has determined that, given the uniqueness of the Arctic, it is important to continue the strategic investment in targeted science to determine which areas warrant additional protection and how best to avoid or minimize impacts. Such science will be used to determine the location and mitigating stipulations needed to protect the environment before further leasing occurs. While recent investment in science has provided significant data on the Arctic's ecological importance, continued scientific research is beneficial to determine how to minimize impacts from potential development. Given all of these factors, including opportunities for exploration and development on existing leases, the unique nature of the Arctic ecosystem, recent demonstration of constrained industry interest in undertaking the financial risks that Arctic exploration and development present, current market conditions, and sufficient existing domestic energy sources already online or newly accessible, the Proposed Final Program does not include lease sales in the Chukchi or Beaufort Seas.

Concerning the equitable sharing of developmental benefits and environmental risks among OCS regions, those areas where OCS activities occur tend to both receive most of the benefits from developing OCS resources, and experience the associated environmental risks. In the Arctic, the potential for development is currently low and quite speculative, but the environmental risks of any OCS activity, particularly the risks associated with necessary exploration, are unavoidable. Moreover, any developmental benefits that would have accrued to Alaska from Arctic lease sales would only have partially occurred in Alaska, as a percentage of the goods and services needed for development would likely have been imported from other

parts of the United States or world markets. By contrast, the Alaska region would have experienced most of the incremental environmental risks from OCS exploration and production. Further, these environmental risks are almost certainly greater in the Arctic than in the GOM due to the frontier nature of the Arctic area, its harsh climate, and the limited resources available for emergency response. In the GOM, however, the benefits of oil and gas development and production are much more certain, and the risks are therefore more proportional. The GOM environment has already been exposed to such risks as a result of past leasing in the area, and will continue to be exposed to those risks regardless of the content of the Proposed Final Program or an approved program, as a result of exploration and development of existing leases. Finally, emergency response resources in the GOM are more developed than in the Arctic area.

Section 18(a)(3) of the OCS Lands Act charges the Secretary with the responsibility to select the timing and location of OCS leasing so as to balance, to the maximum extent practicable, the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone. The Secretary has weighed each of the Section 18(a)(2) factors, engaged in the required Section 18(a)(3) balancing, and considered the 18(a)(4) requirement, as described more fully below, on a national scale, with appropriate comparisons drawn among potential program areas.

S.2 2017–2022 Proposed Final Program Lease Sale Schedule

The schedule below (Table S-1) reflects the lease sales selected for the Proposed Final Program. Those selections result in a schedule of 11 potential lease sales in four OCS planning areas: ten sales in the GOM Program Area and one sale in the Cook Inlet Program Area, offshore Alaska. A more detailed description of the lease sale options is presented in Chapter 11.

Table S-1: 2017–2022 Proposed Final Program Lease Sale Schedule

	Year	Program Area	Sale Number
1.	2017	Gulf of Mexico	249
2.	2018	Gulf of Mexico	250
3.	2018	Gulf of Mexico	251
4.	2019	Gulf of Mexico	252
5.	2019	Gulf of Mexico	253
6.	2020	Gulf of Mexico	254
7.	2020	Gulf of Mexico	256
8.	2021	Gulf of Mexico	257
9.	2021	Cook Inlet	258
10.	2021	Gulf of Mexico	259
11.	2022	Gulf of Mexico	261

S.2.1 Gulf of Mexico Region

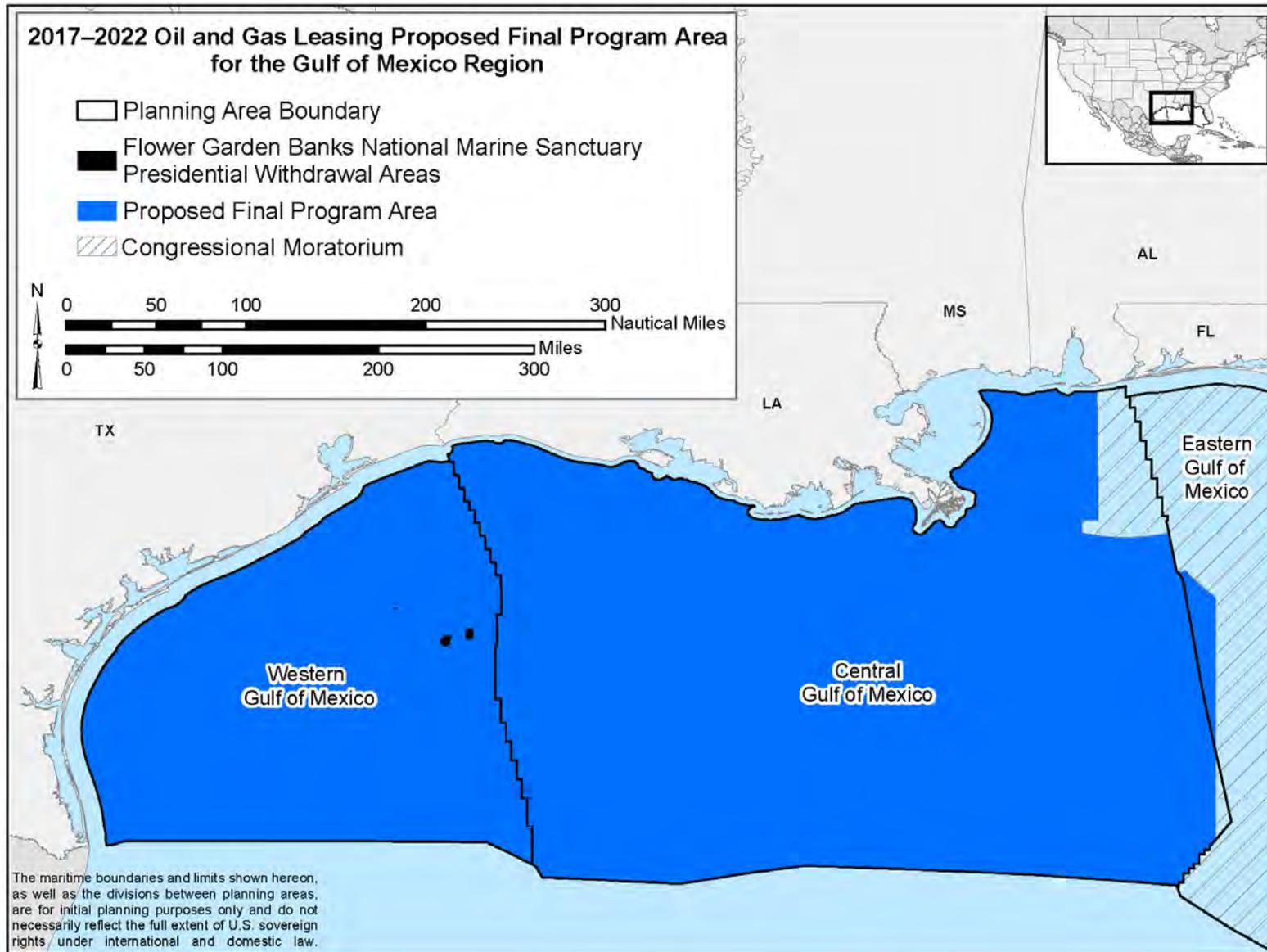
The Gulf of Mexico combines abundant proven and estimated oil and gas resources, broad industry interest, and well-developed infrastructure. The oil and gas resource potential of the Western and Central Gulf of Mexico, as well as the portion of the Eastern Gulf of Mexico not subject to Congressional moratorium, is the best understood of all of the OCS planning areas. Not only are the oil and gas resource

volume estimates for the Gulf of Mexico OCS unparalleled, the infrastructure to support oil and gas activity and emergency response is mature.

In considering and balancing the Section 18 factors, the Proposed Final Program is tailored to support development commensurate with the presence and relative maturity of offshore oil and gas activity. Of the 11 lease sales included in the Proposed Final Program, 10 are in the Gulf of Mexico, where infrastructure is best established and there are strong adjacent state support and significant oil and gas resource potential. Oil and gas resources produced from the Gulf of Mexico help meet the needs of the Gulf and Eastern Seaboard regional energy markets. The Gulf of Mexico proposal includes region-wide sales: one sale in 2017 and 2022, and two sales in 2018, 2019, 2020, and 2021 (see Figure S-1).

In the past, BOEM has scheduled separate annual oil and gas lease sales, alternating between the Western and Central Gulf of Mexico, and periodic sales in the portion of the Eastern Gulf not under Congressional moratorium. This Proposed Final Program schedules region-wide sales comprising the combined Western, Central, and Eastern Gulf of Mexico planning areas' unleased acreage not subject to moratorium or otherwise unavailable. BOEM decided to implement this region-wide approach to provide greater flexibility to industry, including more frequent opportunities to bid on rejected, relinquished, or expired OCS lease blocks, as well as to facilitate better planning to explore resources that may straddle the U.S.-Mexico boundary. While BOEM received minimal comment on the approach within the context of the development of the 2017–2022 Program, industry has been supportive of trying region-wide sales. Furthermore, any individual sale could be scaled back during the pre-lease sale process to conform more closely to the traditional separate planning area model or, as one industry commenter suggested, only one region-wide sale a year could be held.

Figure S-1: 2017–2022 Proposed Final Program Gulf of Mexico Region Program Area



S.2.2 Alaska Region

In Alaska, the Proposed Final Program includes a potential Cook Inlet lease sale in 2021 that includes the northern portion of the Cook Inlet Planning Area (see Figure S-2). Cook Inlet is a mature basin with a long history of oil and gas development in State waters, where existing infrastructure would likely support new activity. The State of Alaska requested area-wide OCS Alaska sales, as first proposed in the DPP, but the Secretary chose to design the Cook Inlet Program Area in a way that allows for the protection of the endangered beluga whale, and for protection of the northern sea otter critical habitat, with the availability for leasing of the areas with greatest industry interest and significant oil and gas resource potential. BOEM will continue to use developing scientific information and stakeholder feedback to determine, in advance of any sale, which specific areas offer the greatest resource potential, while minimizing conflicts with environmental, subsistence, and multiple use considerations in Cook Inlet.

The DPP and Proposed Program included one sale each in the Chukchi Sea and Beaufort Sea Planning Areas. After carefully considering all available information and analyses, the Secretary removed the Chukchi Sea and Beaufort Sea Program Areas from the Proposed Final Program. Without including the Arctic program areas, the Secretary achieved the overarching goal of designing an oil and gas leasing program that will best meet national energy needs, after considering all of the Section 18 factors including, among others, environmental values, industry interest, regional and national energy markets, Alaska state policy, environmental sensitivity, and other uses of the region.

While there are significant hydrocarbon resources in the region, the Arctic is a unique, sensitive, and costly environment in which to operate. Unlike the Cook Inlet, the Arctic OCS is remote, and would require substantial new investment for large-scale OCS development. Industry voiced its interest in the Arctic OCS in the comment period on the Proposed Program. However, foreshadowed by Shell's disappointing 2015 drilling season and announcement that it would leave the U.S. Arctic for the foreseeable future, industry has demonstrated its declining interest in the Arctic OCS with the relinquishment of the majority of leases in these Planning Areas. In fact, the number of active leases in the Arctic OCS has declined over 90 percent in a matter of months, from 527 in February 2016 to only 43 as of November 2016, with most of these expected to expire in 2017.

Although the Arctic OCS has the potential to provide domestic energy production when economic conditions are considerably more favorable, the increase in domestic onshore production from shale formations, and other market factors, have shifted expectations regarding oil and gas price trajectories and have substantially reduced the incentive for expensive Arctic exploration and production. As described in Chapter 6, recent developments in domestic oil and natural gas markets, with an increase in onshore crude production in every year since 2008, have reduced the United States' reliance on imported petroleum. Between the increase in U.S. onshore crude production and expected offshore production from this and previous programs, U.S. domestic energy supply is and will remain strong. BOEM estimates that without the Arctic OCS lease sales, cumulative U.S. oil and gas production will be less than one percent lower over the 70-year life of projected activity and only four percent lower during the 2017-2022 Program's years of peak production. The Nation's energy security remains strong without leasing in the Arctic and the oil and gas resources will likely become more valuable to potential bidders at some point in the future.

Though additional OCS production might fulfill a specific need in domestic energy markets, the Beaufort Sea and Chukchi Sea Program Areas are remote and would require significant investments in infrastructure to bring resources to market, which are unlikely given current market conditions. In contrast, the Cook Inlet and Gulf of Mexico Program Areas are located near existing energy markets and are better suited for complementing U.S. onshore production.

Based on the latest price projections and predictive information provided by the U.S. Energy Information Agency (EIA), which differ from those available at the Proposed Program decision point, industry is more likely to have a strong interest in acquiring substantial new acreage in the Beaufort and Chukchi seas after the 2017–2022 period. Furthermore, subsequent activities related to oil and gas production, particularly the heavy investments in new infrastructure that would be required to make the move from exploration to production for newly leased acreage, are more likely to be economical after that period, given the latest EIA price projections. Based on price projections, higher prices could make the oil and gas resources in the Arctic economically developable for industry and more likely to provide a fair market value for the Nation, as required by Section 18(a)(4). Additional research and technology could provide new ways to extract the resources while ensuring safety and minimizing environmental impacts. In short, given anticipated EIA price projections, removing the two Arctic sales will have a minimal effect on the development of resources in Alaska. Development on existing discoveries will provide new information for the State of Alaska, North Slope communities and the USDOJ to use in planning and preparing for future decisions.

The risks of oil and gas activity to the Arctic may also be greater than in other regions because of the nature of Arctic habitats. Many Arctic species are highly dependent on the same habitat and geographic area (e.g., ice habitat, narrow shelf break in Beaufort Sea). Arctic species also tend to concentrate during certain times of year in areas where there is higher biological productivity, such as along the ice edge. Additionally, in the Arctic, there is a high number of endangered species relative to total species, and there are fewer species in the food web, leaving the ecosystem particularly more vulnerable to disturbance when compared to the Cook Inlet or the GOM.

The decision to remove the Arctic OCS lease sales from the Proposed Final Program was informed by environmental and scientific information demonstrating the unique character of the area. The science continues to evolve, and our understanding continues to improve; allowing for a better understanding of the delicate Arctic ecosystem now than when we considered the same areas in the 2012-2017 Program or even in the Proposed Program. However, a number of ongoing studies may enhance future decision-making by aiding not only our understanding of the environmental resources of the region, but also how they may be impacted by OCS activity. Further experience in exploration and development, as well as evaluation of the Arctic environment, will improve the state of understanding in the Arctic prior to the issuance of additional oil and gas leases. Developing a better understanding of the Arctic environment, potential impacts thereon, and ways to avoid or mitigate those impacts, prior to entering into additional oil and gas leases in the region will lead to more informed decision-making and development processes for the region.

While oil and gas activities are similar across all program areas, the risks associated with those activities in the Arctic may be greater in some areas than others. Further research will enable BOEM to determine the terms of required stipulations or other mitigation measures before granting property rights through the

issuance of Arctic leases, after which BOEM's ability to add mitigation measures may be further constrained. The Beaufort Sea and Chukchi Sea Program Areas are home to several Federally listed and candidate species under the Endangered Species Act, including the bowhead whale, fin whale, Pacific walrus, polar bear, and Steller's eider. Critical polar bear habitat designated under the Endangered Species Act overlaps extensively with the Beaufort Sea and Chukchi Sea program areas, and designated critical habitat for the Steller's eider in Ledyard Bay overlaps with the Chukchi Sea Program Area (see the Final Programmatic EIS).

Current and predictive information shows that climate change-induced temperature increases are occurring fastest in the polar regions, resulting in a disproportionate amount of changes to the physical, biological and chemical environments, such as alteration of species distribution, reduction in seasonal ice cover, and loss of permafrost. Loss of sea ice coverage reduces the available habitat for ice-dependent species such as polar bears and Pacific walrus. Such conditions and stressors may increase the vulnerability of these environmental resources and reduce their resilience to impacts of OCS oil and gas activities. Additionally, the remote nature of the Arctic program areas, the lack of widespread infrastructure, and the presence of sea ice for a large part of the year also make Arctic coastal zones more vulnerable to impacts from oil spills because of the challenges associated with conducting cleanup activities in the event of an oil spill (see the Final Programmatic EIS for detailed information on oil spill impacts).

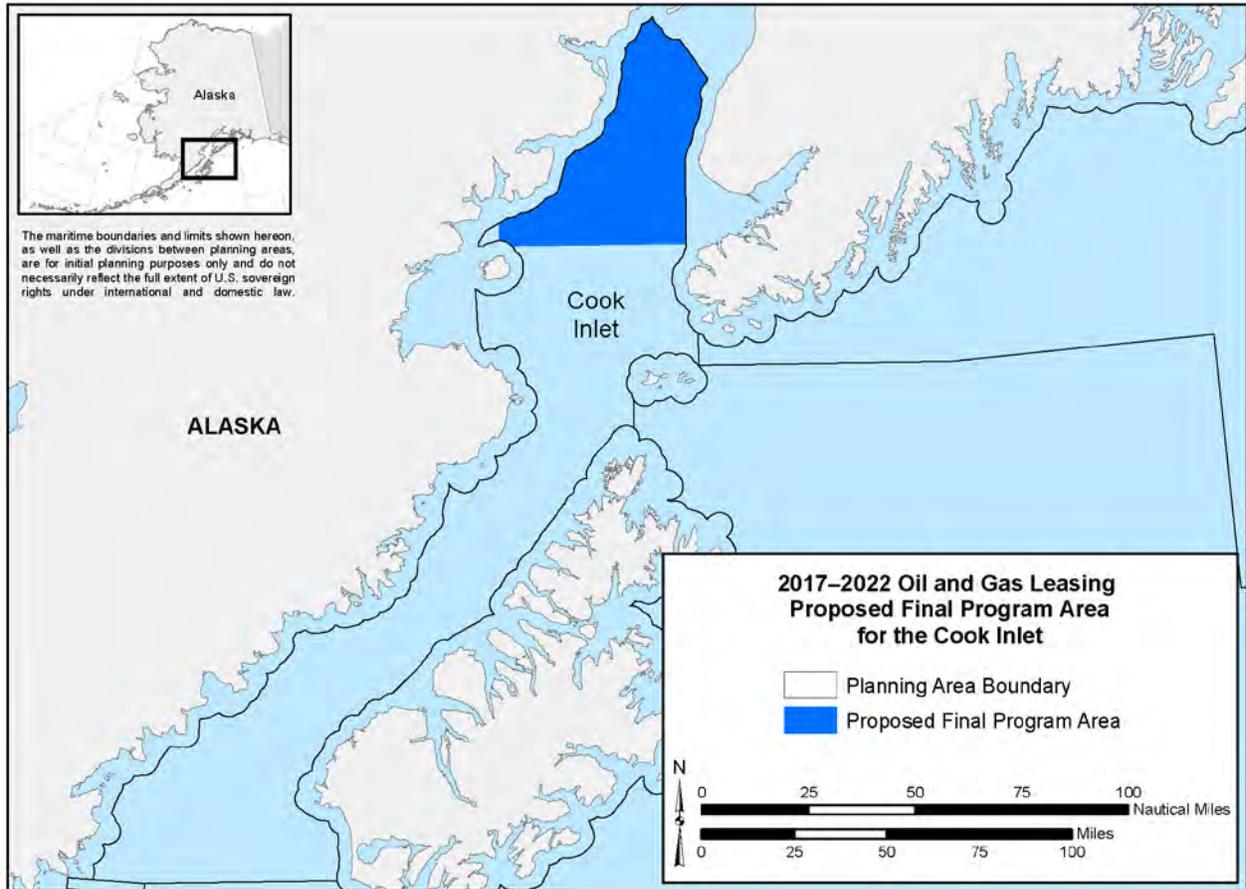
The Final Programmatic EIS analyzes the potential exclusion of several Environmentally Important Areas. These areas represent regions of important environmental value where there is potential for conflict between ecologically important or sensitive habitats; maintenance of social, cultural, and economic resources; and possible oil and gas development. The identification and analysis of four Environmentally Important Areas in the Beaufort Sea and two in the Chukchi Sea underscores the ecological and sociocultural complexities and particular multiple use challenges of the Arctic (see Final Programmatic EIS). If OCS activities were to occur in areas of the Arctic not identified as Environmentally Important Areas, habitats and species in the Environmentally Important Areas could still be impacted by the indirect effects of development in the Region, such as increased vessel traffic, infrastructure development, air quality impacts, and potential for oil spills. For that reason, impact conclusions do not substantially improve for any analyzed environmental resource under the alternative that protects the Environmentally Important Areas.

In addition, while the types and intensity of impacts from OCS activities are similar across the Alaska program areas, the context of these impacts varies significantly from the Arctic to the Cook Inlet. The Cook Inlet Program Area is proximal to existing infrastructure associated with state oil and gas activities and is located nearer to developed population centers, including Anchorage, which is the primary regional energy market. Because infrastructure already exists in the Cook Inlet area, it is likely that less new construction would be necessary, reducing the possibility of new adverse impacts to the coastal zone. Compared to the Arctic, Cook Inlet experiences less sea ice coverage, and for shorter periods, making oil spill response less complex. Response capability and access are also more developed in the Cook Inlet than in the Beaufort and Chukchi Seas. Moreover, habitat loss like that occurring in the Arctic (e.g., drastic reduction in annual sea ice cover and loss of permafrost) is not occurring at the same pace or with the same level of consequence to species and habitats in the Cook Inlet.

The decision to remove the Arctic lease areas from the PFP also took into consideration possible conflicts with other uses of the OCS. In the GOM OCS, oil and gas activities, as well as many other uses, have matured alongside each other and have evolved, over decades, to co-exist as they have learned to adapt and manage conflict. In contrast, accommodating new Arctic OCS oil and gas activities could require shifts in existing OCS uses. Specifically, one of the primary uses of the OCS in the Arctic is the long-standing subsistence lifestyle of the Native communities. While the Presidential Withdrawals in the Arctic do allow for some protections of resources, much of the area remains in conflict, as demonstrated by the alternatives analysis in the Final Programmatic EIS. While many Alaska Native communities recognize the economic benefits associated with oil and gas activity, they continue to prioritize their subsistence culture. Throughout the Program planning process, several North Slope organizations acknowledged both the benefits from oil and gas activity, if it is done safely, and the need to protect areas from oil and gas activity for maintenance of a traditional way of life. Additionally, the National Aeronautics and Space Administration has expressed concern about possible conflicts between its existing program in the Beaufort Sea and expanded oil and gas activity.

Despite the Secretary's decision not to include lease sales in the Beaufort and Chukchi Seas in the 2017-2022 Program, BOEM will continue to work with industry, the State, and the North Slope communities on any proposed development of the existing leases in the Beaufort Sea. This includes BOEM's review of a Development and Production Plan to develop the Liberty Prospect, which is located 32 kilometers (20 miles) east of Prudhoe Bay. BOEM is now reviewing the Plan and preparing an Environmental Impact Statement for the proposed project and looks forward to working with the State and local communities as it reviews the proposal. The Northstar facility, a joint Federal and State of Alaska facility in the Beaufort Sea, also continues to produce Federal OCS resources.

Figure S-2: 2017–2022 Proposed Final Program Cook Inlet Program Area



PART I: REGULATORY FRAMEWORK

Chapter 1 OCS Oil and Gas Leasing Program Development Process

1.1 INTRODUCTION

Section 18 of the Outer Continental Shelf (OCS) Lands Act (43 United States Code [U.S.C.] Section [§] 1344) requires the Secretary of the Interior (Secretary) to prepare and maintain a schedule of proposed OCS oil and gas lease sales determined to “best meet national energy needs for the five-year period following its approval or reapproval.” The proposed oil and gas leasing program must be prepared and maintained in a manner consistent with the principles and criteria specified in Section 18 of the OCS Lands Act. Those criteria, and the manner in which they have been considered in preparing the *2017–2022 OCS Oil and Gas Leasing Proposed Final Program* (2017–2022 Program), are summarized in Chapter 2, Section 18 Factors for Consideration and Balancing.

The OCS is defined as all submerged lands, subsoil, and seabed lying between the seaward extent of the states’ jurisdiction and the seaward extent of Federal jurisdiction as defined in the Submerged Lands Act. The United States’ jurisdiction lies seaward of most states’ jurisdiction of 3 nautical miles (nm); however, Texas, the Gulf coast of Florida, and Louisiana have slightly different jurisdictional limits. The jurisdiction of Texas and that of Florida, off its Gulf coast, extend 9 nm seaward and Louisiana is 3 imperial nm. Several states have had their seaward boundary “fixed” (permanently immobilized) by the Supreme Court, and these fixed boundaries are not affected by a normally ambulating coastline. In 1983, President Reagan proclaimed the sovereign rights and jurisdiction of the United States over submerged lands and seas adjacent to the United States within the Exclusive Economic Zone (EEZ) as recognized by international law. The EEZ extends a distance of 200 nm from the baseline from which the breadth of the territorial sea is measured. The EEZ 200 nm limit, however, does not define the outer limit of the OCS under the OCS Lands Act and the Submerged Lands Act, and may be better considered in that context as a jurisdictional minimum, except where constrained by the jurisdictional reaches of adjacent coastal nations.

Section 18 of the OCS Lands Act requires that the proposed schedule of lease sales be based upon a comparative analysis of the oil- and gas-bearing regions of the OCS. For administrative and planning purposes, the Bureau of Ocean Energy Management (BOEM) has established four OCS regions comprised of 26 planning areas, as shown in Figure 1-1: OCS Lower 48 States Planning Areas and Figure 1-2: OCS Alaska Planning Areas. The four OCS regions are Alaska, Pacific, Gulf of Mexico (GOM), and Atlantic. Administratively, the Pacific Region includes the State of Hawaii. Hawaii does not have any OCS oil or natural gas production because of a lack of hydrocarbon resources; therefore, for the national OCS oil and gas leasing program, the Pacific Region only comprises the four planning areas off the United States (U.S.) west coast.

Figure 1-1: OCS Lower 48 States Planning Areas

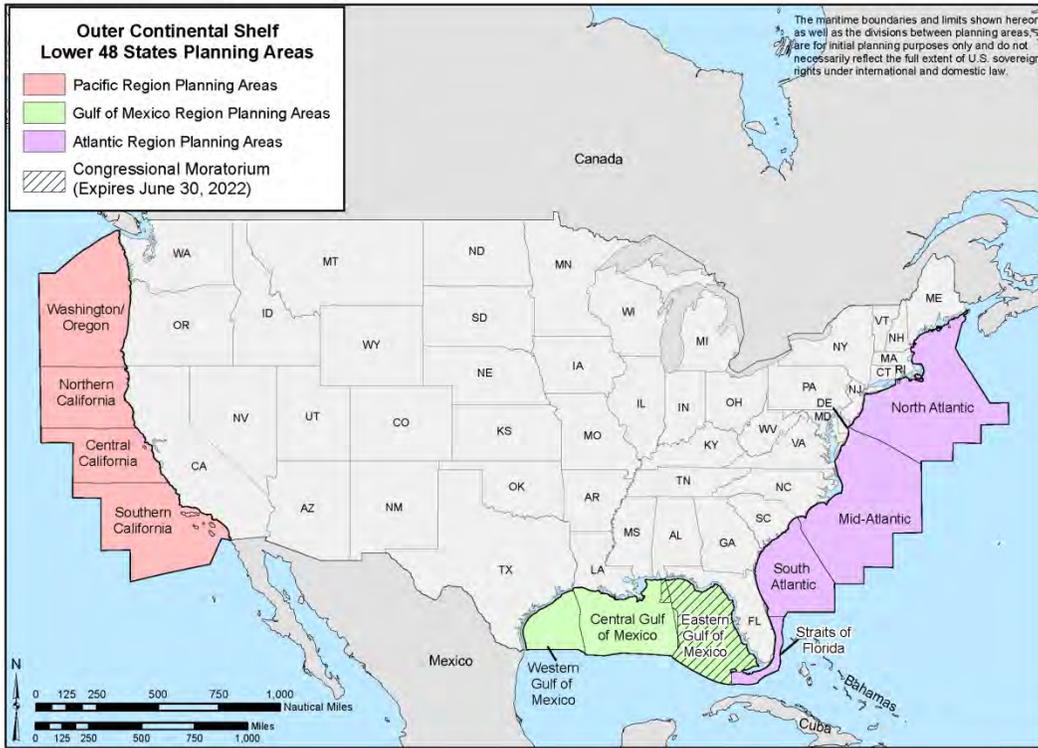
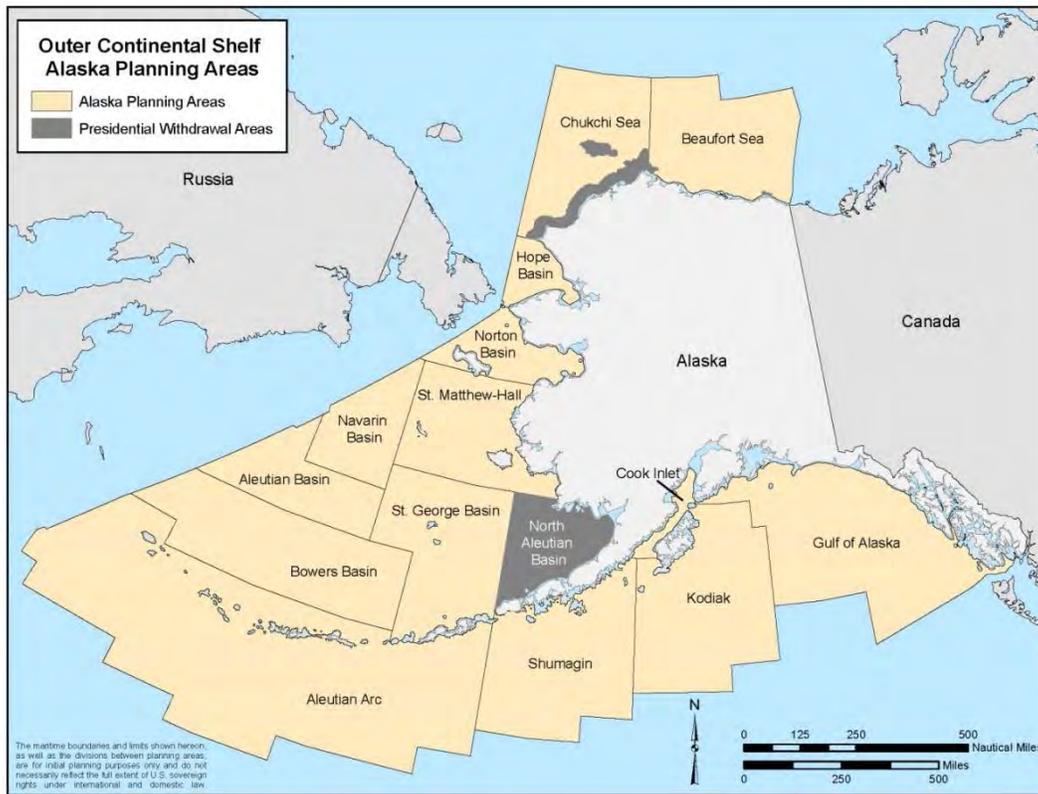


Figure 1-2: OCS Alaska Planning Areas



1.2 ENERGY NEEDS

Meeting national energy needs is a primary purpose of the OCS Lands Act Amendments of 1978, which established the criteria for the Secretary to consider when developing each new OCS leasing program (Public Law [P.L.] 95-372). Section 18 of the OCS Lands Act was added by the Amendments and requires the Secretary to formulate an OCS leasing program to “best meet national energy needs for the five-year period following its approval or reapproval” (Section 18(a), 43 U.S.C §1344(a)).¹ The OCS leasing program is designed for long-term planning so the decision maker can consider national energy needs over the long-term, 40–70 years into the future. While production from an OCS program continues over the long-term, there are additional decision points prior to lease issuance that allow the decision maker to consider new information about the nation’s energy needs (Executive Office of the President 2014).

Energy needs, as recognized in the language of the OCS Lands Act and reinforced by the United States (U.S.) Court of Appeals for the District of Columbia (D.C.) Circuit, is a broad term that includes economic and energy policy goals, national security, dependence on foreign sources of energy, the balance of payments in world trade, and other aspects of national welfare affected by the availability of appropriate quantities and qualities of oil and gas.² Despite changes over the past few decades, many of the energy challenges that led to the passage of the Section 18 requirements still remain today, and energy continues to play a central role in the U.S. economy.

OCS oil and gas production is a key component in meeting U.S. energy needs. OCS oil and gas production provides valuable energy resources that contribute to U.S. energy security; an improved balance of payments; trade gains from exporting refined petroleum products; and increases in public revenues, employment, direct output, and value added through the supply chain.

The President’s national strategy to meet U.S. energy needs consists of a comprehensive energy strategy with three key purposes: (1) supporting economic growth and job creation, (2) enhancing energy security, and (3) deploying low-carbon energy technologies and laying the foundation for a clean energy future (Executive Office of the President 2014). The OCS oil and gas leasing program and resulting OCS oil and gas development is a key component of the first two of these foundational goals. The President’s energy strategy and the OCS Lands Act both indicate that energy needs include not only energy consumption, but also the many ways in which these needs, and meeting these needs, affect the national well-being.

¹ Section 18 also requires the Secretary to consider “the location of such regions [oil- and gas-bearing physiographic regions] with respect to, and the relative needs of, regional and national energy markets” (Section 18(a)(2)(c), 43 U.S.C. §1344(a)(2)(c)). Chapter 6, Program Area Location Considerations, contains the energy markets analysis conducted to help the Secretary meet that requirement.

² The Federal circuit court upheld this broad conception of energy needs in *Center for Sustainable Economy v. Department of the Interior*, 779 F.3d 588 (D.C. Cir. 2015). The court stated the premise that “any capacity that is developed domestically helps to ensure that the United States has available domestic sources of fuel for domestic consumption as needed, for example, in the event of international conflict, natural disaster, unexpected foreign fuel shortages, or price volatility in international markets.”

1.2.1 Contribution of Oil and Natural Gas to the U.S. Economy

Since 2005, American consumers have spent well over one trillion dollars a year, or generally more than 8 percent of the gross domestic product (GDP), on energy (EIA 2016a). In 2015, oil and gas consumption accounted for approximately 65 percent of the energy consumed domestically, and directly or indirectly supports the supply chain for delivering nearly all goods and services in our economy (EIA 2016a). Further, the level of oil and gas activity affects the balance of payments and trade, energy security, and technology, and contributes to employment and public revenues.

The U.S. Geological Survey (USGS) and BOEM estimate that a significant share of the United States' remaining oil (69 percent) and natural gas (22 percent) resources lie on offshore Federal lands (USGS 2013, BOEM 2016). Therefore, the oil and gas production on the OCS can contribute to meeting the country's energy needs. In particular the continued oil and natural gas production in the GOM, the primary OCS region currently available for energy production and development activities, remains vital.

1.2.1.1 Consumption of Energy Sources

Though U.S. energy needs expand far beyond simply consuming oil and natural gas, these fuels currently are fundamental to powering our economy. Section 6.2.4, Oil and Natural Gas Consumption and Production Estimates, provides more information on the consumption of oil and natural gas.

In addition, while oil has largely been replaced by other fuels for electricity generation, its dominant role as a fuel in the transportation sector is unlikely to change significantly in the foreseeable future because of a variety of limiting factors. Other sources of energy have gained less than 5 percentage points of the transportation-fuel market share since 1974, just after the initial oil price shocks of that era, with petroleum still accounting for more than a 91 percent share in 2014 (EIA 2016a). Crude oil is a raw input for gasoline and other transportation fuels, as well as for a variety of petroleum products found in non-fuel markets (e.g., chemicals, plastics, and synthetic materials).

In recent years, advances in the use of hydraulic fracturing (“fracking”), combined with horizontal drilling, have allowed companies to economically produce oil and gas from shale and tight³ onshore formations, leading to large increases in U.S. production. The increase in domestic natural gas production led to lower prices, which has, in turn, increased the consumption of natural gas. Natural gas has low carbon-emitting potential relative to coal, and is increasingly being used for electricity generation (EIA 2015a). Further, lower gas prices have reduced energy costs for manufacturing and allowed more companies to begin, or to increase, domestic operations (PwC 2011). In addition, low energy costs have allowed more companies to bring formerly overseas operations back to the United States, thus benefitting American workers (Boston Consulting Group 2012). This manufacturing renaissance has benefitted all regions of the country. Over the next 20 years, the Energy Information Administration (EIA) expects the United States to rely on greater amounts of oil and natural gas to meet its energy demands, even as alternative sources of energy provide an increasing share of U.S. energy

³ Shale and tight formations have lower permeability and/or porosity than those from which oil and gas historically have been extracted.

needs.⁴ It is important to keep in mind, however, that this assumption is based on current policy; changes in policy could impact future markets and demand for oil and gas.

1.2.1.2 *Balance of Payments and Trade*

In recent years, U.S. spending on imports of goods and services exceeded U.S. exports. In 2014, this resulted in a trade deficit of \$508 billion dollars (BEA 2015). The cumulative U.S. trade deficit in crude oil and petroleum products was \$190 billion, or 37 percent of the cumulative trade deficit in all goods and services (BEA 2015). Even with recent decreases in oil imports, this contribution to the U.S. balance of payments deficit is significant. The increasing export of refined petroleum products has reduced the annual U.S. goods and services trade deficit, but net overall petroleum imports still account for a large portion of the country's current trade deficit.⁵ Current projections show U.S. energy imports and exports coming into balance in 2028, with the U.S. becoming a net exporter of natural gas in 2017 (EIA 2015a).⁶ The country's transition away from being a net importer of energy will greatly improve the balance of trade. OCS production will remain an important contributor to domestic U.S. oil supplies, helping to further improve the balance.

Over the long term, reducing the trade deficit can be expected to strengthen the value of the dollar. This is because a trade deficit involves the purchase of higher dollar-denominated imports than exports, creating an excess supply of dollars in the global marketplace. To the extent that the trade deficit can be reduced by dampening the United States' need for imports of foreign oil, the value of the U.S. dollar would be strengthened. When the value of the U.S. dollar rises in comparison to currencies of other countries, fewer dollars are required to purchase the same amount of international products—imports become less expensive and, conversely, U.S. exports become more expensive to foreign consumers. In addition, since oil is priced in dollars, the revenues received by oil-producing countries are more valuable on the international market when the dollar is stronger. As such, an increase in the value of the dollar mitigates incentives for the Organization of the Petroleum Exporting Countries (OPEC) to undertake strategies that would result in increased prices to maintain the purchasing power of its revenues. Accordingly, increased domestic petroleum production would tend to reduce the United States' dependence on foreign production, in turn reducing imports, shrinking the trade deficit, and potentially strengthening the value of the dollar.

1.2.1.3 *Energy Security*

One of the key elements in the President's energy strategy is enhancement of energy security. The President's plan defines energy security to include "energy supply availability, reliability, affordability, and geopolitical considerations" (Executive Office of the President 2014). Domestically produced oil

⁴ EIA projects that consumption of liquid fuels, such as condensate, natural gas liquids, and biofuels, will decrease slightly through 2040, but consumption of natural gas will increase over the same period (EIA 2015a).

⁵ While EIA projections indicate that the U.S. will continue to be a net exporter of petroleum products through 2040, this is not true for net imports of crude oil, which have been decreasing but are expected to begin increasing by about 2020 (EIA 2015a).

⁶ The Fiscal Year 2016 omnibus budget bill provisions eliminated crude oil export restrictions that had been in place for more than 40 years. The projections in the *Annual Energy Outlook 2015* did not account for these provisions; however, results from a separate study commissioned by EIA indicate that, while the absence of export restrictions would affect specific projections, the general conclusions in this analysis would not change through 2025, the last year considered in the study (EIA 2015a, EIA 2015b).

and gas enhance national security. The United States can reduce dependence on foreign oil primarily through two different methods—increasing the supply of domestic energy or reducing consumption. The President’s energy strategy focuses on both methods.

The recent boom in onshore production of natural gas and oil from shale and tight formations has contributed greatly to U.S. energy supply security. The bounty of light, sweet crude oil (referred to as “tight oil” in this document⁷) has reduced the U.S. need to import foreign oil and has increased world production, which in turn has permitted greater foreign policy latitude and effectiveness for the United States (Cummings and Gold 2013, Engel and Windrem 2013). All U.S. production contributes to the world supply of oil. OCS oil and natural gas varies considerably from year-to-year. The absolute amount of OCS oil production has increased somewhat over the past 10 years, whereas OCS natural gas production has fallen in the last decade, reflecting the decline in gas prices over the same period (BSEE 2015). In recent years, due to increased onshore activity, the percentage of OCS oil and gas as a share of domestic production has declined (see Figure 1-3: Historical and Forecasted U.S. Crude Oil Production by Region and Figure 1-4: Historical and Forecasted U.S. Natural Gas Production by Region). However, as shown in Figure 1-3 and Figure 1-4, the EIA projects that OCS oil production, in particular, is projected to increase in future decades and will remain an important component of domestic energy and economic and national security. Further, OCS production also provides a vital source of domestic production that can reduce the United States’ vulnerability to a supply disruption. As explained in Section 6.2.6.1, Ability of OCS Production to Fulfill Short-term Needs, the program development and leasing processes provide far more flexibility to adapt to unexpectedly low energy needs (e.g., by reducing sale size, delaying or canceling sales) than to unexpectedly high needs (i.e., new sales and areas cannot be added after the Program has been approved).⁸

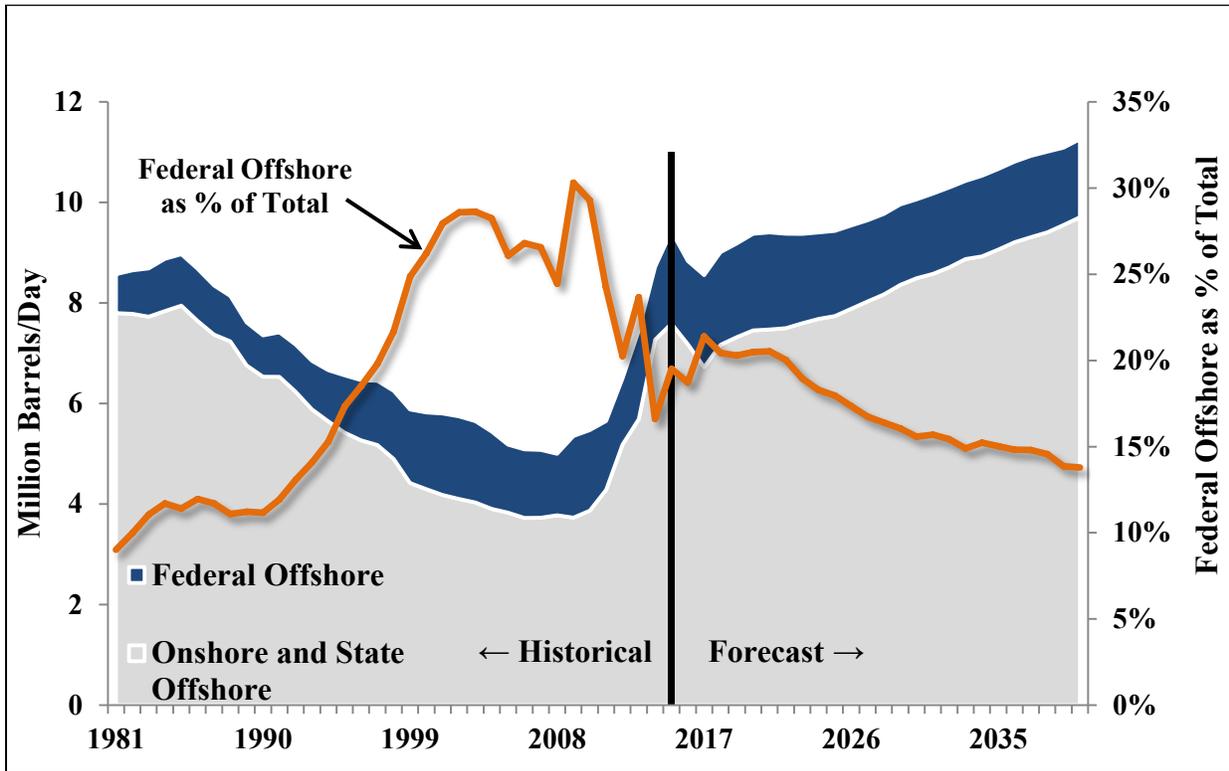
Other components of energy security are affordability of energy supplies and reduction of price volatility. In the absence of artificial rationing or an especially destructive natural disaster, higher prices are often the only publicly visible sign of supply disruptions. Oil is sold in a competitive world market and a reduction in supply (or an increase in demand) in one part of the world causes higher prices globally. Price spikes cause economic disruptions and are damaging to the economy.

The EIA predicts costs for imported energy will increase in real terms over the coming decades. The possibility of high and volatile energy prices, which have been avoided recently due to robust domestic oil and gas production especially for crude oil, raise important energy policy issues about supply options and their effects on the economy and the environment.

⁷ According to EIA, the term tight oil does not have a specific technical, scientific, or geologic definition. Tight oil is an industry convention that generally refers to oil produced from very low permeability shale, sandstone, and carbonate formations, with permeability being a laboratory measure of the ability of a fluid to flow through the rock (EIA 2014).

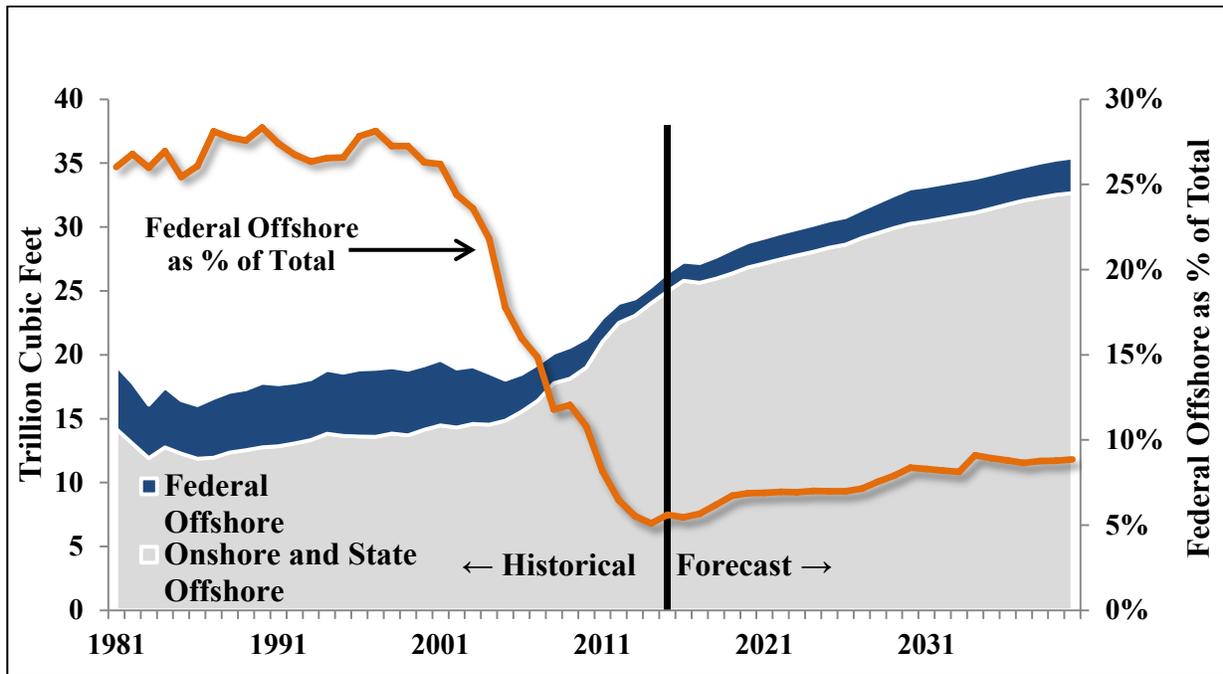
⁸ In addition, while lessees can decide fairly quickly to cancel or not initiate new OCS projects on existing leases, companies cannot initiate new OCS projects on unleased lands without going through a long process, including planning for a lease sale, bidding, applying for and obtaining approvals, and obtaining the necessary resources to determine prospect viability through exploration.

Figure 1-3: Historical and Forecasted U.S. Crude Oil Production by Region



Source: EIA 2016b, EIA 2016c

Figure 1-4: Historical and Forecasted U.S. Natural Gas Production by Region



Source: EIA 2016d, EIA 2016e

1.2.1.1 *Technology*

New technologies in the oil and gas industry are, in large part, responsible for the U.S. energy revival. Technological advancements in hydraulic fracturing (“fracking”) and horizontal drilling, along with high prices, drove the recent onshore boom in production. Offshore, technological advancements in the oil and natural gas industry over the past several decades have greatly expanded the resources available for production. Additionally, regulatory changes, improvements in industry practices, and enhanced Bureau of Safety and Environmental Enforcement (BSEE) inspection capabilities have made OCS exploration and development safer and more environmentally sound. Companies can explore for, and develop, previously inaccessible resources. In addition, higher quality geological and geophysical (G&G) data, achieved through state-of-the-art technology, acquisition methods, and processing, aid in identification of prospects and effective well placement, improving the probability of success of drilling operations. Advanced composite materials and materials engineering have improved offshore structures and mooring to better withstand the offshore operating environment. These and other technologies developed for oil and gas operations have contributed to the U.S. leadership in the worldwide energy industry. The importance of the United States as an offshore oil and gas technology leader was recognized in comments received in response to the Draft Proposed Program (see Appendix A of the 2017–2022 Proposed Program decision document) and Proposed Program (see Appendix A of this decision document). These technological advances support the country’s economic growth and help meet global energy needs.

1.2.1.2 *Employment and Public Revenues*

The domestic energy industry is an important component of the U.S. economy through its contribution to GDP, employment, and public revenues. Production of domestic oil and gas not only provides employment at higher-than-average wages to industry employees, but also provides work for many Americans in other industries that supply goods and services for exploration, development, production, and domestic transportation of oil and gas. The impact of the Federal offshore oil and gas industry on GDP and employment is discussed in Chapter 8, Equitable Sharing Considerations. Chapter 8 also describes the revenues available to local, state, and Federal governments. In general, OCS leasing and production provide the following public revenues:

- billions of dollars a year in bonus bids, rentals, and royalties to the U.S. Treasury
- funding for the Historic Preservation Fund
- funding for the Land and Water Conservation Fund (LWCF)
- OCS Lands Act Section 8(g) revenues and other revenue sharing payments to states⁹
- indirectly, provides worker and industry tax payments to state and local governments.

⁹ Section 8(g) of the OCS Lands Act provides for the Federal Government to share with each coastal state hosting production 27 percent of revenues earned from OCS leases within 3 nm seaward of the state’s submerged lands boundary. The shared revenues are referred to as “8(g) revenues.” In 2006, the U.S. Congress passed the Gulf of Mexico Energy Security Act (GOMESA) promulgating that the states of Texas, Louisiana, Mississippi and Alabama receive a portion of revenues from new oil and natural gas development in federal waters adjacent to the respective state.

1.3 PROGRAM DEVELOPMENT PROCESS

The development of a Proposed Final OCS Oil and Gas Leasing Program (Proposed Final Program or PFP) is one of several Section 18 steps in the process of preparing a new 2017–2022 Program to succeed the current 2012–2017 Program, which became effective on August 27, 2012, and expires on August 26, 2017. This PFP constitutes the third and final proposal for an OCS lease sale schedule for the 2017–2022 timeframe.

The Program development process starts with the broadest consideration of areas available for leasing (all 26 OCS planning areas) and can be narrowed throughout the Program development and lease sale process. Once a defined area is proposed for leasing during the development of the Five-Year Program, it becomes known as a program area. Program areas are the portions of the original OCS planning areas that remain in consideration for leasing during the program development process. For example, the Cook Inlet Program Area in the 2017–2022 Proposed Program includes only the northern portion of the Cook Inlet Planning Area that was originally being considered for leasing in this PFP.

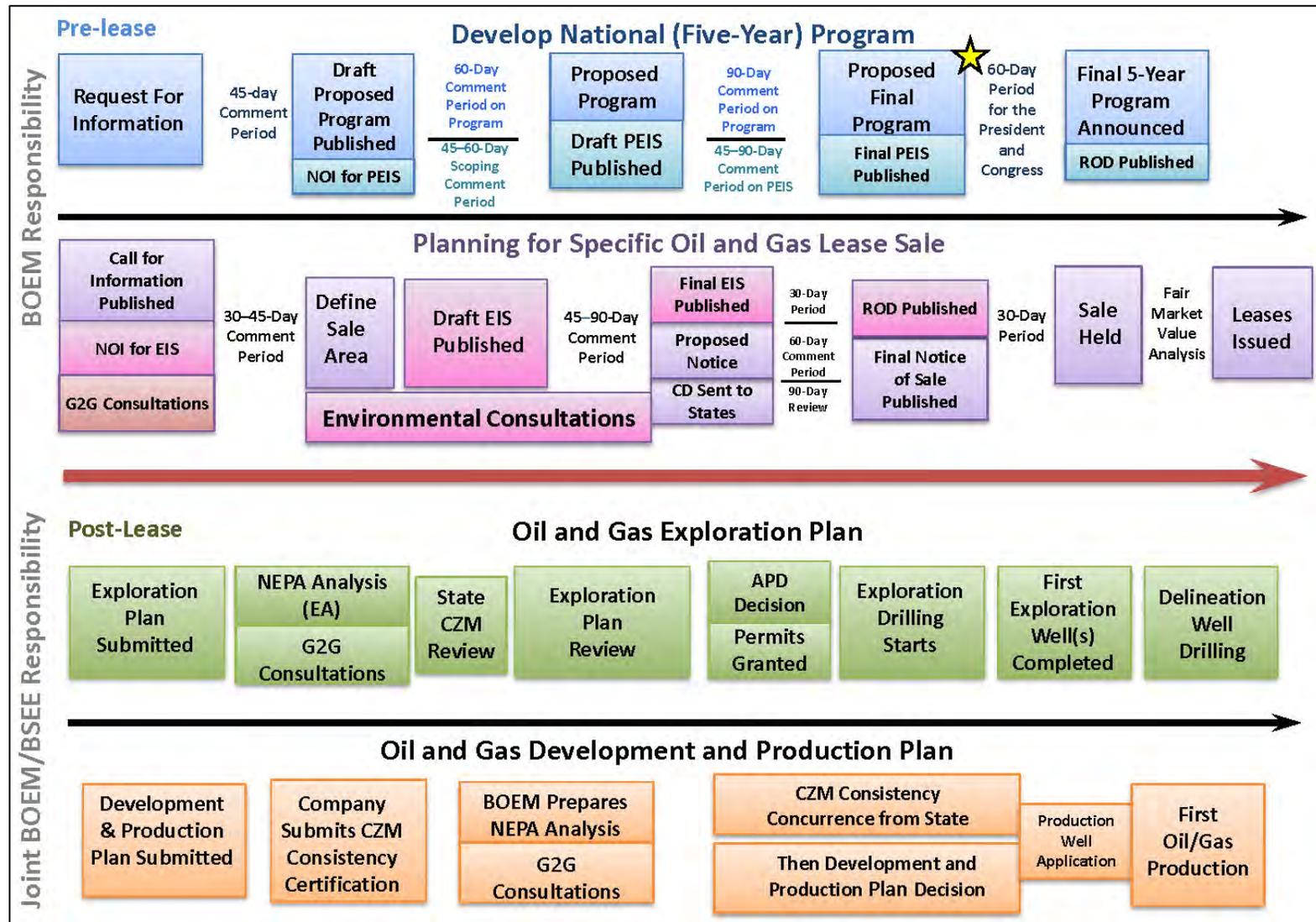
In addition to the analyses and decision documents prepared pursuant to Section 18, BOEM has prepared the *2017–2022 OCS Oil and Gas Leasing Program Final Programmatic Environmental Impact Statement* (Programmatic EIS) to evaluate the potential environmental and socioeconomic impacts associated with the Program and considers alternatives that may avoid or reduce potential impacts. The key steps in preparing a new Program under Section 18 of the OCS Lands Act and the Programmatic EIS under Section 102(2)(C) of the National Environmental Policy Act (NEPA) are shown in Figure 1-5: OCS Oil and Gas Leasing Program Development Process, with a star identifying where BOEM is in the process of developing the 2017–2022 Program and associated NEPA analysis. In addition to the discussion on factor H in Section 2.2 in this document, a more detailed description of the NEPA process is contained in the Programmatic EIS.

The analysis contained in the Draft Proposed Program (DPP) decision document examined and compared all 26 of the OCS planning areas in accordance with the Section 18 factors for consideration and balancing. However, for the Proposed Program, only those areas and Program Options that the Secretary decided were appropriate to include in her DPP decision were further analyzed in the Proposed Program decision document and the Draft Programmatic EIS. Subsequently, the OCS program areas that the Secretary decided to include in the Proposed Program decision, and any potential subsets thereof, are analyzed in this PFP decision document and in the Final Programmatic EIS. The Programmatic EIS considers potential geographic exclusions and restrictions on lessee activities for the 2017–2022 Program as either alternatives or programmatic mitigations. The final decision on the Program may adopt any analyzed exclusions or mitigation measures, which are sufficiently identifiable at the programmatic stage as part of the Secretary's Section 18 balancing decision. Conversely, it could be determined that such exclusions and mitigation measures are more appropriately considered at subsequent stages, such as the pre-lease sale, exploration, or development and production stages.

1.3.1 Draft Proposed Program and Notice of Intent to Prepare a Programmatic Environmental Impact Statement

After considering all of the analyses associated with the Section 18 factors and principles (see Part II of the DPP), the Secretary selected Program Options as part of the DPP decision, which represent the initial

Figure 1-5: OCS Oil and Gas Leasing Program Development Process



Key: APD = Application for Permit to Drill; CD = Consistency Determination; CZM = Coastal Zone Management; EA = environmental assessment; EIS = environmental impact statement; G2G = government to government; NEPA = National Environmental Policy Act; NOI = Notice of Intent; PEIS = programmatic environmental impact statement; ROD = Record of Decision.

proposal for the 2017–2022 Program (see Chapter 2, Section 18 Factors for Consideration and Balancing). BOEM announced the availability of, and requested comments on, the DPP in the *Federal Register* on January 29, 2015 (80 FR 4941), distributed it to interested and affected parties for a 60-day comment period, and transmitted the DPP decision document to all 50 Governors and relevant Federal agencies.

BOEM published a Notice of Intent (NOI) to prepare the Programmatic EIS in the *Federal Register* on January 29, 2015 (80 FR 4939), initiating scoping for the NEPA document. See Chapter 3, Outreach and Coordination for a more detailed discussion on public involvement and outreach for the Proposed Program and Programmatic EIS.

1.3.1 Proposed Program and Draft Programmatic EIS

Preparation of the 2017–2022 Proposed Program was based on additional analyses of required Section 18 factors (see Chapter 2) and comments received by BOEM on the DPP and NOI to prepare the Draft Programmatic EIS. As such, the 2017–2022 Proposed Program was the second version of the Secretary’s proposal for this Five-Year Program.

On March 15, 2016, BOEM announced the publication of the Proposed Program. On March 18, 2016, BOEM published the associated request for comments in the *Federal Register* and submitted the Proposed Program to Congress, Governors, and potentially interested Federal agencies. In that *Federal Register* Notice, (81 FR 14881) BOEM also requested input on the Proposed Program from other interested and affected parties during a 90-day comment period, which closed on June 16, 2016. BOEM will provide written responses to Governors and the Attorney General on their comments on the Proposed Program in conjunction with transmittal of the PFP and Final Programmatic EIS per section 18 of the OCS Lands Act.

Also on March 15, 2016, BOEM published the Draft Programmatic EIS with a comment period that commenced on March 18 and ended on May 2, 2016 (81 FR 14885). The Draft Programmatic EIS considered a reasonable range of alternatives to the DPP proposed lease sale schedule. The analyses in the Draft Programmatic EIS adopt a broad regional perspective; more detailed and geographically focused analyses are conducted after the Program is approved and leasing progresses from the planning stage to the lease sale, exploration, and development stages. The Programmatic EIS is the first of several NEPA analyses that will be conducted for the lease sale and oil and gas exploration and development activities that are subsequently considered, and may ultimately occur, as a result of implementing the Program. However, the Secretary may decide to adopt any geographic exclusions or restrictions on leasing activities that are sufficiently identifiable at this stage to obtain a proper balance between the potential for environmental damage, the potential for discovery of oil and gas, and the potential for adverse impact on the coastal zone. The NEPA assessments, including Environmental Impact Statements (EISs) and Environmental Assessments (EAs) associated with the various stages of OCS oil and gas development, are shown in Table 1-1: Environmental (NEPA) Assessments Conducted for the OCS Oil and Gas Leasing Program.

Table 1-1: Environmental (NEPA) Assessments Conducted for the OCS Oil and Gas Leasing Program

Program Level	Program Stage	NEPA Analysis	Geographic Scope	Focus and Scope
Planning	Program	Programmatic EIS	National	Identification of program areas and number, schedule of lease sales for the Program and programmatic level mitigation requirements
Lease sale	Lease sale	EIS or EA	Program area or OCS region	Identification of parcels to be leased, and lease-sale specific mitigation and monitoring measures
Project	Exploration	CER or EA	Lease block(s)	Identification of project mitigation and monitoring measures
	Production	CER, EA, or EIS	Portion of lease block	
	Decommissioning	EIS, EA, or CER	Specific facility within a lease block	

Note: The level of NEPA analysis at the project level is determined by the complexity of the project, risk factors associated with the project, project location relative to existing oil and gas activities in the area, the technologies proposed for use, and other factors.

Key: CER = categorical exclusion review; EA = environmental assessment; EIS = environmental impact statement

1.3.2 Proposed Final Program and Final Programmatic EIS

At the last phase of the Program analysis, BOEM has prepared this PFP based on additional analyses of Section 18 factors and comments BOEM received on the Proposed Program. The PFP is the third and last version of the Secretary's proposal. Additionally, a Final Programmatic EIS has been developed. OCS areas identified for potential leasing in the Proposed Program are analyzed in the Final Programmatic EIS. BOEM has announced publication of the PFP in the *Federal Register* and will submit it to the President and Congress, along with the Final Programmatic EIS and copies of all incoming comments received on the Proposed Program and responses to comments on the Proposed Program received from state and local governments and Federal agencies. In accordance with Section 18(c)(2), the Secretary will not approve the PFP until at least 60 days after sending it to the President and Congress.

1.3.3 Program Approval and Record of Decision

Sixty days after the PFP is submitted to the President and Congress, the Secretary may approve the 2017–2022 Program. At the time of approval, the Secretary's decision is described in the Record of Decision (ROD), and a signed program decision memorandum is also made publicly available. The ROD is the final step in the Programmatic EIS process and, in general, identifies the selected alternative, presents the basis for the decision, and provides information on the methods to avoid, minimize, or mitigate environmental impacts. The ROD for the Programmatic EIS may adopt any geographic exclusions or restrictions on leasing activities that BOEM considers necessary for environmental protection and that are sufficiently identifiable at the Programmatic stage.

1.4 LANDSCAPE-SCALE APPROACH AND MITIGATION HIERARCHY FOR THE PREPARATION AND IMPLEMENTATION OF THE FIVE-YEAR OIL AND GAS LEASING PROGRAM

On October 31, 2013, the Secretary issued Secretarial Order No. 3330, entitled *Improving Mitigation Policies and Practices of the Department of the Interior* (the “Secretarial Order”). The Secretarial Order states:

[T]he Department seeks to avoid potential environmental impacts from projects through steps such as advanced landscape-level planning that identifies areas suitable for development because of low or relatively low natural and cultural resource conflicts. Where impacts cannot be avoided altogether, the Department must work to ensure that projects minimize impacts to the extent practicable. Finally, for impacts that cannot be avoided or effectively minimized, the Department should seek ways to offset or compensate for those impacts to ensure the continued resilience and viability of our natural resources over time.

As contemplated by the Secretarial Order, the Department issued a report in April 2014 entitled *Strategy for Improving the Mitigation Policies and Practices of The Department of the Interior: A Report to the Secretary of the Interior from the Energy and Climate Change Task Force* (the “Report”). Both Order No. 3330 and the Report call for a Department-wide mitigation strategy that focuses on using a landscape-scale approach employing the full mitigation hierarchy of avoidance, minimization, and compensation to protect resources potentially impacted by activities engaged in under the Department’s auspices.

On November 3, 2015, fully consistent with and supportive of the Department’s mitigation strategy, the President issued a Memorandum directing Federal agencies responsible for public resources—including the Department—to apply the mitigation hierarchy at scales appropriate for the country’s wide-ranging natural and cultural resources, and to, at a minimum, set a no-net loss goal when permitting impacts to key resources we are entrusted to protect (*Presidential Memorandum: Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment*, November 3, 2015). The Presidential Memorandum emphasizes the importance of protecting the environment while also providing efficient Federal permitting to American businesses and communities.

On the same day that the President issued his Memorandum on mitigation, the Department issued a new Departmental Policy that provides goals and guidance for implementing landscape-scale mitigation associated with the management of resources under the jurisdiction of the Department (Department Manual Release, *Landscape-Scale Mitigation Policy* [600 DM 6]). The Department’s Mitigation Policy, which stems from the Secretarial Order and is consistent with the President’s Memorandum, reaffirms the Department’s authority and commitment to use landscape-level planning to implement the full hierarchy of mitigation, including compensatory mitigation when needed.

The planning process envisioned by Congress in the OCS Lands Act squares well with the Department’s landscape-scale mitigation policy. The OCS Lands Act provides for a pyramidal, four-stage process to lease, and ultimately develop, offshore resources, proceeding from broad-based, landscape-level planning

to an increasingly narrower focus as actual development grows more imminent. Moreover, the statute requires the Secretary, in preparing the Five-Year Program, to consider “economic, social, and environmental values of the renewable and non-renewable resources contained in the outer Continental Shelf, and the potential impact of oil and gas exploration on other resource values of the outer Continental Shelf and the marine, coastal, and human environments” (43 U.S.C. §1344(a)(1)). Thus, the OCS Lands Act envisions a landscape-level planning process that takes into account environmental, social, and economic values and allows for the employment of the full hierarchy of mitigation as the process proceeds from development of the Five-Year Program to leasing and ultimately exploration and development. Taking into account, at the programmatic level, the value of OCS resources and impacts that could result from oil and gas activities on the OCS enables the Secretary to use a landscape-level analysis to determine areas most suitable for development. This landscape-level analysis also allows the Secretary to consider future impacts on valuable resources that could result from the exploration and development of an area.

The development of the 2017–2022 DPP followed this approach and looked across the entire OCS to identify areas suitable and not suitable for oil and gas development after considering economic, social, and environmental values of the renewable and non-renewable OCS resources, and the potential impact of oil and gas exploration on other resource values of the OCS and the marine, coastal, and human environments. Particularly emphasizing avoidance and minimization of impacts at the early stage of the process and those areas with negligible hydrocarbon resources and/or industry interest at this time, the DPP decision eliminated numerous planning areas from potential leasing and minimized effects to certain areas through the Secretary’s size, timing, and location decisions.

Following the approval of the 2017–2022 Program, BOEM will consider, and, where appropriate, employ additional mitigation (including the full hierarchy of avoidance, minimization, and compensation) in the later stages of the oil and gas development process under the OCS Lands Act.¹⁰

Appropriately scaled analyses at these later decisions for leasing, exploration, development, and production can best identify specific mitigation measures, including required compensatory mitigation measures. At all decision stages, coordination with state and Tribal governments, as well as other Federal agencies, occurs and will help inform appropriate mitigation, including avoidance, minimization, and needed compensatory mitigation.

Development and implementation of the 2017–2022 Program using this approach allows for the application of a landscape-scale strategy to oil and gas activities on the OCS that promotes the Department’s Mitigation Policy and the President’s Memorandum. This approach also allows BOEM to integrate the mitigation hierarchy into the entire leasing process (i.e., from the Five-Year Program stage, to the lease sale stage, to the development and production stage). The 2017–2022 Program’s landscape-scale approach and the OCS Lands Act’s integration of the use of the full mitigation hierarchy allows for the identification of the best combination of mitigation measures—including compensatory mitigation—to avoid, minimize, and compensate for potential impacts on resources throughout the entire

¹⁰ BOEM is currently developing the appropriate framework to determine how to apply this landscape mitigation approach, including, but not limited to, compensation, into its decision making process. Additional information will be forthcoming as it becomes available.

leasing process. Such an approach considers reasonably foreseeable impacts and applies the mitigation hierarchy in the context of the needs, conditions, and trends of resources, at all relevant scales.

1.5 LEASE SALE PROCESS

Each lease sale that is scheduled in the approved 2017–2022 Program will be subject to an established prelease evaluation and decision process whereby interested and affected parties will have multiple opportunities to participate (see Figure 1-5: OCS Oil and Gas Leasing Program Development Process). That process examines the proposed lease sale (or in some cases, multiple lease sales), starting with the area identified as available for leasing consideration in the Program, and considers reasonable alternative lease sale configurations, reductions, and/or restrictions within that area. No lease sale area can be offered that is not included in the area identified in the approved Program. The pre-lease process leads to the final decision on the terms and conditions of each OCS lease sale. In some cases, steps may occur in a different order or even be repeated, based on the particular needs of the lease sale and area. The process can take between 3 and 5 years to complete, and contains multiple steps and decision points, as described below:

1. **Call for Information and Nominations**—BOEM will request comments from the public on areas of special concern that should be analyzed. Potential bidders are invited to nominate areas of interest within program areas identified for leasing consideration in the Program and provide information on environmental and other aspects of the program area (the portion of a planning area that is being considered for leasing in the Program).
2. **Notice of Intent to Prepare an EIS**—BOEM will issue an NOI to alert the public that an EIS-level (or environmental assessment [EA]) NEPA document will be prepared. The NOI provides a description of the Proposed Action and possible alternatives to the Proposed Action, as well as a description of the scoping process, and any scheduled meetings for scoping of the NEPA document. Note that sometimes the NOI is published after the Area Identification (Area ID) step below.
3. **Area ID**—BOEM will identify the area of the Proposed Action to be analyzed in the NEPA document based on information gathered from the Call for Information and Nominations and the NOI (if preceding the Area ID). Decisions at this step will be made publicly available, particularly if there is a change to the area included in the Call for Information and Nominations and the NOI.
4. **NEPA document**—BOEM will prepare a draft EIS or an EA to evaluate the potential environmental impacts of a Proposed Action, alternatives to the Proposed Action, and the potential effectiveness of mitigation measures.
5. **Public Review and Comment**—For EAs, BOEM will notify the public to obtain their input on those issues that should be addressed in the EA; the specific time period is based on a number of factors and could vary from project to project. If BOEM chooses to solicit public comments on a Draft EA for a lease sale, the Draft EA is available for comment for at least 30 days. For an EIS, the public is invited to be engaged in the scoping process and the Draft EIS is available for public review for at least 45 days.

6. **Government-to-Government Consultations**—BOEM consults with federally recognized tribes, and, in Alaska, additionally with Alaska Native Claims Settlement Act Corporations. These consultations are conducted throughout the stages of the OCS oil and gas leasing process.
7. **Environmental Consultations**—Consultations will occur with Federal agencies such as the U.S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS). This also includes National Historic Preservation Act Section 106 consultations with State Historic Preservation offices.
8. **Final NEPA document**—BOEM will incorporate responses to public comments on the Draft EIS or EA, and update the analysis of environmental impacts.
9. **Proposed Notice of Sale (PNOS)**—BOEM will provide information to the states and the public on the proposed area to be offered and the proposed lease terms and conditions.
10. **Consistency Determination**—BOEM will provide coastal states a determination on whether the proposed lease sale is consistent, to the maximum extent practicable, with the enforceable policies of federally approved state Coastal Management Plans. Note that the State of Alaska does not currently have a Coastal Zone Management (CZM) Plan.
11. **Record of Decision (ROD) (EIS-level) or Finding of No Significant Impact (EA-level)** —This is the final step for the NEPA process regarding the selected action, alternatives, environmentally preferable alternatives, and environmental mitigation measures, adopted or not, and considers the Governor’s comments, consideration of the oil and gas resource potential in context with social, environmental, economic, and environmental values, impacts, and concerns, and the terms and conditions of the lease sale. The ROD is published a minimum of 30 days before the sale date.
12. **Letters to the Governors**—BOEM will send copies of the PNOS to Governors of affected states for their review as required under Section 19 of the OCS Lands Act.
13. **Final Notice of Sale (FNOS)**—BOEM will publish a FNOS a minimum of 30 days before the sale is held. The FNOS includes the date, time and location of the bid opening, blocks offered, and terms and conditions of the sale. BOEM may also include a copy of the Final NEPA document.
14. **Lease Sale**—BOEM will open sealed bids submitted by qualified bidders and read them publicly on the day of the sale. Bids are checked for technical and legal adequacy to determine the high bid, which is then subject to further evaluation regarding the United States receiving fair market value (FMV) and adequate competition before a lease may be issued.
15. **Lease Issuance**—BOEM will issue a lease following completion of the FMV analysis and review by the Department of Justice, in consultation with the Federal Trade Commission regarding antitrust review of lease sales. The Department of Justice, in consultation with the Federal Trade Commission, has 30 days to conduct antitrust review of the lease sale, but may agree to a shorter review period.

1.6 EXPLORATION AND DEVELOPMENT PROCESS

After BOEM issues a lease, a lessee typically begins a process of exploration for oil and gas accumulations. An Exploration Plan is submitted to BOEM for analysis and possible approval (see Figure 1-5: OCS Oil and Gas Leasing Program Development Process). In some cases, these potential resources may already be identified through analysis of existing data and information. In other cases, a

lessee may need to utilize information collected through a much broader exploration program to identify potential resources in areas where exploration data coverage is less dense or non-existent. The general process for oil and gas exploration on a lease typically begins by conducting geophysical seismic surveys early in an exploration cycle to obtain information about subsurface geologic formations and potential oil and gas traps. Such activity on a lease is conducted pursuant to the lease and/or plan requirements and does not require a separate permit, as is the case for pre-lease survey activity. Seismic survey techniques and technologies are continuously becoming more sophisticated. Generally, areas with mature oil and gas development, such as in the GOM, have more recent, and therefore more sophisticated (e.g., three-dimensional [3-D] seismic surveys), seismic data available, while older, less sophisticated seismic data (e.g., two-dimensional [2-D] seismic surveys) is often all that is available to delineate frontier areas. As activity increases in frontier areas, new seismic data will be collected and more detailed information will become available.

High-resolution geophysical surveys on a lease are performed prior to exploration plan submittal to identify natural and man-made hazards, areas of potential benthic habitat such as hard bottoms and reefs, and significant cultural resources such as historic shipwrecks. The next phase of exploration involves drilling an exploration well that targets the interpreted oil or gas trap in the subsurface to determine if an oil and/or gas resource exists. If a resource is discovered in quantities appearing to be economically favorable, one or more follow-up delineation wells may be drilled to help define the amount of resource or the extent of the reservoir.

Delineation and production wells are sometimes collectively termed development wells. If a lessee wishes to drill a development well, a Development and Production Plan must be submitted to BOEM for analysis and possible approval (see Figure 1-5: OCS Oil and Gas Leasing Program Development Process). Assuming that hydrocarbons are discovered and successfully delineated, a production facility may be installed at the site. The number of wells per facility varies according to the type of production facility used, the prospect site, and the drilling and production strategy deployed. Oil and gas are brought to market via a system of pipelines and processing facilities or through production into a floating system.

Both exploration plans and development and production plans are subject to focused, site-specific environmental analyses under NEPA and the requirement for an operator to certify consistency concurrence of the proposed activities with the state's CZM program, as appropriate.

For more information about the exploration and development process, see BOEM's web pages: <http://www.boem.gov/Status-of-Gulf-of-Mexico-Plans/> and <http://www.boem.gov/akplans>. For more information about BOEM's oil and gas resource evaluation program, see BOEM's web page: <http://www.boem.gov/Resource-Evaluation-Program/>.

Chapter 2 Section 18 Factors for Consideration and Balancing

2.1 BOEM’S APPROACH TO ANALYZING PROGRAM AREAS

Section 18(a) of the OCS Lands Act contains four subsections which set forth specific principles and factors that guide Program formulation and which, together, provide the foundation for BOEM’s analysis that is used in the development of reasonable Program Options for a schedule of proposed lease sales. The Secretary may select from these Program Options “indicating, as precisely as possible, the size, timing, and location of leasing activity which [the Secretary] determines will best meet national energy needs for the five-year period following its approval...” (43 U.S.C. §1344(a)). A brief overview of those Section 18 requirements is presented in this chapter, which also includes judicial guidance provided in court decisions on prior Programs (see Section 2.7, Judicial Guidance). This PFP decision document contains analyses of the Program Options chosen by the Secretary in the Proposed Program decision, as well as supplemental Program Options, for further analysis pursuant to the principles and factors articulated by Section 18 of the OCS Lands Act, including, but not limited to, the eight factors listed in Section 18(a)(2) of the OCS Lands Act (see Section 2.2, Section 18(a): Factors for Determining Size, Timing, and Location of Leasing). Collectively, the Program Options chosen in the Proposed Program decision and the supplemental Program Options are referred to in this PFP as the PFP Options. These PFP Options are also considered in the Final Programmatic EIS.

The analyses underlying the 2017–2022 Program use the best available information. Previous studies and analyses are augmented by the latest documents, reports, and studies available, along with pertinent information provided in comments to the DPP and the Proposed Program. Additionally, BOEM reviews and reinterprets existing oil and gas resource data as necessary. The DPP lease sale schedule provided the initial Proposed Action analyzed in the Proposed Program and Draft Programmatic EIS. The Draft Programmatic EIS was published in conjunction with the Proposed Program decision document. The Proposed Program lease sale schedule provided the refined Proposed Action analyzed in the PFP and Final Programmatic EIS. The Final Programmatic EIS is being published in conjunction with this PFP decision document.

2.2 SECTION 18(A): FACTORS FOR DETERMINING SIZE, TIMING, AND LOCATION OF LEASING

As stated above, Section 18(a) of the OCS Lands Act outlines several principles and factors that guide Program formulation. Section 18(a)(2) lists eight factors that the Secretary must consider when determining the size, timing, and location of oil and gas activities among the different areas of the OCS. While some of these factors lend themselves to quantification for facilitating the comparison among Program Areas, others do not and need to be considered qualitatively. Each of the eight factors provided in Section 18(a)(2)(A) through (H) is listed as follows:

A) Geographical, Geological, and Ecological Characteristics

The main sources of information on geographical, geological, and ecological characteristics of the OCS program areas considered in preparing the PFP analysis are the 2017–2022 Programmatic EIS, other recently completed Federal agency NEPA documents prepared for leasing and operational activities, BOEM oil and gas resource assessments and associated regional geologic and reserves reports, the 1994 National Research Council report concerning information for Alaska OCS decisions (NRC 1994), scientific study results (as reported in BOEM’s Environmental Studies Program Information System [ESPIS]), published and gray literature, expert knowledge, and information submitted or cited by commenters. Such information can be found in various places in this decision document (e.g., geological characteristics in Chapter 5 and geographical and ecological characteristics in Chapter 7). The latter also are outlined fully in the Programmatic EIS.

B) Equitable Sharing of Developmental Benefits and Environmental Risks

Chapter 8 analyzes the equitable sharing of developmental benefits and environmental risks associated with oil and gas leasing. The chapter provides a discussion of the developmental benefits that accrue in regions near existing and potential OCS oil and gas production and the benefits that are distributed widely throughout the United States. The onshore areas adjacent to the regions possessing substantial oil and gas resources tend to both receive most of the benefits from, and be subject to the associated environmental risks of, developing those resources. Developmental benefits analyzed include increased wages, additional jobs, increased tax collection, revenue sharing where applicable, and proximity of supply and consumers of energy.

The Final Programmatic EIS identifies and discloses the potential impacts associated with the PFP Options and provides information on the severity of potential impacts. Environmental risks include the potential for activities stemming from the PFP to adversely affect (1) the quality of the human environment (e.g., water quality, air quality, accidental or catastrophic oil spill events); (2) species and habitats, including those that are commercially, culturally, or recreationally valuable (e.g., commercial fisheries, coastal tourism, subsistence harvest); (3) species and habitats that are protected by Federal environmental laws and regulations; (4) cultural and archaeological resources; (5) access to subsistence resources; or (6) overall marine productivity that may affect or diminish ecosystem services (see Chapter 7). By discussing the impacts that affect both regional and national interests, Chapter 8 provides the Secretary with information on the sharing of developmental benefits and environmental risks. For example, new or expanded OCS oil and gas exploration and development in Alaska would result in increased job opportunities and higher wages for employees in Alaska and elsewhere; however, additional environmental risks would also occur in these areas due to expanded operations. Chapter 8 also includes a discussion on the developmental benefits and environmental risks that would be anticipated if the No Sale Option were chosen in any of the program areas.

C) Location with Respect to Regional and National Energy Markets and Needs

The analyses in Chapter 6 focus on recent developments in energy markets, including recent low oil and gas prices.¹¹ The analyses include the U.S. Department of Energy’s (DOE) projections of national and regional production and consumption according to the EIA’s *Annual Energy Outlook (AEO) 2016* (EIA 2016); the potential contribution of OCS oil and gas production in meeting the United States’ needs; regional energy markets and the location of OCS planning areas; and alternatives to OCS production.

The Final Programmatic EIS describes the socioeconomic environment (population, employment, income, and environmental justice) for each OCS region and nearby onshore areas, including the existing oil and natural gas infrastructure and its relationship to new leasing. Recent OCS oil and gas lease sale EISs and other NEPA documents also provide relevant information relating to regional distribution and processing of OCS oil and natural gas.

D) Location with Respect to Other Uses of the Sea and Seabed

Section 6.6 discusses competing uses of the OCS. This section includes information received from Federal, state, and local government agencies; environmental organizations; and regional fishery management bodies (see Appendix A); as well as information provided by BOEM’s Marine Minerals and Renewable Energy Programs. Section 6.6 contains references to additional information and analyses on other uses of the OCS that are presented in the Final Programmatic EIS.

E) Laws, Goals, and Policies of Affected States Identified by Governors

Section 9.2 includes summaries of the relevant laws, goals, and policies—including federally approved CZM programs and policies—that state governments identified when responding to BOEM’s request for comments. As required by Section 18(c)(1), BOEM sent letters to the Governors of all 50 states requesting their suggestions and asking them to identify any relevant state laws, goals, and policies for the Secretary’s consideration. Appendix A summarizes the comments received on the Proposed Program, including those from Governors and state government agencies.

F) Interest of Potential Oil and Gas Producers

Section 9.1 describes industry interest as indicated in response to the Proposed Program. Appendix A summarizes the comments received, including those from oil and natural gas companies and associations in the exploration and production sector of the energy industries

G) Relative Environmental Sensitivity and Marine Productivity

Chapter 7 contains an analysis of the environmental sensitivity and marine productivity for the Program Areas. “Sensitivity” is not a well-defined term in ecology or environmental science. In Chapter 7, as in previous Programs, BOEM defines the term “sensitivity” as sensitivity to potential impacts from oil and gas exploration and development as measured by indicators of vulnerability to impact.

¹¹ Section 1.2, Energy Needs, also addresses energy needs but with respect to the overriding purpose of the Five-Year Program “to best meet national energy needs” As noted above, the focus of Chapter 6 is on providing information to allow the Secretary to meet the requirements of Section 18(a)(2)(C).

An estimate of OCS marine productivity is also included in this analysis. Productivity is defined as the rate of biomass production per unit of time. In the marine environment, primary production conducted via photosynthesis determines the total amount of biomass available to higher trophic levels. However, the relationship between primary and secondary and/or higher production is not straightforward or uniform across marine ecosystems (Pomeroy 1991). Higher level productivity is difficult to estimate, especially across geographically large and ecologically diverse areas, such as the OCS (Balcom et al. 2011). Furthermore, measurements for the areas that remain in the Program were produced using satellite-based measurements of chlorophyll, available light, and photosynthetic efficiency (Balcom et al. 2011). These rates are on an areal basis so direct comparisons among program areas of different sizes can be made.

H) Environmental and Predictive Information

The 2017–2022 Programmatic EIS describes the environmental setting and potential impacts on environmental and socioeconomic resources, focusing on moderate to major impacts that could occur in each program area. Relevant environmental and predictive information is presented concerning potential environmental impacts from the Proposed Program lease sale schedule and Supplemental Options analyzed in the PFP (referred to in the Programmatic EIS as the Proposed Action) and alternatives.

Because it is a Programmatic EIS, the broadest and most extensive analysis of the program areas is discussed to support the balancing of OCS Lands Act considerations, including social, environmental, and economic concerns. The Programmatic EIS provides a broad overview of the types of relationships between resources and impact-producing factors that could result in impacts on those resources. Resources discussed in the Programmatic EIS include water quality, air quality, biological resources, the acoustic environment, and socioeconomic and sociocultural resources. Impact-producing factors analyzed in the Programmatic EIS include marine noise, oil spills, air emissions, construction and presence of oil and gas production structures, and others. The nature and severity of these impacts are discussed in the Programmatic EIS. The Final Programmatic EIS and appendices that have been made available to the Secretary to inform the PFP decision are available at www.boemoceaninfo.com.

The detailed environmental impact analyses contained in the Final Programmatic EIS have been conducted in accordance with NEPA, as well as the environmental portions of relevant Section 18 factors that are briefly discussed in this PFP decision document, including the following:

- Section 18(1), consideration of environmental values of renewable and non-renewable OCS resources and the impact of oil and gas exploration on other resource values of the OCS and the marine, coastal, and human environments
- Section 18(2)(A), existing information concerning the geographical, geological, and ecological characteristics of such regions
- Section 18(2)(H), relevant environmental and predictive information for different areas of the OCS

Therefore, the PFP decision document references the Final Programmatic EIS, as appropriate, so readers can easily find pertinent, detailed environmental information and impact analyses that address each of the environmentally relevant Section 18 factors.

Section 18 factors associated with environmental concerns that are addressed in detail in this PFP decision document include Section 18(2)(B), an equitable sharing of developmental benefits and environmental risks among the various regions (see the Programmatic EIS); and Section 18(2)(G), the relative environmental sensitivity and marine productivity of different areas of the OCS (Chapter 7). The Final Programmatic EIS and PFP decision document are published in conjunction and are part of the materials reviewed prior to any decision making. Therefore, the Final Programmatic EIS and PFP decision document together present a robust picture of the environmental, cultural, economic, and resource considerations necessary to aid the Secretary in balancing environmental concerns with energy needs, and to inform the decision on the proposed 2017–2022 lease sale schedule with regard to the size, timing, and location of leases.

2.3 SECTION 18(A)(3): BALANCING THE POTENTIAL FOR ENVIRONMENTAL DAMAGE, DISCOVERY OF OIL AND GAS, AND ADVERSE IMPACT ON THE COASTAL ZONE

Another of the Section 18(a) guiding principles is found in Section 18(a)(3), which requires the Secretary, when making decisions on the size, timing, and location of OCS leasing, to strike a balance among the potentials for environmental damage, the discovery of oil and gas, and adverse impacts on the coastal zone. The Secretary’s balancing effort must be informed by her analysis of the Section 18(a)(2) factors. Pursuant to the balancing requirement, Part II of this PFP decision document presents a comparative analysis of the PFP Options.

An element of the analysis is an estimation of societal net benefits for each program area, derived by calculating the value of production anticipated from the PFP Options minus the cost to industry and the environmental and social costs of developing those resources. The analysis also considers the impacts of the most likely energy substitutes that would exist in the absence of lease sales in any or all of the program areas. BOEM refers to the results of this analysis as the incremental net benefits (see Section 5.3, Net Benefits Analysis). See also the descriptions of the various types of “value” in Section 2.6, Section 18(a)(1): Economic, Social, and Environmental Values.

The comparative analysis also considers the program areas according to quantified information relating to environmental sensitivity and marine productivity (see Chapter 7) and relating to the interest of potential oil and natural gas producers (see Section 9.1, Industry Interest). Other Section 18(a)(2) factors, including geographical, geological, and ecological characteristics, and laws, goals, and policies of affected states, do not lend themselves to quantification and are, therefore, treated qualitatively. The comparative analysis also examines additional qualitative information pertaining to the findings and purposes of the OCS Lands Act, the comments and recommendations of interested and affected parties, and other information relevant to striking a proper balance under Section 18(a)(3).

The OCS Lands Act does not specify what the balance should be, or how the factors should be weighed, to achieve that balance, leaving it to the Secretary’s discretion to reach a reasonable determination under the existing circumstances.

2.4 SECTION 18(A)(4): ASSURANCE OF FAIR MARKET VALUE

Section 18(a)(4) of the OCS Lands Act requires receipt of FMV from OCS oil and gas leases. BOEM’s two-phase post-sale bid evaluation process, used since 1983, assures the FMV requirement is met for the issuance of individual leases. Historically, this process has considered geologic and auction market factors in phase one and economic factors in phase two. In addition to the assurance of FMV in the Five-Year Program development and implementation process, BOEM continues to assess market and resource conditions as each lease sale approaches, and designs the lease sale fiscal terms to achieve FMV. Additional information on, and analysis of, FMV is contained in Chapter 10, which also considers the uncertainties surrounding OCS oil and gas leasing, and how these uncertainties can impact the value of OCS acreage.

2.5 SECTION 18(A): ENERGY NEEDS

As stated in Section 18(a) of the OCS Lands Act, the purpose of the OCS oil and gas leasing program is to help meet the future energy needs of the United States. Section 1.2, Energy Needs, presents an analysis of anticipated energy needs from the perspective of meeting the goals of the OCS Lands Act, which recognizes the importance of oil and gas exploration, development, and production, not only to provide fuel to consumers of all types, but also to support job creation, improve the GDP, the national balance of trade, national energy security, and as an integral component to national economic and energy policies in general.¹²

2.6 SECTION 18(A)(1): ECONOMIC, SOCIAL, AND ENVIRONMENTAL VALUES

Section 18(a)(1) of the OCS Lands Act requires that the Secretary manage the OCS “in a manner which considers economic, social, and environmental values of the renewable and non-renewable resources contained in the outer Continental Shelf...” The PFP analyses presented in Part II of this document are conducted to ensure that economic, social, and environmental values associated with exploration, development, and production of OCS resources are incorporated as important aspects of the Program’s development. The OCS Lands Act also requires the Secretary to consider potential impacts that oil and gas activities could have on other resource values of the OCS and on the marine, coastal, and human environments. The purpose of the analyses performed for the PFP is to assist the Secretary with meeting these requirements (including the balancing requirement described in Section 2.3, Section 18(a)(3): Balancing the Potential for Environmental Damage, Discovery of Oil and Gas, and Adverse Impact on the Coastal Zone), in consideration with the other analyses.

The Programmatic EIS analysis is described in Section 2.2 under Section 18 factor H. The Final Programmatic EIS describes the environmental setting and potential impacts on environmental and socioeconomic resources from the Proposed Program schedule of lease sales and alternatives to that schedule.

¹² Chapter 6 addresses similar energy issues but focuses on information the Secretary must consider pursuant to Section 18(a)(2)(C), discussed in Section 2.2, Section 18(a): Factors for Determining Size, Timing, and Location of Leasing.

2.6.1 Economic Value

Economic value is realized from decades of oil and natural gas activity and production that result from leases awarded during the implementation of the Program. Several metrics are used to calculate economic value, such as net economic value (NEV) of the extracted oil and natural gas resources; employment, wages, and income from oil and natural gas activity;¹³ government receipts of cash bonuses, rentals, royalties, and taxes; and consumer surplus related to potentially lower domestic oil and natural gas prices resulting from OCS production. Economic values are discussed primarily in Net Benefits (Section 5.3), Equitable Sharing Considerations (Chapter 8), and Assurance of Fair Market Value (Chapter 10).

2.6.2 Social Value

Social value is realized when OCS resources are combined with inputs or processes to generate improvements in the lives of people or benefits to society. When OCS resources are used to maximize social value, the Program is being efficiently managed. Social value can be negatively impacted (a social welfare loss) when OCS resources are not developed in the interest of conservation¹⁴ or when Program activities result in adverse consequences to society, such as could occur from a significant increase in air pollution from offshore production or from a highly damaging event like a large offshore oil spill. At the same time, energy substitutes for forgone OCS oil and gas production can also cause social welfare losses, resulting from such things as spills of imported oil or air pollution from increased onshore production. Social values consist of both economic and environmental effects and values (including cultural and community values) and reflect the components of all the substantive requirements analyses prepared in support of this PFP. Social values are especially relevant in Part II, analysis of the PFP Options identified by the Secretary.

2.6.3 Environmental Value

Environmental value is the worth society places on the intrinsic natural capital in the OCS's renewable and non-renewable resources. Natural capital, the essential goods and services that nature provides, includes marine productivity, quality of aesthetic resources, human-ecological connectivity, and air and water quality. The analyses presented herein discuss environmental sensitivity and marine productivity (Chapter 7), and the important effect of relevant environmental impacts on environmental value (see the Programmatic EIS for additional analysis). Section 18(a)(2)(G) calls for the assessment of the relative environmental sensitivity and marine productivity of the OCS. BOEM sponsored the development of a new method for performing this assessment for the 2017–2022 Program, the results of which were first presented in the DPP document. See Section 2.2 (G) and Chapter 7 in this document for methodological explanations. Feedback from internal and external reviews of this new approach was incorporated into the analysis for this PFP.

¹³ Consistent with standard practices in cost-benefit analysis, the net benefits analysis in Chapter 5, Valuation of Program Areas, treats employment, wages, and income as costs necessary to obtain the oil and natural gas that provide economic value. However, in general, these results of OCS development are widely viewed as benefits to society, and they are treated in that context in Chapter 8.

¹⁴ In this context, conservation refers to the responsible development of oil and gas resources by preventing waste and maximizing recovery of economically producible reservoirs (MMS 2007).

2.7 JUDICIAL GUIDANCE

The 2017–2022 Program will be the ninth program prepared by the Department. Pursuant to Section 23(c)(1) of the OCS Lands Act, all challenges to the Program are heard in the U.S. Court of Appeals for the D.C. Circuit. The 1980–1985, 1982–1987, 1987–1992, 2007–2012, and 2012–2017 Programs prepared and approved under Section 18 were challenged in court. No lawsuits were filed with respect to the approved 1992–1997, 1997–2002, or 2002–2007 Programs.

The 2017–2022 Program is being prepared in accordance with guidance provided in those court decisions addressing past programs. A brief description of the findings of each decision and how they have guided preparation of the programs over time follows.

- *California v. Watt*, 688 F.2d 1290 (D.C. Cir. 1981) (*California I*)—In this case, the State of California challenged the 1980–1985 Program. This Program was the first that followed the passage of the OCS Lands Act Amendments of 1978, which added the Section 18 requirement for a leasing program. The court stated that the Secretary must consider all eight factors and not defer required factors to later stages because more information might be available. It accepted the use of a cost-benefit-type analysis and recognized that certain analyses could be qualitative. The court found that the three balancing factors in Section 18(a)(3) were not inherently equal and the Secretary had discretion in weighting them, as long as the decision was not arbitrary. The case was remanded to consider those of the eight factors not previously considered, better quantify environmental costs, and present a coherent explanation on how NEV is determined and the value of deferring leasing. However, as a new program for 1982–1987 was already in preparation, the 1980–1985 Program was not revised.
- *California v. Watt*, 712 F.2d 584 (D.C. Cir. 1983) (*California II*)—In this case, the court held that the 1982–1987 Program met the requirements found lacking in the 1980–1985 Program. The court upheld the methodology and assumptions used for the net social value (NSV) analysis. The court reiterated the “pyramidic” nature of the entire leasing process and upheld the first use of area-wide leasing because exact tracts (blocks) do not need to be identified at the Program stage. It found that receipt of FMV does not mean “maximization of revenues” and validated the post-sale bid evaluation methodology. The court also stated that once the determination has been made to not consider an area for leasing, that area does not need to be analyzed further.
- *Natural Resources Defense Council, et al. v. Hodel*, 865 F.2d 288 (D.C. Cir. 1988) (*NRDC*)—In this case, the court remanded the 1987–1992 Program for better NEPA coverage of cumulative impacts of simultaneous development in different planning areas. The court validated the use of administratively established planning areas as the basis for comparing “oil- and gas-bearing physiographic regions,” a term used, but not defined, in the OCS Lands Act. As in the previous cases, the court upheld the cost-benefit methodology and assumptions used.
- *Center for Biological Diversity, et al. v. Department of the Interior*, 563 F.3d 466 (D.C. Cir. 2009)—In this case, the court remanded the 2007–2012 Program for failure to consider the relative environmental sensitivity and marine productivity of “different areas of the outer Continental Shelf,” not just the shoreline, and required the Secretary to rebalance under Section 18(a)(3) using the revised analysis along with the other seven factors. The court also found that the OCS Lands Act does not require consideration of the impact of consuming OCS oil and gas and denied the NEPA claims presented in this case, holding the claims not ripe because an agency’s NEPA obligations mature only once it reaches a critical stage of a decision, which will result in irreversible and irretrievable commitments of resources to an action that will affect the

environment and, that in the case of the Five-Year Leasing Program, the point of irreversible and irretrievable commitment of resources and the concomitant obligation to fully comply with NEPA do not mature until leases are issued.

- *Center for Sustainable Economy (CSE) v. Jewell*, 779 F.3d 588 (D.C. Cir. 2015)—The court found that CSE’s NEPA challenges were unripe, because the Department makes no irreversible commitment of resources at the Five-Year Program stage, and upheld the Department’s chosen methods of cost-benefit analysis as reasonable and consistent with the statute.

Chapter 3 Outreach and Coordination

Outreach and coordination between BOEM; other Federal agencies; state, local, and tribal governments; non-governmental organizations; and the public is a crucial part of the program development process. BOEM's outreach and consultation efforts strive to encourage open and continued communication between and among these groups to share ideas and concerns, and to ensure that accurate and timely information is exchanged.

3.1 PROGRAM OUTREACH AND COORDINATION

Section 18 of the OCS Lands Act specifies a multi-step process of consultation and analysis that must be completed before the Secretary may approve a new Five-Year Program. This process requires the Secretary to consider, among other factors, comments and concerns of local governments and tribes, public input, and competing uses of the OCS. Additionally, the OCS Lands Act requires the consideration of the laws, goals, and policies of affected states that have been specifically identified in comments received from Governors, and the interest of potential oil and gas producers in the development of oil and gas resources as indicated by exploration or nomination (i.e., industry interest). Laws, goals, and policies of affected states that were identified by Governors' comments are discussed in Section 9.2 and industry interest is discussed in Section 9.1.

The program development process requires multiple opportunities for stakeholders and the general public to provide comments, with three comment opportunities under the OCS Lands Act process and two under the NEPA process.

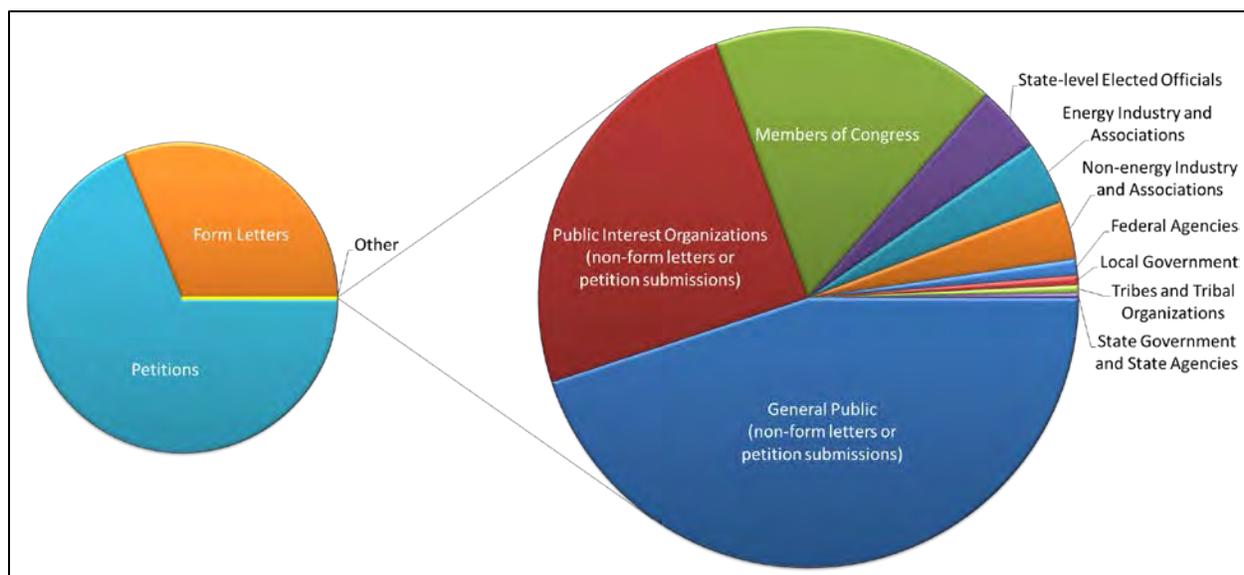
3.1.1 Request for Information and Comments

On June 16, 2014, BOEM published in the *Federal Register* a Request for Information and Comments (RFI), which is the first step in the preparation of a new OCS Oil and Gas Leasing Program (79 FR 34349). BOEM also sent letters to all Governors and potentially interested Federal agencies requesting their input. The initial comment deadline of July 31, 2014, was extended to August 15, 2014, after BOEM received requests from several states for additional time to respond (79 FR 44861). BOEM received a total of 500,130 comments in response to the RFI (see Appendix A of the 2017–2022 DPP for a summary of comments received on the RFI).

The 2017–2022 DPP was published on January 29, 2015, initiating a 60-day public comment period that ended on March 30, 2015 (80 FR 4941). The scoping comment period for the Programmatic EIS was concurrent with the DPP public comment period. Approximately 2,619 letters and 26 form letters were received during the scoping comment period for the Programmatic EIS. Additionally, BOEM received approximately 1,083,500 public comments from various stakeholders and partners on the DPP, including 35 different form letters and at least 250 unique letters. Of the comments received on the DPP, slightly more than half stated support for Atlantic area leasing, and slightly less than half stated opposition to Arctic, Atlantic, and/or Pacific area leasing (see Appendix A of the 2017–2022 Proposed Program for a summary of the comments received on the DPP).

The 2017–2022 Proposed Program was on March 18, 2016, initiating a 90-day public comment period that ended June 16, 2016 (81 FR 14881). The public comment period for the Programmatic EIS also began on March 18, 2016, with a 45-day comment period ending on May 2, 2016. Approximately 75,000 letters were received during the public comment period for the Programmatic EIS. Additionally, BOEM received approximately 1.83 million public comments from various stakeholders and partners on the Proposed Program, including 19 different form letter campaigns, 23 petitions, and approximately 700 unique letters. See Figure 3-1: Proposed Program Comment Letters by Commenter Category for a breakdown of comment letters received by commenter category. Approximately 500,000 commenters support new oil and gas leases in the GOM and Alaska Program Areas. Approximately 700,000 oppose all new oil and gas leasing; an additional 500,000 commenters specified that they oppose new leasing in the Alaska Program Areas, but did not mention the GOM Program Area. Approximately 50,000 commenters specified that they oppose new leasing in the GOM, but did not mention the Alaska program areas. Appendix A provides an overview of comments and summaries of comments received on the Proposed Program.

Figure 3-1: Proposed Program Comment Letters by Commenter Category



3.1.2 Public Meetings for the Programmatic EIS

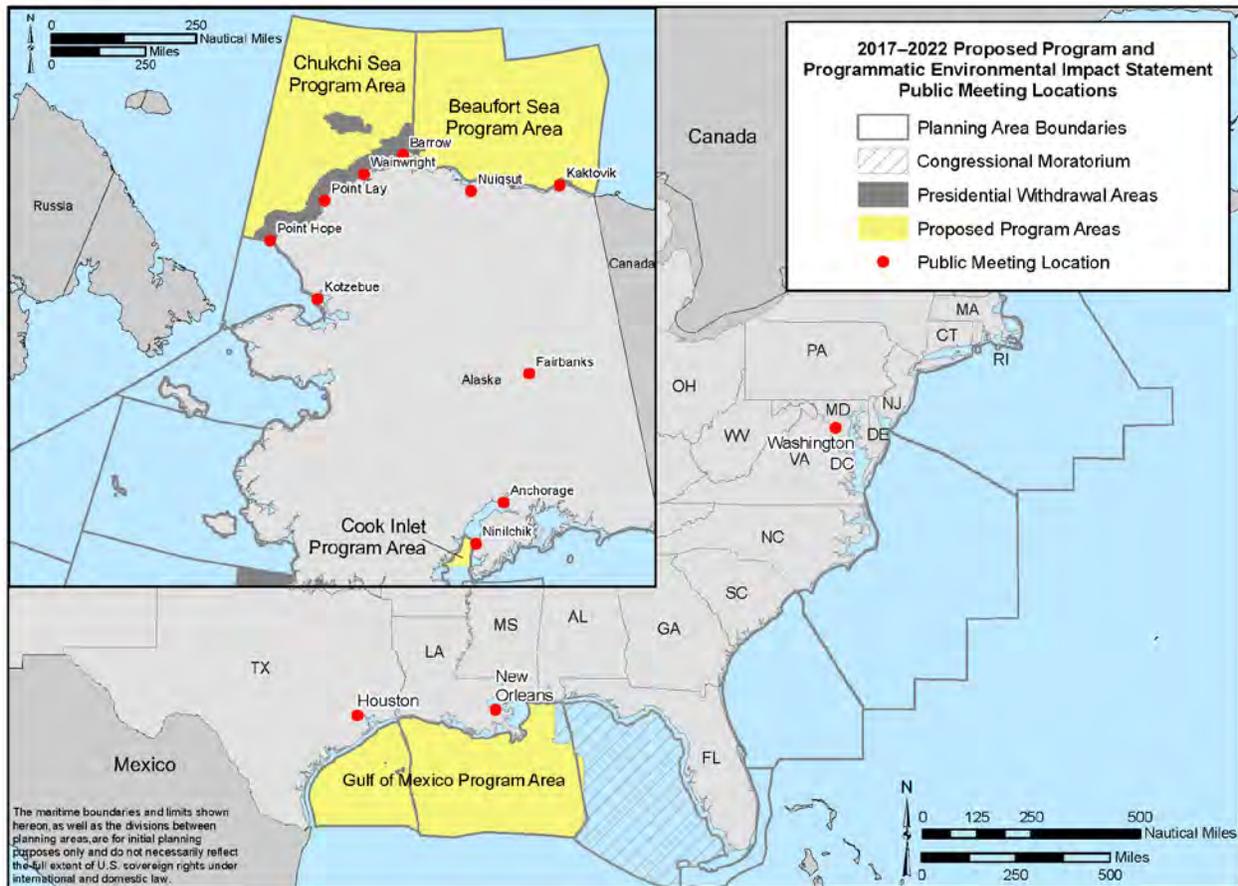
In addition to the procedural requirements under Section 18, the NEPA process requires public input at the scoping stage of Programmatic EIS development and after the publication of the Draft Programmatic EIS. BOEM collected comments relevant to the Draft Programmatic EIS and program development at 13 public meetings (see Table 3-1: Public Meetings for the 2017–2022 Draft Programmatic EIS and Figure 3-2: Locations of Draft Programmatic EIS Public Meetings), from the Federal commenting website www.regulations.gov (docket numbers BOEM-2016-0003 and BOEM-2016-0002), and through the U.S. mail. The public meetings were jointly attended by both BOEM Program and NEPA staff, who facilitated discussions with the public on both planning processes. The Programmatic EIS also includes a robust public comment process, including a responsibility to respond to substantive comments on the Draft Programmatic EIS within the Final Programmatic EIS.

Table 3-1: Public Meetings for the 2017–2022 Draft Programmatic EIS

Location	Date	Approximate Number of Attendees
Kaktovik, AK	March 29, 2016	25
Barrow, AK	March 30, 2016	23
Nuiqsut, AK	March 30, 2016	15
Point Lay, AK	March 31, 2016	48
Wainwright, AK	March 31, 2016	30
Point Hope, AK	March 31, 2016	21
Kotzebue, AK	April 1, 2016	5
Fairbanks, AK	April 4, 2016	83
Anchorage, AK	April 5, 2016	120
Ninilchik, AK	April 6, 2016	5
New Orleans, LA	April 18, 2016	105
Houston, TX	April 20, 2016	114
Washington, DC	April 26, 2016	144
Total Attendees		738

Key: AK = Alaska; DC = District of Columbia; LA = Louisiana; TX = Texas

Figure 3-2: Locations of Draft Programmatic EIS Public Meetings



Chapter 4 Background, Leasing History, and Status of OCS Program Areas

This chapter contains the background and history of the program areas, and discusses the PFP Options deemed suitable for further analysis for potential oil and gas leasing with respect to size, timing, and location by the Secretary in the Proposed Program decision, as well as ten supplemental Program Options. Supplemental program options are options that differ from the Secretary’s Proposed Program phase decision options or the no sale option within each program area. The Secretary may choose any of the options or any practical combination of options to become the PFP decision. The PFP analyses are based on the schedule of 13 potential lease sales in four program areas as described in the Proposed Program decision. In the Proposed Program, ten region-wide sales were proposed in the GOM Program Area; and one sale each in the Chukchi Sea, Beaufort Sea, and Cook Inlet program areas offshore Alaska. Ten supplemental Program Options, two in the GOM and eight offshore Alaska, are also analyzed in this document. All of the PFP Options are described in detail below. The Atlantic lease sale proposed in the 2017–2022 DPP decision was removed from the lease sale schedule in the 2017–2022 Proposed Program decision. No lease sales have been proposed for the Pacific region in the 2017–2022 Program development process.

All PFP Options are analyzed in the Final Programmatic EIS. Under the Council on Environmental Quality’s NEPA implementing regulations, a reasonable range of alternatives must be analyzed. Consistent with the NEPA process and its requirements, the Final Programmatic EIS analyzes additional alternatives that are addressed as supplemental program options throughout this document. These additional Final Programmatic EIS alternatives, which include protections for what are called “Environmentally Important Areas,” are analyzed as supplemental options in this PFP document in a qualitative manner, under Section 18, to provide the Secretary with information, along with the information presented in the Final Programmatic EIS, to inform decisions concerning these Environmentally Important Areas.

4.1 PROGRAM AREAS HISTORY

Existing Federal leases are present only in the Beaufort Sea and Chukchi Sea Planning Areas; the only Federal production is occurring in a joint Federal/state unit in the Beaufort Sea Planning Area. Outside of the Beaufort Sea and Cook Inlet, there is little, if any, existing oil and gas infrastructure and activity offshore in Alaska. All Alaska areas are considered to be frontier areas due to the low level of Federal oil and gas production. Three Alaska program areas (Beaufort Sea, Chukchi Sea, and Cook Inlet) are analyzed in this PFP document.

4.1.1 Beaufort Sea

Ten lease sales have been held in this planning area since 1979. BOEM published a Call for Information and Nominations in July 2014, but only received one nomination, thereby raising concerns about the

competitiveness of any such lease sale at that time. On October 16, 2015, the Secretary cancelled Lease Sale 242 in the Beaufort Sea due to lack of industry interest and then-existing market conditions.

The Barrow and Kaktovik whaling areas were withdrawn from leasing consideration for an indefinite period by the President under Section 12 of the OCS Lands Act on January 27, 2015. Exclusions from leasing consideration have long existed around Barrow and Kaktovik at the request of stakeholders, including the North Slope Borough and the Native Village of Kaktovik, respectively.

As of November 1, 2016, there were 42 existing OCS leases in this planning area, most of which expire in 2017. Thirty-four exploratory wells have been drilled. The most recently drilled well (2012) was plugged and abandoned without being drilled to total depth. BOEM currently is reviewing a development and production plan to build a gravel island to drill wells for producing from a discovery in this planning area. There is production from a joint Federal/state unit. The State of Alaska holds area-wide sales in the adjacent state waters annually in the fall, and there is active production from state acreage adjacent to existing OCS leases.

The State of Alaska and others, in public comments on the RFI, DPP, and Proposed Program, have prioritized ensuring adequate oil production to extend the operation of the Trans-Alaska Pipeline System (TAPS). TAPS is currently operating at approximately one-quarter of its capacity and requires new discoveries to continue operations. Both the Beaufort Sea and the Chukchi Sea OCS areas have the potential for oil discoveries that could help extend the viability of TAPS.

4.1.2 Chukchi Sea

Three lease sales have been held in this area since 1988. Five exploratory wells were drilled prior to 1992 on leases issued in earlier sales; all have been plugged and abandoned. An uneconomic gas discovery was made in 1990 in the Burger prospect and the well was plugged and abandoned. One exploration well was drilled in 2012, but was also plugged and abandoned without being drilled to total depth. In 2015, one exploration well was drilled to total depth and has been plugged and abandoned. Lease Sale 193, the most recent in this area, was held in February 2008, and was the largest sale in the history of Alaska OCS leasing, generating more than \$2.6 billion in revenues. As of November 1, 2016, there is one existing lease. The majority of the leases issued in Sale 193 were relinquished in the past couple of years. These leases were scheduled to expire by the end of 2020. The Chukchi Sea Planning Area has significant estimated hydrocarbon resource potential in Alaska.

On September 28, 2015, Shell announced that although indications of oil and gas were found in the one well drilled during the open-water season in 2015, they were not sufficient to warrant further exploration in that prospect. The company also stated it would not operate in the Arctic for the foreseeable future (Shell Global 2015). In addition, Statoil announced on November 17, 2015, that it would not be conducting operations for exploration and development of oil and gas resources in the Chukchi Sea, stating that the leases in this area were no longer competitive when compared to the company's other global mineral holdings (E&E News 2015).

In September 2013, BOEM issued a Call for Information and Nominations for Lease Sale 237, which was scheduled for 2016 in the current 2012–2017 Program, but no specific nominations were submitted by industry. On October 16, 2015, the Secretary cancelled Lease Sale 237 due to lack of industry interest

and then-current market conditions. On January 27, 2015, President Obama, pursuant to Section 12 of the OCS Lands Act, withdrew a 25-mile coastal buffer, a subsistence use area, and the Hanna Shoal region lying within the contours of the 40-meter isobaths of the Chukchi Sea Planning Area from oil and gas leasing for an indefinite period.

4.1.3 Cook Inlet

There have been five lease sales in this area since 1977. The most recent sale was held in 2004, with no bids received. Fourteen exploratory wells have been drilled, with no commercial discoveries. There are no existing OCS leases in this area. Lease Sale 244 is scheduled in the current 2012–2017 Program and BOEM has begun the pre-lease sale process to hold the sale in 2017. Information gathered, analyses conducted, and decisions made for this sale pursuant to the pre-lease sale and NEPA processes can be expected to provide input for the next steps in preparation of this Program and any potential sale in the Cook Inlet Program Area.

The upper Cook Inlet is a mature basin in which extensive exploration and development in state waters has occurred during the past 40 years. The State of Alaska schedules annual area-wide sales in state waters, the most recent of which was held in May 2015. In May 2016, due to **no stated interest from oil companies, the State of Alaska canceled its 2016 lease sale bid opening in Cook Inlet.** Annual production from non-OCS leased acreage during fiscal year (FY) 2014 totaled approximately 5.9 million barrels of oil (bbl) and 95 billion cubic feet of natural gas. Existing infrastructure in the upper portion of Cook Inlet includes 17 offshore platforms in state waters, associated oil and gas pipelines, and onshore processing and support facilities. See the Programmatic EIS for more information on potential impacts to land use and infrastructure.

4.1.4 Alaska Region Proposed Final Program Options

In the Beaufort Sea Program Area, the following program options are analyzed: (1) Targeted Leasing Option; (2) Advancing the Beaufort Sea Lease Sale to 2019; (3) Barrow Canyon Exclusion Option; (4) Camden Bay Exclusion Option; (5) Cross Island Exclusion Option; (6) Kaktovik Exclusion Option; and (7) No Sale Option. The Beaufort Sea Program Area Options are depicted in Figure 4-1.

In the Chukchi Sea Program Area, the following program options are analyzed: (1) Targeted Leasing Option; (2) Hanna Shoal Walrus Foraging Area Exclusion Option; (3) Hanna Shoal Movement Corridor Exclusion Option; and (4) No Sale Option. The Chukchi Sea Program Area Options are depicted in Figure 4-2.

In the Cook Inlet Program Area, the following program options are analyzed: (1) Targeted Leasing Option; (2) Cook Inlet Beluga Whale Critical Habitat Exclusion Option; and (3) No Sale Option. The Cook Inlet Program Area Options are depicted in Figure 4-3.

Figure 4-1: 2017–2022 PFP Options for the Beaufort Sea Program Area

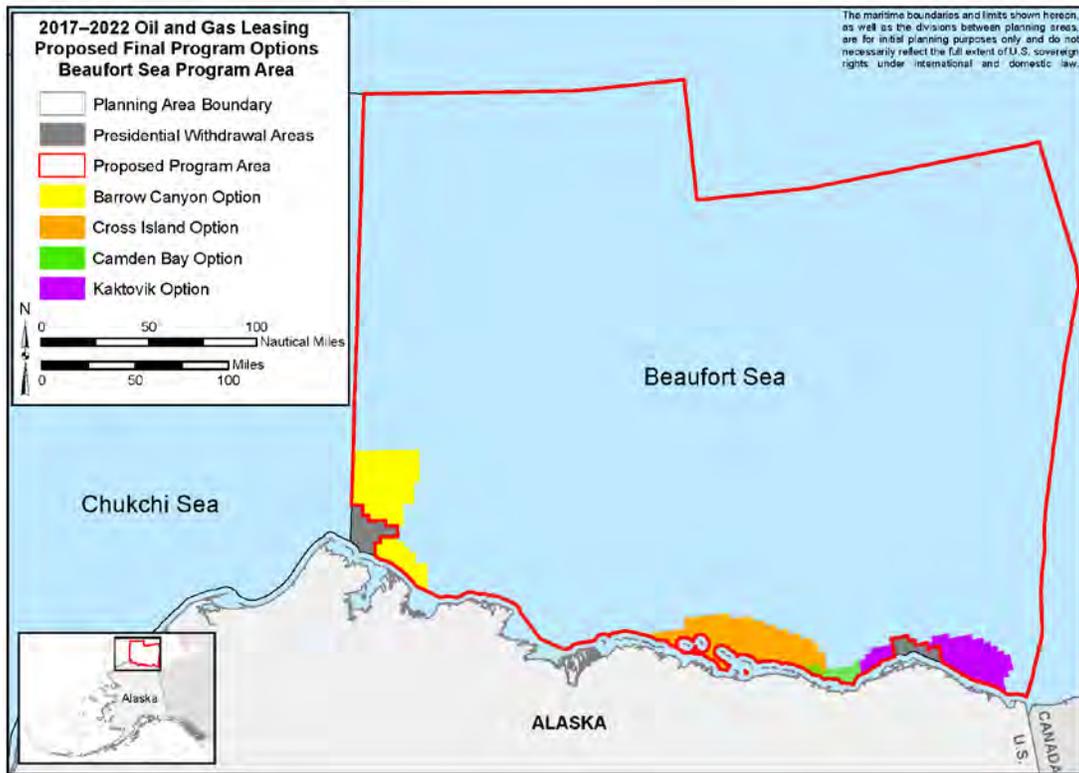


Figure 4-2: 2017–2022 PFP Options for the Chukchi Sea Program Area

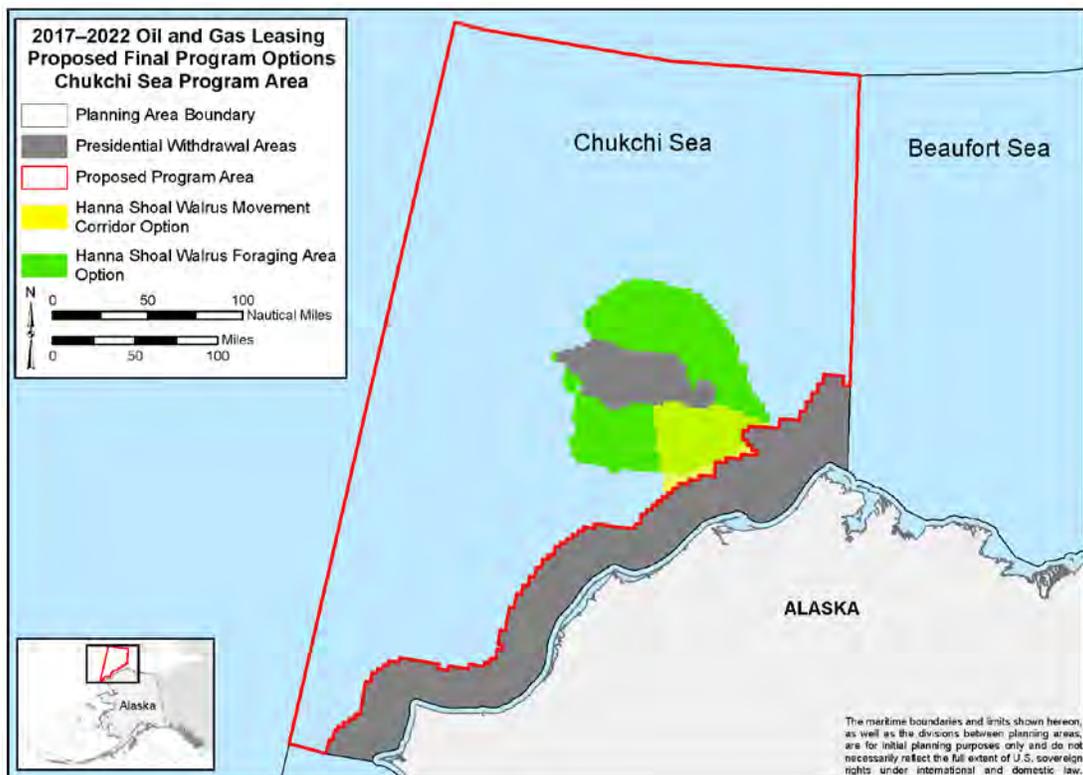
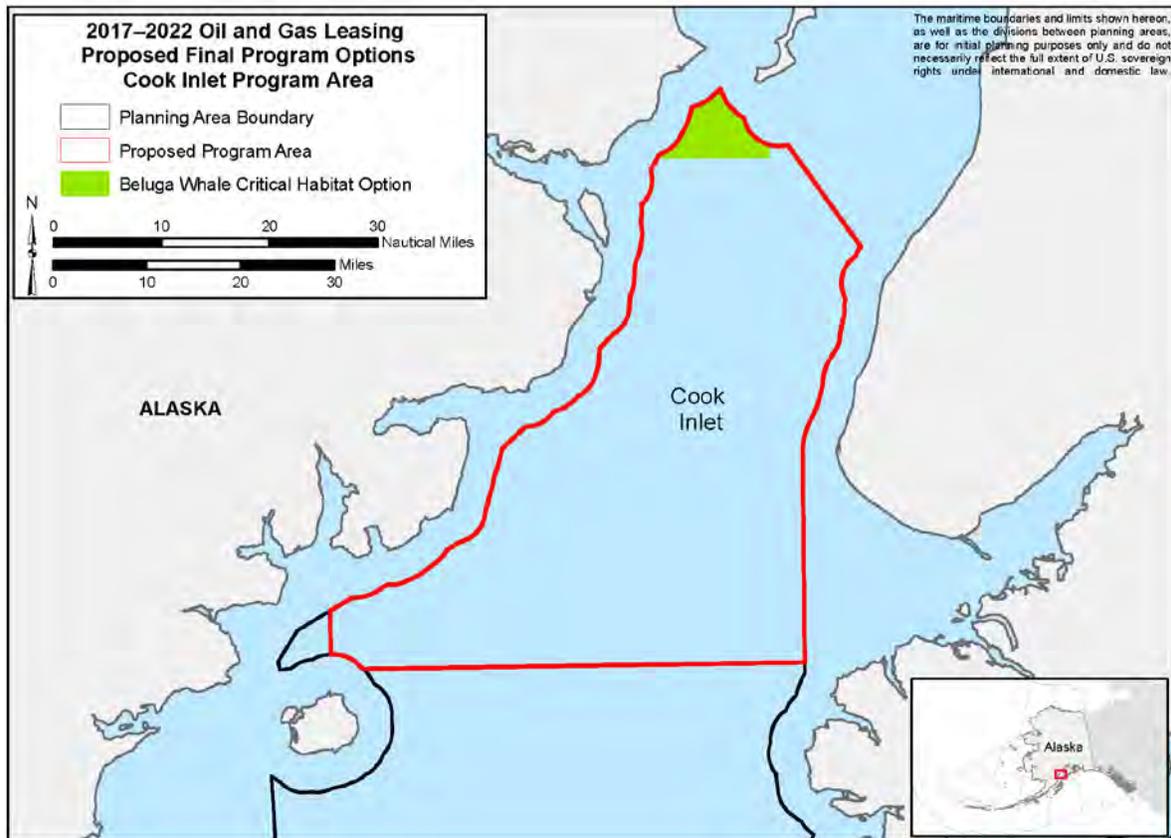


Figure 4-3: 2017–2022 PFP Options for the Cook Inlet Program Area



4.1.4.1 Targeted Leasing Option

This Proposed Program Option continues the targeted leasing strategy set forth in the 2012–2017 Program by identifying one potential sale each in the Beaufort Sea (2020), Cook Inlet (2021), and Chukchi Sea (2022) Program Areas. In the Targeted Leasing Option, the potential sales in the three Alaska Program Areas are scheduled to be late in the five-year period to provide additional opportunity to obtain and evaluate additional information regarding environmental issues, subsistence use needs, infrastructure capabilities, and results from any exploration activity associated with existing leases.

As developed for the 2012–2017 Program, BOEM will continue to use scientific information and stakeholder and partner feedback to proactively determine, in advance of any potential lease sale, which specific areas offer the greatest resource potential while minimizing potential conflicts associated with the environment, subsistence activities, and other uses of the OCS. Therefore, lease sales will be tailored to offer areas that have significant resource potential while appropriately weighing environmental protection, subsistence use needs, and other considerations.

This PFP presents the analysis for a potential Beaufort Sea Lease Sale 255 in 2020, a potential Chukchi Sea Lease Sale 262 in 2022, and a potential Cook Inlet Lease Sale 258 in 2021, all in areas not under Presidential Withdrawal or otherwise restricted from leasing (see Figures 4-1, 4-2, and 4-3).

4.1.4.2 *Advancing the Beaufort Sea Lease Sale to 2019 Option*

This PFP presents a supplemental Program Option to move the potential Beaufort Sea Lease Sale 255 from 2020 to 2019. In a comment letter in response to the DPP, the Governor of Alaska requested that the Beaufort Sea lease sale be moved earlier in the Program to 2018; however, that timeframe would not allow BOEM to complete the lease sale process. The lease sale process could be completed for a lease sale in 2019, so BOEM included a lease sale in this timeframe as a PFP Option for analysis.

4.1.4.3 *Environmentally Important Areas Exclusion Options*

Seven of the eight supplemental Program Options analyzed in this PFP decision document are analyzed in the Programmatic EIS as Alternative B (Exclusion of or Programmatic Mitigation in Environmentally Important Areas), which analyzes reductions in available leasing acreage through the exclusion of, or adoption of, mitigation to minimize impacts within specified Environmentally Important Areas within the Beaufort Sea, Chukchi Sea, and Cook Inlet Program Areas. These areas were chosen through a process of stakeholder engagement and are based on rich scientific evidence. See the Programmatic EIS for more information on how BOEM developed and categorized these Environmentally Important Areas as well as BOEM's environmental analysis of these areas under Alternative B.

The Programmatic EIS provides information on the geographical, geological, and ecological characteristics of the Environmentally Important Areas. Table 4-1: Description of Environmentally Important Areas Analyzed in the Programmatic EIS summarizes the defining environmental characteristics of each of the Environmentally Important Areas. Background information on geologic plays and hydrocarbon resources, as well as a brief description of the acreage overlap of the Environmentally Important Areas with potential hydrocarbon resources (geologic plays), is presented in Chapter 5, Valuation of Program Areas, of this PFP decision document. Qualitative analyses of the Environmentally Important Areas with respect to the Section 18 factors are presented, as appropriate, throughout this decision document.

4.1.4.1 *No Sale Option*

This PFP decision document presents the analysis for no sale being held in any of the Alaska Region Program Areas during 2017–2022.

4.2 **GULF OF MEXICO PROGRAM AREA HISTORY**

The GOM Region is comprised of the Western, Central, and Eastern GOM Planning Areas. The Western and Central GOM Planning Areas are the most mature and active of all 26 OCS planning areas. The GOM's Western and Central GOM Planning Areas, consisting of the OCS offshore Alabama, Mississippi, Louisiana, and Texas, remain the primary offshore source of oil and gas for the United States, generating about 97 percent of all OCS oil and gas production. The majority of the Eastern GOM Planning Area and a small portion of the Central GOM Planning Area are not available for leasing consideration during the time period of this Program pursuant to the Gulf of Mexico Energy Security Act (GOMESA). There are existing leases in the portion of the Eastern GOM that is not available for leasing consideration that predate the GOMESA restriction.

Table 4-1: Description of Environmentally Important Areas Analyzed in the Programmatic EIS

Environmentally Important Area	Description
Beaufort Sea Program Area	
Barrow Canyon	This is an important migration and foraging area for beluga, bowhead whales, gray whales, and seabirds. This Environmentally Important Area includes the core area of the Barrow Canyon complex, which has high benthic biomass and high biological productivity. The canyon area is in the vicinity of the North Slope Borough, is at the nexus of the Chukchi and Beaufort seas, and is an important area for subsistence hunting.
Cross Island	This is an important and historically significant subsistence hunting area. The larger Cross Island area is important to the bowhead whale migration, beluga whales, pinnipeds, and as a feeding and denning area for polar bears. This area was highlighted by several stakeholders during scoping; stakeholders provided testimony, data, and studies to demonstrate its ecological and cultural importance.
Camden Bay	Several stakeholders provided data and studies supporting the importance of this Environmentally Important Area for ecological and subsistence purposes. The Camden Bay area is important to bowhead, beluga, and seal feeding, and is also an important bowhead whale subsistence hunting area in the fall.
Kaktovik	This area is subject to subsistence use around the existing Presidential withdrawal and was also highlighted during public scoping as important ecologically and for subsistence use with data and studies supporting both aspects. This area is important to feeding bowhead and beluga whales (especially in the fall), seabirds, pinnipeds, and feeding and denning polar bears.
Chukchi Sea Program Area	
Hanna Shoal Walrus Foraging Area and Movement Corridor	This area surrounds the current Hanna Shoal Presidential withdrawal and includes a corridor from Hanna Shoal to the existing Chukchi Corridor Presidential withdrawal. These areas include important habitat for the Pacific walrus, including areas of high benthic biomass within shallow waters where sea ice persists into the summer, providing habitat for foraging walrus.
Cook Inlet Program Area	
Beluga Whale Critical Habitat	This is critical habitat for the Cook Inlet Distinct Population Segment (DPS) of beluga whales and is federally designated under the Endangered Species Act (ESA). The Cook Inlet beluga DPS, which is listed as endangered under the ESA, has declined by approximately 74 percent since 1979 and numbers in the vicinity of 300 animals.

The geology of the GOM basin and the complexity and abundance of its salt structures provides the setting that makes the GOM one of the richest oil and natural gas regions in the world. The greatest undiscovered resource potential in the U.S. OCS is forecast to exist in the deep and ultra-deep waters of the GOM.

There have been more than 100 lease sales since 1953 in the GOM Region. There is production from leases in the Western and Central GOM Planning Areas, but as of November 1, 2016, no production has occurred from leases in the entire Eastern GOM Planning Area. See Chapter 5 for a display of geologic play maps and discussion of anticipated production by program area.

Internationally, the U.S.-Mexico Transboundary Hydrocarbons Agreement signed in December 2013, establishes a framework for U.S. offshore oil and gas companies and Mexico's Petroleos Mexicanos to jointly develop transboundary reservoirs. Mexico made constitutional amendments in December 2013, followed by secondary legislation in August 2014, which opened oil and natural gas markets to foreign investments, including from entities that are active in the GOM. The first leases in the area covered by the Agreement were issued from Western GOM Lease Sale 238, held in August 2014. The opening of Mexican waters could provide for long-term expansion of U.S.-Mexico energy trade and opportunities for U.S. companies, but also could result in a short- or longer-term shift in investment focus to the Mexican waters from the U.S. OCS.

In addition, the National Oceanic and Atmospheric Administration (NOAA) has proposed expansion of the Flower Garden Banks Marine Sanctuary in the GOM. Expansion of the sanctuary could affect acreage offered in or terms of subsequent lease sales. NOAA's Draft EIS analyzed five alternative levels of expansion from no expansion to affecting as many as 256 lease blocks, of which 119 are currently leased.

4.2.1 Western Gulf of Mexico

As of November 1, 2016, there are approximately 574 existing leases in the Western GOM. More than 7,800 wells have been drilled. The most recent lease sale, Sale 248, was held on August 24, 2016, and resulted in 24 leases being awarded with bonuses totaling approximately \$18 million. The State of Texas administers a robust oil and gas program in state waters adjacent to this area.

4.2.2 Central Gulf of Mexico

As of November 1, 2016, there are approximately 2,736 existing leases in the Central GOM. More than 43,400 wells have been drilled. The most recent sale, Sale 241, was held on March 23, 2016, and resulted in 121 leases being awarded, with bonuses totaling more than \$151 million. One lease sale remains on the current 2012-2017 Program schedule in 2017 (Sale 247). The States of Louisiana and Alabama administer robust oil and gas programs in state waters adjacent to this area. There are no leases in Mississippi state waters.

4.2.3 Eastern Gulf of Mexico

As of November 1, 2016, there are 37 existing leases in this area. Fourteen lease sales have been held in this planning area as it has been configured over the years and 105 wells drilled, with significant discoveries of natural gas. However, there has been no production from the wells in the entire planning area. The majority of this planning area is unavailable for leasing consideration through June 30, 2022, under GOMESA's Congressional moratorium. Sale 224 in March 2008 resulted in leases being awarded on 36 OCS blocks with bonuses totaling \$64.7 million in the small area available for leasing consideration. The most recent lease sale, held in the same small area, was Sale 226 on March 23, 2016, and no bids were received.

4.2.4 Gulf of Mexico Region Proposed Program Options

PFP Options analyzed in both this PFP decision document and the Programmatic EIS for the GOM include: (1) the Region-wide Leasing Option; (2) the Modified Traditional Leasing Option; (3) the

Baldwin County Buffer Option¹⁵; and (4) the No Sale Option. The GOM PFP Program Options are shown in Figure 4-4: 2017–2022 PFP Options for the GOM Program Area.

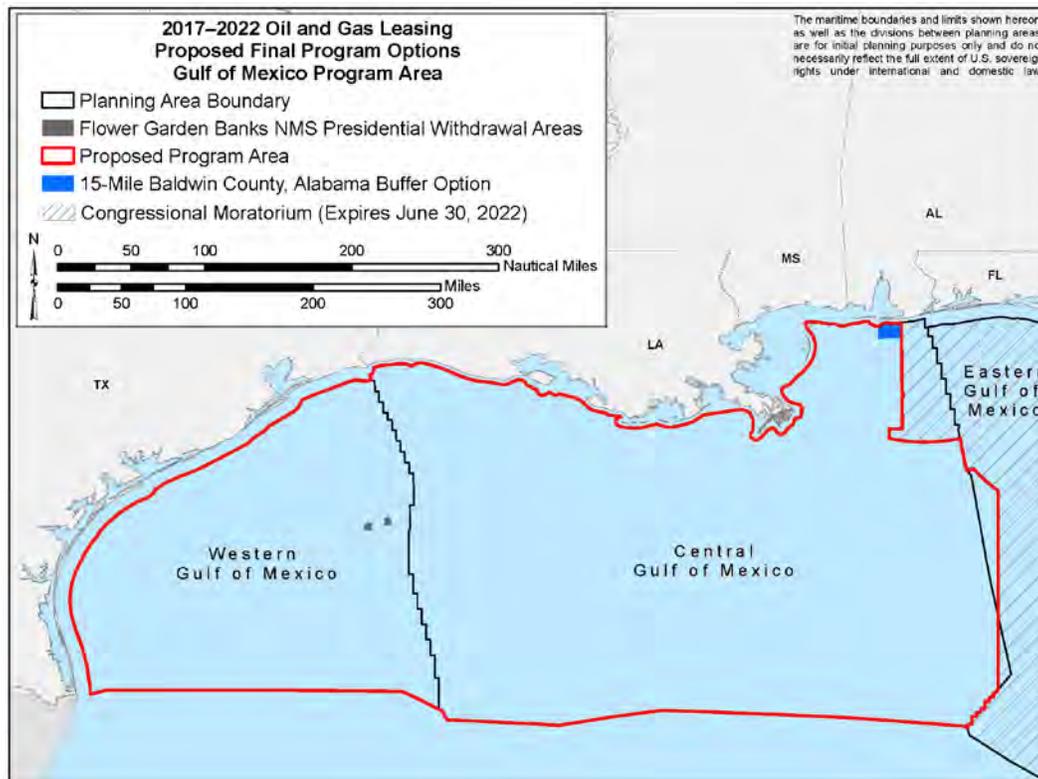
4.2.4.1 Region-Wide Leasing Option

This PFP decision document presents the analysis for a lease sale schedule that consists of 10 region-wide sales in the GOM: one sale each in 2017 and 2022, and two sales each in 2018, 2019, 2020, and 2021. Under this PFP Option, the entire GOM Region that is unleased and not under moratoria or otherwise excluded from leasing would be offered for each sale.

Traditionally, BOEM has scheduled separate, generally alternating, annual sales in the Western and Central GOM Planning Areas and periodic sales in the portion of the Eastern GOM not under moratoria. The Proposed Program decision schedules region-wide sales comprised of the Western, Central, and Eastern GOM unleased acreage not subject to moratoria.

BOEM is proposing this change to provide greater flexibility to industry, including the ability to respond to the significant recent energy reforms in Mexico that have the potential to meaningfully change how exploration and development decisions are made in the GOM. Given that lease sales cannot be added to an approved Program, consideration should be given to providing flexibility at the Five-Year Program stage to respond to emerging activities offshore Mexico.

Figure 4-4: 2017–2022 PFP Options for the GOM Program Area



¹⁵ An analysis of the Baldwin County Buffer Program Option is included in this PFP decision document but is not analyzed as a separate NEPA alternative in the Programmatic EIS because it would not analytically differ from the Proposed Action.

In scheduling lease sales by offering the entire available GOM acreage, BOEM is providing more frequent opportunities to bid on rejected, relinquished, or expired OCS lease blocks, as well as facilitating better planning to explore resources that may straddle the U.S.-Mexico boundary. Furthermore, 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. Additional advantages of implementing this PFP Option would be the potential to prepare one multi-sale EIS with supplemental EISs for each lease sale and perform combined Endangered Species Act (ESA) consultation (e.g., one biological opinion), which could result in cost savings and a shorter timeline to complete the processes.

4.2.4.1 *Modified Traditional Leasing Option*

In addition, this PFP decision document presents the analysis for an approach in the GOM similar to the 2012–2017 Program. This analysis is based on holding 10 separate, alternating, annual sales in the Western and combined Central and Eastern GOM Planning Areas not under moratorium. Any individual sale could be scaled back during the lease sale process to conform more closely to the traditional separate planning area model should circumstances warrant. Further, the analyses for the PFP considers, as an option, the traditional, separate planning area model, which includes five sales in the Western GOM and five in the combined Central/Eastern GOM not subject to moratoria or otherwise unavailable. The lease sale schedule analyzed for this supplemental Program Option is shown in Table 4-2: Proposed Lease Sales by Year for the Modified Traditional Leasing Option.

Table 4-2: Proposed Lease Sales by Year for the Modified Traditional Leasing Option

Year	GOM Planning Area
2017	Western GOM
2018	Central and Eastern GOM
2018	Western GOM
2019	Central and Eastern GOM
2019	Western GOM
2020	Central and Eastern GOM
2020	Western GOM
2021	Central and Eastern GOM
2021	Western GOM
2022	Central and Eastern GOM

4.2.4.2 *Baldwin County Buffer Option*

This PFP decision document presents the analysis for a 15-mile, no-leasing buffer offshore Baldwin County, Alabama (herein referred to as the Baldwin County Buffer Option), as requested in earlier comments from the Governor of Alabama both individually and as a member of the OCS Governors Coalition. This PFP Option could be combined with the Region-wide Leasing Option or the Modified Traditional Leasing Option (See Figure 4-4).

4.2.4.3 *No Sale Option*

Under the No Sale Option, no oil and gas lease sales would be held for the GOM Region in 2017–2022.

4.3 SUMMARY OF PROPOSED FINAL PROGRAM OPTIONS ANALYZED

Table 4-3: 2017–2022 Proposed Program Lease Sale Schedule reflects the lease sale schedule selected by the Secretary in the 2017–2022 Proposed Program decision. The selection resulted in a schedule of 13 potential lease sales: 10 lease sales in the GOM; and one lease sale each in the Beaufort Sea, Chukchi Sea, and Cook Inlet Program Areas, offshore Alaska. The Atlantic lease sale proposed in the 2017–2022 DPP decision was removed from the lease sale schedule by the Secretary in the 2017–2022 Proposed Program decision. No lease sales are proposed for the Pacific.

In the GOM, which is known to contain significant oil and gas resources and already has well-developed infrastructure, the proposed schedule is designed to make substantial areas available for exploration and development. Offshore Alaska, the proposed schedule takes a more cautious approach, scheduling lease sales later in the Program to allow time to conduct additional research and data collection regarding the resource values and reflecting that necessary infrastructure needs to be developed.

In addition to the lease sale schedule contained in the Proposed Program decision, ten supplemental Program Options are analyzed in this PFP document (see Table 4-4). Collectively, the Program Options presented in the Proposed Program decision, and the supplemental Program Options, are referred to in this document as PFP Options.

Table 4-3: 2017–2022 Proposed Program Lease Sale Schedule

	Year	Program Area	Sale Number
1.	2017	Gulf of Mexico	249
2.	2018	Gulf of Mexico	250
3.	2018	Gulf of Mexico	251
4.	2019	Gulf of Mexico	252
5.	2019	Gulf of Mexico	253
6.	2020	Gulf of Mexico	254
7.	2020	Beaufort Sea	255
8.	2020	Gulf of Mexico	256
9.	2021	Gulf of Mexico	257
10.	2021	Cook Inlet	258
11.	2021	Gulf of Mexico	259
12.	2022	Gulf of Mexico	261
13.	2022	Chukchi Sea	262

Table 4-4: Options Analyzed in this PFP Decision Document

	Proposed Program Decision Options	Supplemental Program Options	No Sale Option
Beaufort Sea Program Area	(1) Targeted Leasing	(2) Advancing sale to 2019 (3) Barrow Canyon Exclusion (4) Cross Island Exclusion (5) Camden Bay Exclusion (6) Kaktovik Exclusion	(7) No Sale
Chukchi Sea Program Area	(1) Targeted Leasing	(2) Hanna Shoal Walrus Movement Corridor Exclusion (3) Hanna Shoal Walrus Foraging Area Exclusion	(4) No Sale
Cook Inlet Program Area	(1) Targeted Leasing	(2) Beluga Whale Critical Habitat Exclusion	(3) No Sale
GOM Program Area	(1) Region-wide Leasing	(2) Modified Traditional Leasing (3) Baldwin County Buffer	(4) No Sale

PART II: ANALYSIS OF OCS PROGRAM AREAS

Chapter 5 Valuation of Program Areas

The following chapters will analyze the PFP Options according to the various factors articulated in Section 18(a) of OCS Lands Act.

This chapter explains the calculation of net benefits for PFP Options in a strategic manner: (1) estimates of oil and gas resources and anticipated production; for the anticipated production (2) estimates of net economic value; (3) estimates of environmental and social cost; (4) domestic economic surplus; and (5) net benefits. Together, this information on the valuation of program areas considers economic, environmental, and social value, as required in Section 18(a)(1), and provides valuable information for the Secretary to consider in the balancing under Section 18(a)(3). As the court stated concerning Section 18(a)(3) in *California I*, “[i]t is reasonable to conclude that within the section’s “proper balance” there is some notion of “costs” and “benefits,” recognizing that “costs” in this context must be a term of uncertain content to the extent it is meant to stand for environmental and social costs.” The court upheld this methodology in *California II* and in *NRDC* stating in the latter case that the court has endorsed the Secretary’s interpretation of this section to instruct a cost-benefit analysis that begins with a calculation of each planning area’s net social value (NSV). NSV is “net economic value” (the market value of expected resources less the cost of production and transportation) minus “social costs” (environmental and social costs). The analysis described in this chapter builds on this concept of social value and presents a more complete accounting of costs and benefits to society from the production of oil and natural gas on the OCS.

5.1 ESTIMATING HYDROCARBON RESOURCES

Oil and gas resource assessments are critical components of energy policy analysis and provide important information about the relative potential of U.S. offshore areas as sources of oil and natural gas. In particular, they provide the Secretary with information on the geological characteristics of OCS regions, as required by Section 18(a)(2)(A) of the OCS Lands Act. For the DPP analysis, BOEM considered the amount of undiscovered economically recoverable oil and gas resources (UERR) available on unleased blocks in each of the OCS planning areas as part of the valuation and ranking process. The Proposed Program analyses focused on the subset of UERR anticipated to be leased, discovered, and produced under a specific leasing proposal. This PFP analysis follows the approach of the Proposed Program and focuses on the anticipated production expected under the specific leasing proposals of the Program Options set forth in the PFP. BOEM’s approach to resource assessment is designed to account for the uncertainty inherent in predicting production from undiscovered resources.

In general, uncertainty in estimates of undiscovered oil and natural gas are greatest for frontier areas that have had little or no past exploratory effort. For areas that have been extensively explored and are in a mature development stage, many of the developmental risks have been reduced and the degree of uncertainty reflected in the range of possible outcomes has been narrowed.

Where possible, BOEM considers recent geophysical, geological, and technological information to estimate the potential presence and amount of technically recoverable oil and gas resources on the OCS.

BOEM also considers economic parameters, such as exploration and development costs and oil and gas prices, to estimate the economically recoverable resources on the OCS. Current BOEM oil and gas resource estimates come from the 2016 National Assessment (BOEM 2016a). The 2016 National Assessment forms the basis for the anticipated production used in the economic analysis provided in this chapter.

5.2 INTRODUCTION TO HYDROCARBON RESOURCES ON THE OCS

Each of the OCS regions comprises geologic characteristics and petroleum system elements that provide an opportunity for the existence of oil and gas resources. Oil and gas are thermally generated as organic matter in sedimentary strata that undergo changes in composition with increasing burial depth and temperature. Once generated and expelled from these source rocks, the hydrocarbons then migrate laterally and vertically into porous reservoirs that are associated with an impermeable trap or reservoir seal. A reservoir is a subsurface, porous, permeable rock body in which oil or gas or both may have accumulated. Natural gas can also be biologically (microbially) generated as a direct consequence of bacterial activity. Most biogenic gas is generated in burial depths of less than 3,000 feet.

These petroleum system elements are not ubiquitous across the entire OCS; instead, the assessment of hydrocarbon resources requires that geologic plays be delineated, which incorporates local geologic conditions. A geologic play is a group of geologically related known or potential hydrocarbon accumulations that share a common history of hydrocarbon generation, accumulation, and entrapment in a reservoir. Two types of geologic plays are defined for this resource assessment:

- **established play:** geologic play in which hydrocarbons have been discovered and a petroleum system has been proven to exist; and
- **conceptual play:** geologic play in which hydrocarbons have not been detected, but for which G&G data, integrated with regional geologic knowledge, suggest that hydrocarbon accumulations may exist.

Geologic plays consist of oil and gas pools, where a pool is defined as a discovered or undiscovered accumulation of hydrocarbons. In many instances, a prospect (undiscovered case) or a field (if discovered) will comprise one or more pools. A prospect or field is an area consisting of a single reservoir or multiple reservoirs all grouped on, or related to, a shared geologic structural feature and/or stratigraphic trap.

Figure 5-1, Figure 5-2, and Figure 5-3 show the geologic plays analyzed for the 2016 National Assessment of oil and gas resources on the OCS. Most plays are defined on the basis of reservoir-rock stratigraphy and are delineated by the extent of the reservoir rocks; however, a few plays are defined on the basis of structural characteristics of prospective traps. Plays may overlap spatially because they exist at different rock levels (depths) and, in many cases, are stacked on top of each other. Therefore, the figures showing geologic plays do not always represent the full extent of an individual geologic play.

Figure 5-1: Geologic Plays in the Beaufort Sea and Chukchi Sea Program Areas

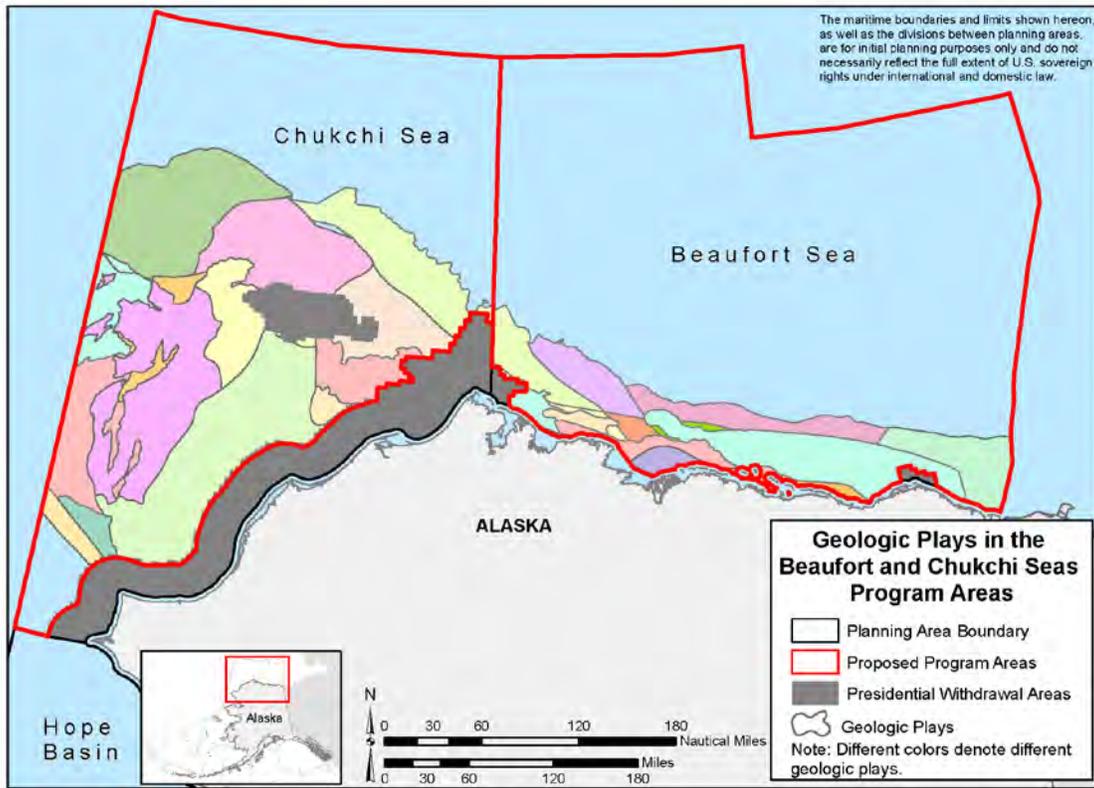


Figure 5-2: Geologic Plays in the Cook Inlet Program Area

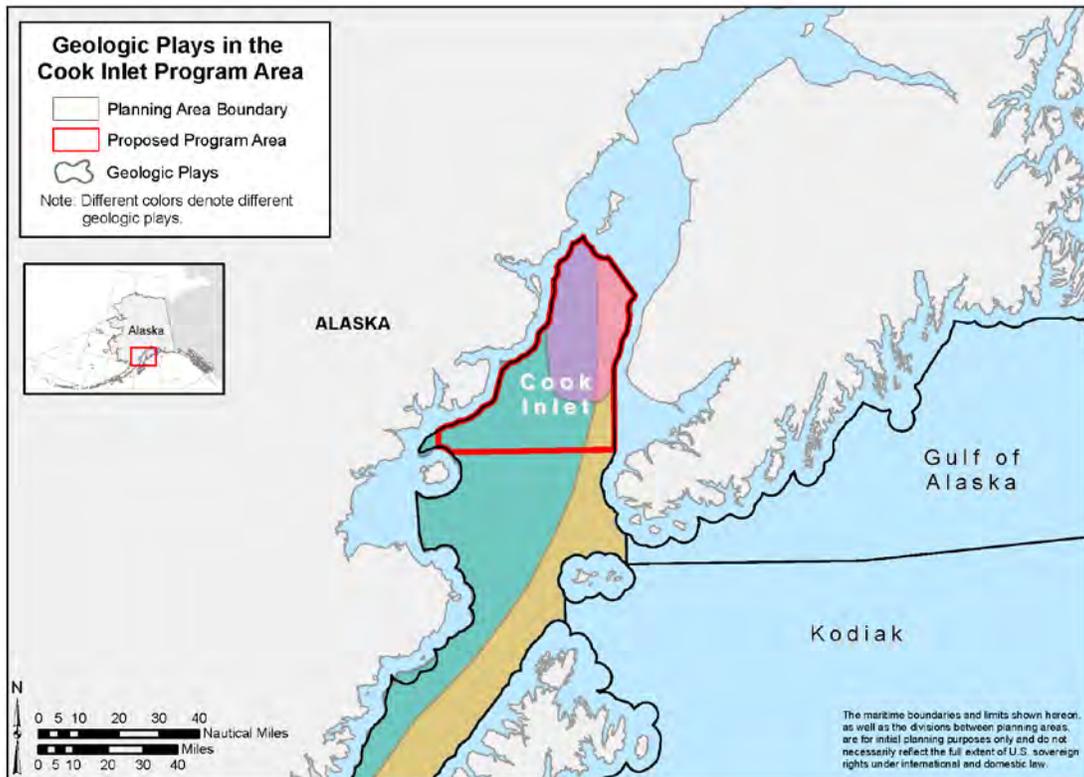
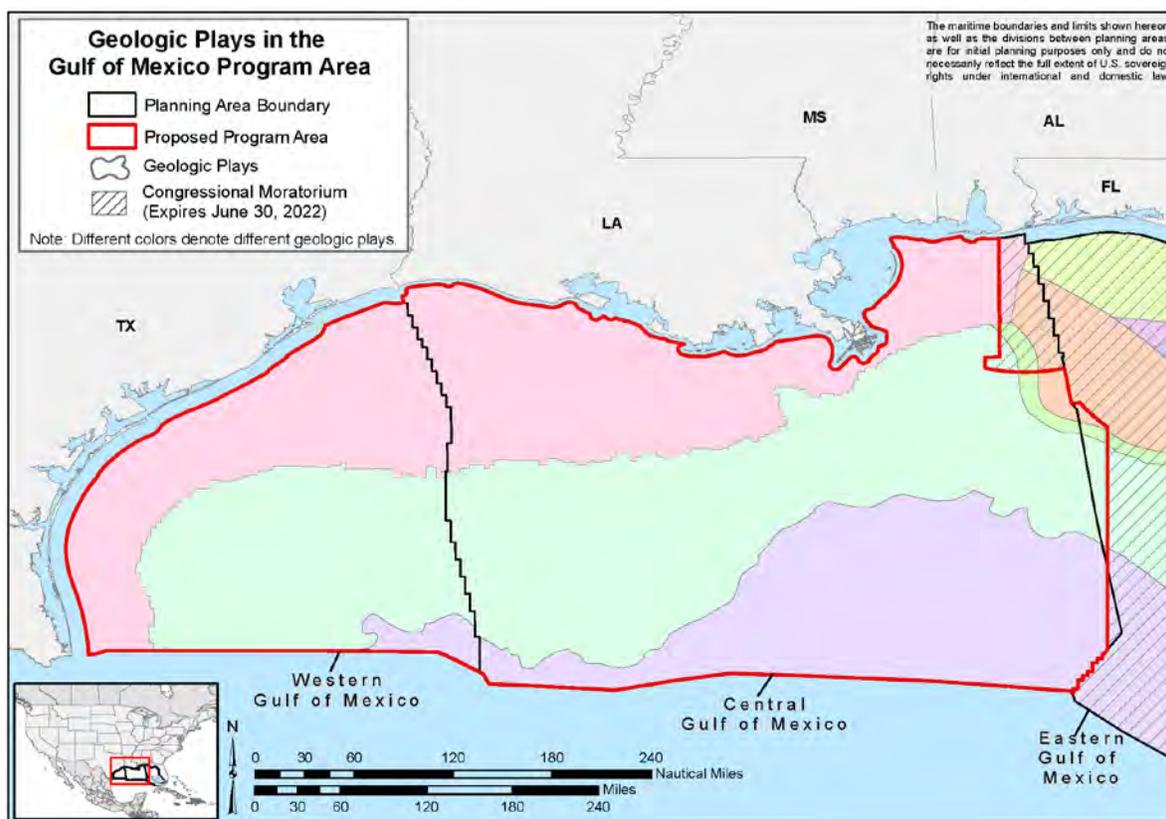


Figure 5-3: Geologic Plays in the Gulf of Mexico Program Area



5.2.1 Resource Commodities Assessed

BOEM assesses crude oil, natural gas liquids (condensate), and natural gas that exist in conventional reservoirs and are producible with conventional recovery techniques. Crude oil and condensate are reported jointly as billion barrels of oil (BBO); natural gas is reported in aggregate as trillion cubic feet (Tcf) of gas. Oil-equivalent gas is a volume of gas expressed in terms of its energy equivalence to oil (i.e., 5,620 cubic feet of gas per barrel of oil). The combined volume of oil and oil-equivalent gas resources is referred to as barrel of oil equivalent (BOE) and is reported in billion barrels of oil equivalent.

The technically and economically recoverable resources forecasted by BOEM do not include potentially large quantities of hydrocarbon resources that could be recovered by enhanced recovery techniques. Furthermore, these assessments do not consider gas in geopressured brines, methane hydrates, or oil and natural gas that may be present in insufficient quantities or quality (low-permeability, “tight” reservoirs) to be produced by conventional recovery techniques.

5.2.2 Sources of Data and Information

Estimating undiscovered oil and gas resources on the OCS is a complex process and requires the incorporation of a variety of geological, geophysical, economic, and engineering data. The petroleum geologic characteristics (i.e., volumes and qualities of source rocks, reservoir rocks, and traps) of plays are defined using play-specific information from wells, seismic-reflection profiles, and/or analogous

information from geologically similar reservoirs in other parts of the world. In areas where oil and gas production from a play is mature (such as established plays in the GOM), data and information typically are derived from producing reservoirs and fields within the play. In these cases, volumetric estimates of discovered oil and gas pools within the play are used to develop probability distributions for the size and number of undiscovered pools and fields in assessment areas.

Due to sparse data directly associated with BOEM conceptual plays in the Alaska OCS Region, analog-based parameters are developed using professional judgment to cover the range of uncertainties associated with these plays. The analog development process includes extensive research into the geologic, geochemical, and lithological characteristics of productive oil/gas discoveries in analogous plays. Specific information analyzed within analog plays includes the style of oil and/or gas trap, reservoir depositional environment and lithology, reservoir age, and analysis of existing drilling and well bore information. Conceptual play models are developed using regional geophysical and geologic data.

5.2.3 Geophysical Data Collection (Seismic Surveys)

Geophysical (seismic) surveying is a method of mapping below the seafloor using sound waves. The sound waves are generated using acoustic energy from air guns that release bursts of compressed air, which are reflected back from rock layers below the seafloor and recorded. Geophysicists use these data to identify areas favorable for the accumulation of hydrocarbons.

Geophysical data provide important information for oil and gas resource assessments. Two-dimensional seismic surveys often are designed to cover thousands of square miles or entire geologic basins as a means to assess large areas for potential hydrocarbon prospectivity. In contrast, 3-D surveys can focus on several hundred OCS blocks and provide much better resolution to evaluate hydrocarbon potential in structurally complex areas (often below salt) that are difficult to image with 2-D seismic data.

BOEM maintains an inventory of industry seismic data that includes more than 250,000 OCS blocks of 3-D coverage and 2.6 million line-miles of 2-D coverage. The distribution of seismic data over OCS regions is generally coincident with the maturity of existing oil and gas development in the regions. For example, more than 99 percent of the 3-D seismic data on the OCS are located in the GOM, while only approximately 70 percent of the 2-D seismic data are located in the GOM.

The acquisition and processing of marine seismic data is a complex process that often requires a significant time and cost investment. For a proposed 2-D survey with a large areal extent in a frontier area, the time from the permit stage to the point of actual interpretation is measured in terms of years.

5.2.4 Uncertainty in Resource Assessment

When considering estimates of hydrocarbon resources for decision making, one must keep in mind that resource estimates are just that—estimates. All methods of assessing potential quantities of technically and economically recoverable resources are efforts in quantifying a value that will not be reliably known until the resource is nearly depleted. Thus, there is considerable uncertainty intrinsic to any estimate, and resource estimates should be used as general indicators and not predictors of absolute volumes. Some of the uncertainty is regarding the presence and quality of petroleum source rocks, reservoir rocks, seal rocks, and traps; the timing of hydrocarbon generation, migration, and entrapment; and the location,

number, and size of accumulations. The value and uncertainty regarding these petroleum geologic factors can be expressed qualitatively (e.g., “There is a high probability that the quality of petroleum source rocks is good.”). However, to develop volumetric resource estimates, the value and uncertainty regarding these factors must be expressed quantitatively. Each of these factors, and the volumetric resource estimate derived from them, is expressed as a range of values, with each value having a corresponding probability.

5.2.5 Resource Assessment Methodology and Output

The general methodology that BOEM utilizes to assess undiscovered oil and natural gas resources on the OCS is a multi-step process using existing data, professional judgment, and probability distributions in conjunction with the Geologic Resource Assessment Program (GRASP) model. GRASP is a geologic play-based model that compiles oil and gas play data to generate the most likely cumulative probability distribution of undiscovered resources for each geologic play.

The execution of the GRASP model is comprised of the following steps to assess oil and gas resources on the OCS:

1. Compile play data.
2. Generate a cumulative probability distribution of pool sizes from probabilistic distributions of reservoir parameters distribution.
3. Generate a number of pools probability distribution.
4. Determine the probabilities for individual oil, natural gas, and mixed pool types.
5. Establish individual pool sizes and compare to the ranked sizes of discovered pools.
6. Generate play potential resources.

Volumetric estimates of undiscovered technically recoverable resources (UTRR) and UERR are based on the geologic and petroleum engineering information developed through petroleum geological analysis and quantified through play analysis. These estimates are developed in two stages. First, UTRR are assessed for each play, where UTRR are defined as oil and gas that may be produced from the subsurface using conventional extraction techniques without any consideration of economic viability.

The UTRR estimates from the 2011 National Assessment (BOEM 2011) and 2014 Atlantic Assessment update (BOEM 2014a) formed the basis of the DPP analysis. The Proposed Program and this PFP analyses consider UTRR estimates from the 2016 National Assessment (BOEM 2016a). This assessment is available at <http://www.boem.gov/Resource-Assessment/>.

Following assessment of the UTRR, economic and petroleum engineering factors are included for each assessment area to estimate the portion of the UTRR that is economically recoverable over a broad range of commodity prices. UERR are defined as the portion of the UTRR that are economically recoverable under specified economic and technologic conditions, including prevailing prices and costs. The economic portion of the assessment incorporates a wide range of oil and gas price points¹⁶ and uses a

¹⁶ Because oil and gas typically are produced together, BOEM estimates UERR at specific combinations of oil and gas prices, or “price pairs.”

relationship between the cost of exploration and development and commodity prices. Estimates of UERR are derived for each designated oil-gas price pair by:

- subjecting the distributions to multiple computer iterations simulating the development of the hydrocarbon accumulations associated with the areas; and
- performing a discounted cash-flow analysis to determine the area's resources using specified economic parameters.

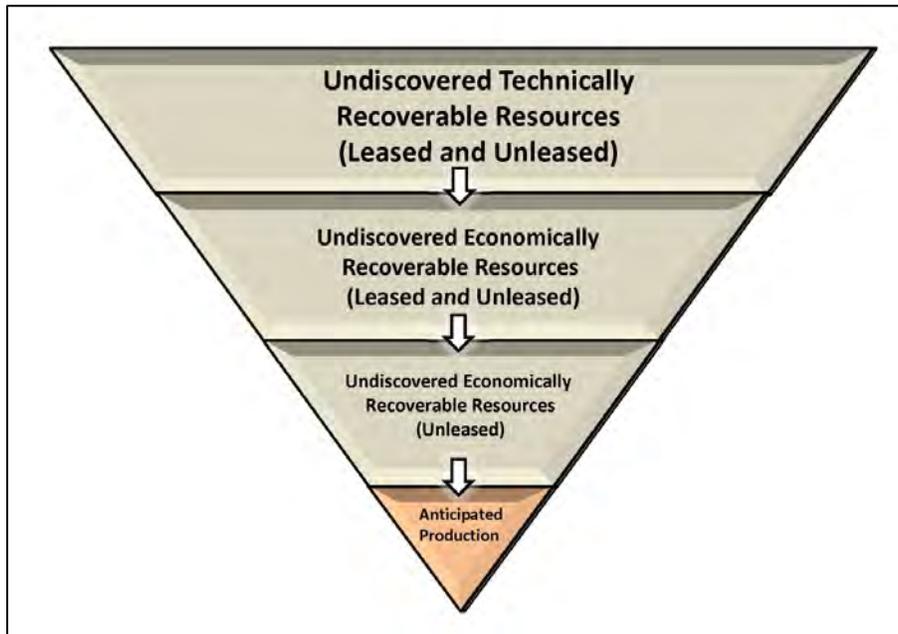
5.2.6 Proposed Final Program and Anticipated Production

The DPP analysis required an assessment of the UERR that are expected to be available for lease (i.e., currently unleased) as of July 2017 and used all of the unleased UERR available in each planning area as its resource base. The Proposed Program built on comments from Governors and others and analyzed the anticipated production from the specific lease sale options under consideration at that stage. This PFP builds on additional comments received on the Proposed Program decision and analyses in order to analyze the PFP Options. At the Proposed Program and PFP stages, the analyses focus on the subset of UERR anticipated to be leased, discovered, and produced under each specific leasing proposal. Figure 5-4: Conceptual Workflow Showing Transition from UTRR to Anticipated Production shows this winnowing process. The anticipated production estimates are focused on the program areas included in the PFP Options (as described in Chapter 4) rather than on full planning areas; therefore, they represent the portion of the UERR that is anticipated to be leased, discovered, and produced as a result of the implementation of each of the PFP Options. In addition to estimates of anticipated production, BOEM develops exploration and development (E&D) scenarios, which represent the quantification of the timing and scale of the anticipated exploration, development, and production activities.¹⁷ For the GOM, these scenarios represent multiple proposed lease sales, whereas they represent only a single sale each for program areas in the Alaska Region, as proposed in the Proposed Program.

BOEM estimates anticipated production for each program area using historical producing leases and field production data to reflect only what is expected to be produced from the leases sold in this Five-Year Program. BOEM does not assume that every lease produces; instead, the method used is consistent with the reality that only a subset of all leases are drilled, resources discovered, and ultimately produced, due to the geologic and economic risk inherent in finding oil and gas. BOEM generates the E&D scenarios for purposes of analysis and they represent best professional judgment based on a variety of factors, including estimates of recoverable resources in unleased blocks, historical oil and gas activities, and information from industry and trade groups. For both mature and frontier areas, these scenarios of future development and activity are generated for analytical purposes only and do not constitute official forecasts.

The availability of historical data for developing E&D scenarios varies greatly between mature and frontier areas. The GOM, for example, is a mature region where oil and gas leasing and development have been occurring for nearly 70 years. Therefore, most E&D scenarios for the GOM Program Area are the result of assessing historical patterns of activity that have become established for the GOM Region.

¹⁷ For the purpose of this document, the term E&D scenario includes any related production profiles.

Figure 5-4: Conceptual Workflow Showing Transition from UTRR to Anticipated Production

Note: For the DPP, only the unleased UERR was considered for analysis. For the Proposed Program and PFP, only anticipated production (orange area) was considered for analysis.

In contrast to the abundant oil and gas development on the GOM OCS, there has been no development activity on most other program areas of the OCS. In the Alaska OCS, the only Federal production extends from the Northstar Field in the Beaufort Sea, a single Federal-state development in Alaska State waters. Accordingly, the E&D scenarios for the Arctic rely on information available based on Arctic operations worldwide.

Oil and natural gas prices can change greatly during development of a Five-Year Program and will also fluctuate during implementation of the 2017–2022 Program. Not even the keenest industry observers can reliably predict when or how much prices will change, only that they will change. Therefore, this analysis is conducted using three representative price cases and corresponding sets of resource estimates.¹⁸ The product-price pairs used for this analysis are shown in Table 5-1: Price Case Scenarios for the Proposed Final Program. The activity scenarios based on these flat-price cases allow the Secretary to fairly easily identify the extent to which a Program Option's anticipated benefits and costs, or impacts, might vary under widely different price environments. These price cases are not meant to imply or represent price expectations, forecasts, or even upward and lower bounds of possible prices. Furthermore, while the price cases determine the UERR estimates used for each scenario, the industry activity levels are not price-specific—they are more generally applicable to historical low, mid, and high development scenarios. These price cases were selected to encompass a reasonable range of UERR paired with an appropriate range of activity levels given possible oil and gas prices over the life of the 2017–2022 Program.¹⁹ EIA and other forecasters do not expect the low oil prices of 2015 and 2016 to persist over

¹⁸ For each scenario, anticipated production and related activities are bound by the UERR for the designated price pairs and industry activity levels suitable for the appropriate case.

¹⁹ For example, BOEM considered using a low price case of \$30 per barrel of oil; however, that would imply a price level that would yield results identical, or very similar, to those of the No Sale Option for program areas outside the GOM. Therefore, a

the long term, but even if they do, the prices for the low case were selected to allow the Secretary to evaluate the likely effects of Program Options throughout a sustained period of lower prices. The three price scenarios are discussed in more detail in the *Economic Analysis Methodology for the OCS Oil and Gas Leasing Program for 2017-2022* (BOEM 2016b); (herein referred to as the Economic Analysis Methodology paper), which also includes a discussion of how the price scenarios were determined.

Table 5-1: Price Case Scenarios for the Proposed Final Program

Price Case	Oil Prices	Natural Gas Prices
Low Case	\$40/bbl	\$2.14/mcf
Mid-Case	\$100/bbl	\$5.34/mcf
High Case	\$160/bbl	\$8.54/mcf

Key: bbl = barrels of oil; mcf = thousand cubic feet

The anticipated production estimates shown in Table 5-2: Anticipated Production by Program Area are the same as those presented in the Proposed Program, with one exception. The Chukchi Sea Program Area anticipated production estimates have been updated from the Proposed Program to recognize the lease relinquishments that have occurred in the region since the publication of the Proposed Program. At the time of the analysis for the Proposed Program, BOEM assumed that active leases from the 2008 Chukchi Sea Lease Sale 193 would remain active and undergo a normal progression of exploration and development activities. As described in the Second Supplemental EIS for Chukchi Sea Lease Sale 193 (BOEM 2014b), that sale was assumed to result in the discovery of two fields that would ultimately provide the necessary infrastructure for future discoveries and anticipated production resulting from future lease sales. This assumption changed in June 2016 when all but one active lease in the Chukchi Sea were relinquished. In response to the relinquishments, the timing of activities that were once associated with Sale 193 have been moved forward into the 2017–2022 OCS leasing program. The anticipated production analyzed in this PFP is associated with the development of a single field that provides an infrastructure base that would ultimately enable production from satellite fields discovered on leases issued after the 2017–2022 Program. These future production volumes are described in the Programmatic EIS. Given the change in development assumptions, the anticipated production in the Chukchi Sea for the 2017–2022 OCS leasing program for the PFP analysis is greater than that analyzed at the Proposed Program stage. Given the necessary infrastructure requirements in the Chukchi Sea, BOEM assumes this large anchor field to be explored and developed first to justify the large amount of infrastructure necessary to begin offshore production in the Chukchi Sea Program Area. While there have been relinquishments in the Beaufort Sea and Gulf of Mexico areas, the remaining active leases provide sufficient opportunity for exploration and development. Thus, the E&D scenarios in the Beaufort Sea and the Gulf of Mexico do not change from the Proposed Program to the PFP.

Table 5-2: Anticipated Production by Program Area shows the anticipated production generated from the E&D scenarios. Unlike the DPP, wherein BOEM ranked planning areas based on a consistent measure

\$30 low price case would provide the Secretary with little meaningful additional information for several area-specific options (if BOEM showed no activities rather than a feasible minimum-level scenario). BOEM adopted the \$40 price case not because it represented the lowest plausible price but because it was reasonable for analysis of activities for every program area under a low-price environment.

(i.e., the full complement of UERR in each planning area), the anticipated production estimates used for the PFP are not directly comparable between regions due to differences in assumptions, methodology, and levels of historical activity in each area. For the PFP analysis, the anticipated production represents a subset of the UERR that reflects what is anticipated to be leased, developed, and produced as a result of leasing in each program area.

Table 5-2: Anticipated Production by Program Area

Program Area	Oil (Million barrels)			Gas (Bcf)			BOE (Million Barrels)		
	Low Price Case	Mid-Price Case	High Price Case	Low Price Case	Mid-Price Case	High Price Case	Low Price Case	Mid-Price Case	High Price Case
Beaufort Sea	-*	2,295	3,673	-*	4,029	6,447	-*	3,012	4,820
Chukchi Sea	-*	2,644	4,231	-*	1,116	1,785	-*	2,843	4,548
Cook Inlet	84	209	335	37	93	149	90	226	362
GOM	2,105	3,531	5,593	5,470	12,011	22,122	3,079	5,668	9,529
TOTAL	2,189	8,680	13,831	5,507	17,250	30,503	3,169	11,749	19,259

Note: The low price case is \$40/bbl and \$2.14/mcf. The mid-price case is \$100/bbl and \$5.34/mcf. The high price case is \$160/bbl and \$8.54/mcf. All price scenarios represent a constant, inflation-adjusted price throughout the life of the 2017–2022 Program.

Key: bbl=barrels of oil, Bcf = billion cubic feet; BOE=barrel of oil equivalent, mcf=thousand cubic feet

*At the low price case, there is insufficient economic oil and gas to support a single platform, so these scenarios were evaluated for exploration only, without subsequent development.

Potentially excluding the Environmentally Important Areas (see Chapter 4) from leasing would impact leasing viability as well as levels of exploration, development, production, and decommissioning activities. Table 5-3 contrasts the acreage of the Environmentally Important Areas with the acreage of the associated program area, as well as the combined footprint of the all geologic plays within the respective program area. Geologic plays are used to assess the potential for undiscovered oil and natural gas development in an OCS planning area. An individual play is identified and mapped based on common geologic characteristics and a common history of hydrocarbon generation, migration, reservoir development, and entrapment. In many of the planning areas, geologic plays are often stacked in the vertical dimension (see Section 5.2 for more information). Potential exclusions in the Beaufort Sea and Chukchi Sea Program Areas are likely to have the largest impact on activity levels given their relative size and location coincident with high hydrocarbon resource potential.

Table 5-3: Overlap of Environmentally Important Areas with Geologic Plays

Programmatic EIS Environmentally Important Area	Environmentally Important Area (acres)	Percent of Program Area Acreage	Percent of Geologic Plays Acreage	Number of Geologic Plays Overlapping Environmentally Important Areas
Beaufort Sea Program Area: Alternatives B(1) through B(4)				
Barrow Canyon	1,014,392	1.6	8.3	8
Camden Bay	127,574	0.2	1.1	5
Cross Island	925,641	1.4	7.8	9
<i>Overlap of Camden Bay and Cross Island EIAs</i>	<i>32,567</i>	<i>0.05</i>	<i>0.3</i>	<i>4</i>
Kaktovik	599,530	0.9	5.0	4
Chukchi Sea Program Area: Alternatives B(5) and B(6)				
<i>Overlap of Walrus Foraging Area and Movement Corridor EIAs</i>	<i>1,280,994</i>	<i>2.4</i>	<i>3.7</i>	<i>15</i>
Walrus Foraging Area	5,348,051	10.1	15.6	15
Walrus Movement Corridor	1,487,070	2.8	4.3	6
Cook Inlet Program Area: Alternative B(7)				
Beluga Whale Critical Habitat	29,372	2.7	2.7	4

Note: Geologic play acreage overlap is not a direct proxy for oil and gas resource potential.

5.3 NET BENEFITS ANALYSIS

The net benefits analysis examines the benefits to society from the production of oil and natural gas expected as a result of the PFP and the environmental and social costs associated with the anticipated exploration, development, production, and decommissioning activities. Net benefit estimates are provided as a tool to assist the Secretary in balancing the considerations required by the OCS Lands Act in Section 18(a)(3); it is only one of many factors that the Secretary will consider. This analysis recognizes that, without a Five-Year Program, substitute sources of energy would be required, and therefore, accounts for the net benefits associated with those produced, substitute resources. The result of the analysis is an estimate of the incremental net benefits associated with the PFP; that is, the net benefits of the PFP less the net benefits of the most likely energy substitutes in the absence of a new Program.

At the PFP stage, the net benefits analysis evaluates the PFP Options. This analysis is similar to that conducted in the Proposed Program, but both are distinct from the DPP analysis. The DPP analysis was intended to support an initial decision and, accordingly, provided the Secretary with a quantitative relative ranking of planning areas based on aggregate resource potential and NSV associated with finding and extracting those resources.²⁰ That analysis assumed the ultimate recovery of all UERR.

²⁰ The intent of the DPP analyses was to provide the Secretary with information with which to make her initial decision. Analyses in the DPP assumed the availability of all planning areas. Therefore, the entire OCS was analyzed and planning areas were ranked according to value.

The Proposed Program analysis went beyond that initial ranking of planning areas included in the DPP and instead conducted a benefit-cost analysis for each of the program areas included in the Proposed Program options, considering only anticipated production from the set of leases projected to be sold in a program area. This PFP analysis follows the same assumptions and methodology as the Proposed Program analysis. Again, following the approach of the Proposed Program, the net benefits of the PFP are adjusted to reflect the net benefits associated with substitute or replacement energy resources in the absence of a new Program if the No Sale Option were selected in any program area. The No Sale Option in all of the program areas corresponds to the No Action Alternative analyzed in the Programmatic EIS. For purposes of analysis, the benefits of the No Sale Option do not include any leasing in the relevant program areas in future programs. Under this No Sale Option, domestic oil and natural gas supply would be lower than with the Program, and oil and gas prices would tend to rise.

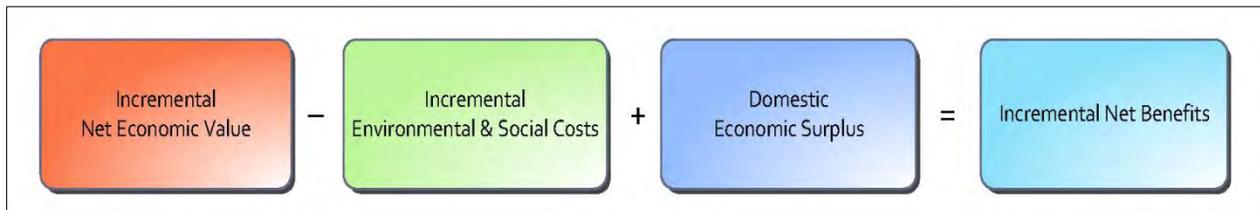
The benefits and costs derived from previously leased resources are not included in this analysis. While society continues to receive the benefits and associated costs from previously leased OCS resources, policies relating to their treatment are not subject to this PFP decision. The net benefits analysis includes information designed to help with decisions about the size, timing, and location of future lease sales on the OCS under consideration in this PFP by providing a quantitative evaluation of economic, social, and environmental factors as required in Section 18(a)(1). The analysis focuses on the Secretary's decision of whether to include a lease sale in a particular program area and does so based on calculations under status quo baseline energy market assumptions. While BOEM is cognizant that there are numerous other factors which could affect baseline energy markets (e.g., climate policies) in the future, those factors would affect production and consumption under both a scenario with proposed lease sales and one without those sales. As those factors are not known at this time, and it is beyond the scope of this analysis to conduct such sensitivity analysis, those factors are excluded. Future Program analyses may build in different methodologies to understand and analyze the impact of such factors. However, it is important to remember, in this context, that the net benefits analysis is only one way in which the Secretary considers the Section 18 factors in providing quantitative information for the balancing required in Section 18(a)(3).

The net benefits analysis is conducted at three sets of price scenarios (\$40, \$100, and \$160 per barrel for oil and corresponding gas prices of \$2.14, \$5.34, and \$8.54 per thousand cubic feet) and anticipated production of oil and gas is represented at these different price levels. These price cases represent scenarios where flat prices remain constant through the life of the program. The price cases are designed to provide program area-specific information to the Secretary on the value of OCS resources under three different sets of energy market conditions. Historical oil price volatility shows that unanticipated market and political events, new technologies, weather, geopolitical unrest, economic changes, or other factors can cause energy price paths to deviate considerably from even the most respected forecasts. Moreover, use of a trend forecast or fluctuating prices in the analysis would make it difficult to separate the effects on the measures of net benefits of assumed price changes, and their timing, from the resource and cost differences in program areas. For these reasons, the PFP analysis includes resource and net benefit estimates evaluated at each of the three price scenarios shown in Table 5-1: Price Case Scenarios for the Proposed Final Program. As stated above, these price cases do not represent strict upper and lower bounds. BOEM recognizes that prices outside those presented in the analysis could occur through the life of the 2017–2022 Program. Prices below those in the low price scenario would likely lead to less

anticipated production in each region and fewer total net benefits.²¹ Alternatively, prices above those in the high price scenario could lead to greater anticipated production than estimated in the high price case, which would generate larger net benefits. More information on the price scenarios is included in the Economic Analysis Methodology paper (BOEM 2016b).

The net benefits analysis is comprised of three components, depicted in Figure 5-5: Net Benefits Analysis Calculation, each with its own intermediate calculations. The first component of the incremental net benefits is the calculation of incremental NEV. NEV is the gross revenue of the Program less the private costs of exploration, development, production, and transportation of the forecasted production (see Section 5.3.1, Incremental Net Economic Value). The second component is the calculation of incremental environmental and social costs. Environmental and social costs are the external costs that companies do not generally pay for, but still are imposed on society by the exploration, development, production, and transportation of resources from the OCS, as described in Section 5.3.2, Incremental Environmental and Social Costs. The third component is the calculation of economic surplus. Economic surplus is the net change in producer and consumer surplus from the decrease in prices caused by additional OCS production. To derive incremental net benefits, the costs are subtracted from the Program benefits, as described in Section 5.3.3, Domestic Economic Surplus.

Figure 5-5: Net Benefits Analysis Calculation



The first two components are calculated as an incremental benefit or cost, respectively, because they include the benefits or costs that would occur in the absence of the OCS Program (or alternatively, are forgone in the presence of an OCS Program). BOEM adjusted the Program NEV to reflect the forgone opportunity of producing potentially valuable substitute domestic energy resources to obtain the incremental NEV (i.e., the benefits of the No Sale Option). Additionally, BOEM adjusted the Program environmental and social cost to account for the environmental and social costs of substitute energy sources anticipated to result from the No Sale Option (i.e., the costs of the No Sale Option). As discussed in Section 5.3.2., Incremental Environmental and Social Costs, the resulting incremental environmental and social costs are actually an added benefit of the Program, since the anticipated environmental and social costs of energy substitutes are larger than those associated with the Program.

The third component is the welfare benefit to consumers from slightly lower-priced energy resources, which accompany OCS production (over the No Sale Option), less the reduced revenue to domestic producers under the same prices. Each of these components is described in more detail in this section and in the Economic Analysis Methodology paper (BOEM 2016b).

²¹ Note that under the current low price scenario, there is no anticipated production in the Chukchi Sea and Beaufort Sea program areas and only exploration activity is expected to occur. With lower prices, the anticipated production in other program areas could similarly fall to zero and benefits as well as expected environmental costs would accordingly decline.

5.3.1 Incremental Net Economic Value

The incremental NEV is the difference between the OCS Program NEV and the NEV associated with the likely substitutes under the No Sale Option. Both are described below along with the results for the incremental NEV by program area. Note that all values are discounted using a social discount rate of 3 percent, consistent with guidance from the U.S. Office of Management and Budget Circular A-4 on the social rate of time preference. More detailed tables with intermediate calculations are provided in the Economic Analysis Methodology paper (BOEM 2016b).

5.3.1.1 OCS Program Net Economic Value

NEV is the value to society derived from developing hydrocarbon resources in the OCS. The NEV equals the discounted gross revenues from the produced oil and natural gas minus the private costs required to realize the economic value of the resources. These costs include the discounted costs of exploring, developing, producing, and transporting the oil and natural gas to the market and decommissioning the facilities used in those activities. The NEV can be considered as the present value of the expected economic rent for the anticipated production. A portion of the NEV goes to the U.S. Government as lessor and steward for the public, in the form of bonus bids, rents, royalties, and taxes. The lessees, as private firms, retain the remainder of NEV as economic profits that may be distributed to shareholders around the country.²² The net economic value is estimated using the three sets of flat price cases and the accompanying production assumptions.

5.3.1.2 No Sale Option Net Economic Value

In the absence of an OCS program, a certain amount of production from onshore or imported oil, gas, coal, and other resources would be needed to meet U.S. demand otherwise met by OCS oil and gas anticipated to result from the PFP decision. This substitution from OCS production to other sources of energy is calculated using the Market Simulation model (*MarketSim*), as described in *Consumer Surplus and Energy Substitutes for OCS Oil and Gas Production: The 2015 Revised Market Simulation Model (MarketSim)* (BOEM 2015a).

Rather than attempt to calculate the NEV from the increased production in onshore natural gas, oil, and other domestic production in the absence of an OCS program, BOEM instead employs a simplifying assumption that the NEV of offshore production is equivalent to that of the energy substitutes. BOEM realizes this is likely an overestimate of the NEV of these sources because they are replacements for offshore production, access to which is constrained by non-market decision making (i.e., the decision not to offer OCS acreage is a policy decision not directly influenced by profitability). In general, greater access to resources will result in development of the most profitable fields or sources first, lowering average economic rent in later years.

²² BOEM's Economic Analysis Methodology for the OCS Oil and Gas Leasing Program for 2017–2022 (BOEM 2016b) discusses the factor applied to the NEV to account for profits going to foreign shareholders. This adjustment to NEV means that what remains, and what is taken into account in the PFP analysis, is only the domestic value.

5.3.1.3 Incremental Net Economic Value

Based on *MarketSim* runs for the Program scenario (in contrast with the No Sale Option), BOEM estimates that approximately 30 percent of OCS energy production that would be forgone in the No Sale Option would, for that Option, be replaced with domestic sources of energy. To account for the NEV of these domestic sources, BOEM reduced the NEV estimate by 30 percent. The other 70 percent of OCS production would be replaced either by imports or forgone as a result of reduced demand in the face of higher oil and gas prices. The difference between the Program scenario NEV and the estimated NEV from domestic sources and substituted production under the No Sale Option is the incremental NEV. Table 5-4: Incremental NEV by Program Area shows the incremental NEV for each program area.

It is worth noting that while the NEV analysis treats the private expenditures on exploration, development, production, and transportation as costs, this spending can actually be considered a benefit in a broader macroeconomic context. For example, the use of labor and capital to search for and extract oil and gas resources contributes to the national income. Also, this spending generates regional economic impacts and multiplier effects that arise from the creation of jobs, investment in infrastructure, and other activities. A discussion of additional benefits of OCS production is included in the Economic Analysis Methodology paper (BOEM 2016b) and is further discussed in Chapter 6, Program Area Location Considerations, and Chapter 8, Equitable Sharing Considerations.

Table 5-4: Incremental NEV by Program Area

Program Area	Incremental Net Economic Value (\$billions)		
	Low price case	Mid-price case	High price case
Beaufort Sea	*	17.61	79.29
Chukchi Sea	*	40.32	130.78
Cook Inlet	0.10	4.69	13.03
GOM	2.40	48.99	169.98

Note: The low price case is \$40/bbl and \$2.14/mcf. The mid-price case is \$100/bbl and \$5.34/mcf. The high price case is \$160/bbl and \$8.54/mcf. All values are discounted at a real discount rate of 3 percent. All price scenarios represent a constant, inflation-adjusted price throughout the life of the 2017–2022 Program.

Key: *=Under the forecasted E&D scenarios, only exploration activities are anticipated for Beaufort and Chukchi seas in the low price case scenario. As a result, NEV would be negative for these areas. At this price, there are only negligible UERR. Companies may still engage in exploration activities in these areas with the expectation that prices will rise in the future. See the Economic Methodology paper for more information (BOEM 2016b).

5.3.2 Incremental Environmental and Social Costs

Beyond the private costs used to calculate the incremental NEV, society incurs broader environmental and social costs from the activities and facilities associated with OCS oil and natural gas exploration and development. This can include, but is not limited to, impacts on air quality, commercial fisheries, and recreation.

5.3.2.1 OCS Program Environmental and Social Costs

BOEM uses the in-house Offshore Environmental Cost Model (OECM) to calculate the environmental and social costs associated with OCS oil and gas activity. The OECM was initially developed in 2001, revised substantially in 2012, and underwent minor revisions in 2014.²³ It is designed to model the impact of typical activities associated with OCS production and oil spills (other than possible catastrophic oil spills, which are analyzed separately) occurring on the OCS. The model uses economic inputs, resource estimates, and E&D scenarios as the bases for its calculations. Costs are calculated for six categories: (1) recreation; (2) air quality; (3) property values; (4) subsistence harvests; (5) commercial fishing; and (6) ecological impacts.

Recreation and air quality impacts are two of the largest monetized components of the OECM, and the results of monetizing can be initially surprising. For example, an oil spill in the GOM could threaten recreational activities, but a spill of equal magnitude in the Arctic might not have the same effect on recreation because fewer people participate in these activities in the Arctic. In that case, the OECM would show a greater reduction in social welfare for the GOM than for the Arctic, even though the Arctic estimate would include other costs such as damages to subsistence harvests. The OECM's monetization of subsistence harvest impacts is limited to Alaska planning areas because of the relative importance and availability of data on harvests in that region (BOEM 2012). While some subsistence activity takes place in other regions, data of the type needed for the OECM are not available.²⁴ Regional differences are further recognized in OECM's air quality model that evaluates the onshore damages caused by dispersed criteria pollutants emitted offshore. Because the coast along the GOM is more developed and populous, air emissions there create larger monetized environmental impacts on human health and agriculture, and more material damage, than in the Arctic. These differences are especially noticeable when comparing the environmental and social costs per barrel of oil equivalent (BOE) between the regions. For example, the three Alaska program areas have environmental and social costs of less than 10 cents per BOE, whereas costs in the Western and Central GOM are 90 and 70 cents per BOE, respectively. Additional information on the OECM environmental and social cost components and calculations is included in the Economic Analysis Methodology paper (BOEM 2016b).

While the model captures a wide range of environmental and social costs, it is not designed to represent impacts on unique resources or from catastrophic oil spills. Impacts on unique resources, such as endangered species, are discussed in Chapter 7, Environmental Consideration Factors and Concerns, and analyzed in more detail in the Programmatic EIS. Further, these impacts will be subject to mitigation measures at later stages in the leasing and permitting processes.

The OECM is also not designed to represent impacts from catastrophic oil spill events. The OECM only considers a range of oil spills up to 100,000 barrels. Given the unpredictable nature of catastrophic oil spills, including the many factors that determine their severity, efforts to quantify their unexpected costs are less meaningful and more uncertain than the other measures considered in the net benefits analysis. In

²³ A discussion of the OECM is included in the Economic Analysis Methodology paper (BOEM 2016b). See also BOEM 2015a, BOEM 2015b, and BOEM 2015c.

²⁴ BOEM continues to review subsistence information and can modify the OECM if appropriate data become available. Some information on subsistence harvests in the other regions is discussed in the *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (BOEM 2014c).

addition to the difficulty in calculating the cost of the potential impacts of a catastrophic spill, there are similar difficulties in calculating the risk. For these reasons, the risks and impacts of catastrophic oil spills are not considered in the net benefits analysis. An analysis of the costs and impacts of an unlikely, but possible, catastrophic oil spill is included in the Economic Analysis Methodology paper (BOEM 2016b) and in the Programmatic EIS. Additional information is also available in a supporting paper to the DPP: *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (BOEM 2014c).

5.3.2.2 No Sale Option Environmental and Social Costs

Environmental and social costs arise from OCS activity, but similar environmental and social costs also exist in the absence of a new OCS Program with added production from replacement fuel sources that the economy will demand. Regardless of whether a new Five-Year Program is approved, the United States still demands substantial energy resources. The choice of the No Sale Option in any or all of the program areas means no leasing would take place in those area(s) during the 5 years of the program, and that domestic oil and natural gas supply would be reduced. This supply reduction would be associated with only a small increase in hydrocarbon prices, consistent with the increased imports and domestic onshore production as well as fuel switching that would help meet domestic demand for oil and natural gas products at those prices. Program areas without current production already rely on energy market substitutes (e.g., imports, domestic onshore production) and incur their environmental and social costs, but reliance on these substitutes could be lessened with OCS production in the region.

As will be discussed in more detail in Section 6.4, Possible OCS Production Substitutes, various factors over the life of the program could affect the composition of energy substitutes. However, to provide the Secretary meaningful information, the substitutes analysis is conducted using baseline assumptions which span both the program and No Sale Option analyses. This identifies changes in environmental and social costs specific to each program area decision.

With oil from the new Program not available, increased onshore production of oil, gas, and other energy sources such as coal would generate new air emissions. Also, replacement imports of oil cause corresponding increases in air emissions and oil spill risks from increased tanker operations along the U.S. coastal areas receiving the oil. Moreover, these added oil imports, along with additional onshore gas production, generate air emissions closer to population centers than those occurring as a result of OCS oil and gas production. These discharges, consistent with air quality dispersion modeling, create a greater influence on human health than do air emissions generated many miles offshore.

To estimate these substitute energy sources, BOEM uses *MarketSim* to determine the substitutions for offshore oil and natural gas development if one or more areas are excluded from the Program. Overall, the model indicates that if the 2017–2022 Program is not approved, OCS production of oil and natural gas would be reduced over the next 50–60 years between approximately 3,169 and 19,259 million BOE.²⁵ On average, approximately 30 percent would be replaced by domestic substitutes (26 percent with increased onshore oil and gas production, 3 percent other sources [e.g., biofuels], 1 percent from electricity from

²⁵ This represents the range for the estimated production of oil and gas from the 2017–2022 Program using the low and high price scenarios. Program oil and gas production estimates are 3,169, 11,749, and 19,259 million BOE for the low, mid-, and high price case scenarios, respectively.

sources other than oil and natural gas [e.g., nuclear, hydroelectric, solar, wind], 1 percent from increased activity on existing offshore leases). Of the remaining 70 percent, 63 percent of this would be replaced with additional imports; the remaining 7 percent would be replaced with a reduction in domestic quantity of energy demanded. Table 3 in the Economic Analysis Methodology paper (BOEM 2016b) shows the detailed selection of energy substitutes by price case and separated for oil and natural gas.

The OECM calculates the No Sale Option environmental and social costs based on the area in which they are expected to occur. However, for evaluating costs and benefits of different PFP Options to the United States as a whole, BOEM has attributed them to the program area for which the energy substitutes would be required if the No Sale Option were selected. Since the net benefits analysis is a national analysis, this approach allows for a transparent assessment of the national tradeoffs in decisions regarding timing, size, and location of sales.²⁶ Additional information on this approach is included in the Economic Analysis Methodology paper (BOEM 2016b). Further, estimates of these No Sale Option costs in and adjacent to the areas where they are likely to occur are provided in Chapter 8.

5.3.2.3 Incremental Environmental and Social Costs

Similar to the reduction in the NEV estimates in the absence of a new Program, BOEM considers the environmental and social costs of the energy substitutes when calculating the incremental net benefits. Incremental environmental and social costs are the environmental and social costs from the anticipated activities generated from leases in this Program less the environmental and social costs from the most likely energy market substitutions replacing OCS production in the event that no Program is approved. Only the incremental environmental and social costs are included in the calculation, as some level of environmental and social costs would occur regardless of whether the Program was approved or not.

Table 5-5: Incremental Environmental and Social Costs by Program Area shows the incremental external costs BOEM estimates for each program area. Since the environmental and social costs of relying on the substitute sources of energy exceed those from producing the program area resources, the costs are negative (that is, external costs under the Program are less than under the No Sale Option). These negative costs are subtracted during the Net Benefits calculation, resulting in an overall benefit to society. As discussed above, the impacts of the additional onshore production and imports lead to additional air emissions near population centers, which can result in greater human health impacts than OCS emissions far offshore. Further, additional imports create increased near-shore oil spill risk. These costs, which can be attributed to the lack of a Program, are avoided with the OCS Program, and BOEM calculates these negative costs as benefits in the final calculation of the incremental net benefits. For example, at the mid-price case in the GOM Program Area, nearly \$6.1 billion in environmental and social costs are avoided with the OCS Program rather than the No Sale Option.

²⁶ This approach was upheld by the District of Columbia (D.C.) Circuit Court in *Center for Sustainable Economy v. Jewell* 779 F.3d 588 (D.C. Cir. 2015). The court noted the national perspective of the net benefits analysis and distribution of the No Sale Option costs to the program area in the absence of leasing are both reasonable and consistent with Section 18(a) of the OCS Lands Act.

Table 5-5: Incremental Environmental and Social Costs by Program Area

Program Area	Incremental Environmental and Social Costs (\$ billions)		
	Low	Mid	High
Beaufort Sea	*	-3.62	-6.02
Chukchi Sea	*	-3.37	-5.20
Cook Inlet	-0.18	-0.38	-0.64
GOM	-3.97	-6.09	-11.12

Note: The low price case is \$40/bbl and \$2.14/mcf. The mid-price case is \$100/bbl and \$5.34/mcf. The high price case is \$160/bbl and \$8.54/mcf. All values are discounted at a real discount rate of 3 percent. All price scenarios represent a constant, inflation-adjusted price throughout the life of the Program.

*=Under the forecasted E&D scenarios, only exploration activities are anticipated for Beaufort and Chukchi seas in the low price case scenario. Environmental costs are small under these circumstances but appear as zero due to rounding.

5.3.3 Domestic Economic Surplus

In addition to the inclusion of incremental environmental and social costs, the net benefits analysis is expanded for the Proposed Program and PFP to include domestic economic surplus. In calculating the total net benefits, BOEM adds the supply-side benefits (NEV minus net environmental and social costs) to the demand-side benefits (domestic economic surplus). Domestic economic surplus is the welfare change to producers and consumers from a change in energy prices. If energy prices decline, U.S. consumers receive a benefit from paying lower prices measured as consumer surplus, whereas U.S. producers lose welfare from receiving lower prices measured as a loss in producer surplus.²⁷

New OCS oil and natural gas production increases the supply of oil and natural gas, which lowers the price consumers pay and the price producers receive. The Five-Year Program analysis focuses on gains and losses within the U.S, so only the domestic portion of this welfare change is included in the net benefits analysis. While consumers benefit from lower prices due to the Program, whether from oil or gas sourced domestically versus internationally, the total gain in consumer surplus is partially offset by a loss in domestic producer surplus.

To estimate the change in economic surplus, BOEM uses *MarketSim* to calculate the price changes in energy markets as a result of new OCS production. For example, over the first 50 years of production, the average annual price change in 2017 dollars was \$0.52 per barrel for oil and \$0.03 per thousand cubic feet (mcf) of natural gas. Though these are small changes, applied to all domestic consumption of imports, these result in large economic surplus gains. The estimates for these welfare changes as a result of the Program are provided in Table 5-6: Domestic Economic Surplus by Program Area. The full calculation of consumer surplus gains and producer surplus losses is provided in the Economic Analysis Methodology paper (BOEM 2016b), along with the display of the full economic surplus calculation.

²⁷ In theory, consumer surplus is the difference between the price actually charged for a service or product and the highest price consumers would be willing to pay for a service or product. Similarly, producer surplus is the difference between the actual price that producers receive and the minimum price they would be willing to accept.

Table 5-6: Domestic Economic Surplus by Program Area

Program Area	Domestic Economic Surplus (\$ billions)		
	Low	Mid	High
Beaufort Sea	*	1.27	3.67
Chukchi Sea	*	2.47	2.98
Cook Inlet	0.14	0.41	0.53
GOM	4.28	10.19	16.48

Note: The low price case is \$40/bbl and \$2.14/mcf. The mid-price case is \$100/bbl and \$5.34/mcf. The high price case is \$160/bbl and \$8.54/mcf. All values are discounted at a real discount rate of 3 percent. All price scenarios represent a constant, inflation-adjusted price throughout the life of the program.

Key: *=With only exploration activities anticipated for the Beaufort and Chukchi seas in the low price case scenario, there is no anticipated production. As a result, there are no price changes and the estimated economic surplus is zero.

5.3.4 Incremental Net Benefits

The sum of the supply (incremental NEV less incremental environmental and social costs) and demand (incremental economic surplus) benefits constitutes the total incremental net benefits associated with the program area resources anticipated to be leased and produced. The estimated incremental net benefits of resources in the PFP areas forms one of the bases for developing PFP Options. The estimates for incremental net benefits per program area at each of the three sets of price cases are shown in Table 5-7: Incremental Net Benefits by Program Area.

Table 5-7: Incremental Net Benefits by Program Area

Program Area	Incremental Net Benefits (\$ billions)		
	Low	Mid	High
Beaufort Sea	*	22.50	88.96
Chukchi Sea	*	46.16	138.95
Cook Inlet	0.42	5.48	14.20
GOM	10.65	65.27	197.58

Note: The low price case is \$40/bbl and \$2.14/mcf. The mid-price case is \$100/bbl and \$5.34/mcf. The high price case is \$160/bbl and \$8.54/mcf. All values are discounted at a real discount rate of 3 percent. All price scenarios represent a constant, inflation-adjusted price throughout the life of the program.

Key: *=Under the forecasted E&D scenarios, only exploration activities are anticipated for the Beaufort and Chukchi seas in the low price case scenario. At this price, there are only negligible UERR. Companies may still engage in exploration activities in these areas with the expectation that prices will rise in the future.

Table 5-7: Incremental Net Benefits by Program Area shows the results of the incremental net benefits analysis for the PFP program areas. For example, at the mid-price case in the Cook Inlet Program Area, approximately \$5.5 billion (2017 dollars) in economic value is anticipated as a result of the Program.

Table 5-8: Incremental Net Benefits for Proposed Final Program Options shows the estimate of net benefits for the specific options in each program area. Each program area has a No Sale Option where no new leasing would occur in the program area. The Net Benefits of each program area's No Sale Option

are the net benefits associated with the energy substitutes that occur in the absence of an OCS lease sale. The incremental program area values are the net benefits of the OCS Sale Option less the benefits of the No Sale Option. For example, as shown in Table 5-7, at the mid-price case in the Beaufort Sea Program Area, the incremental net benefits are an estimated \$22.5 billion. Table 5-8 shows this incremental calculation split into the \$42.9 billion in net benefits from a sale in the program area and the \$20.4 billion in net benefits at the mid-price case without a lease sale in the Beaufort Sea Program Area. The difference between the two, approximately \$22.5 billion ($\$42.9 \text{ billion} - \$20.4 \text{ billion} = \22.5 billion, shown in Table 5-7 and Table 5-8), represents the value of the program area above the No Sale Option, i.e., the incremental net benefits.

The net benefits analysis is based on anticipated production in entire program areas, not particular locations within the areas. As such, BOEM estimates that there will be relatively small changes to the net benefits as a result of excluding any of the individual Environmentally Important Areas. Any changes would likely still fall within the range of estimates presented for the Sale Options.

BOEM has not calculated a specific net benefits value for selection of any or all of the Environmentally Important Areas in the Beaufort Sea or Chukchi Sea program areas as the impacts could vary depending on the exclusions adopted. The exclusion of any individual Environmentally Important Area would have relatively small impacts on the Incremental Net Benefits and the results would be similar to those presented in the Sale Option. However, if multiple Environmentally Important Areas in the Arctic program areas are excluded that substantially overlap geologic plays, there could be economic implications that affect industry interest. In the Chukchi Sea, development depends on a successful exploration program leading to the discovery and subsequent development of at least one economically viable oil and gas field to warrant the infrastructure construction necessary to produce and transport hydrocarbons to TAPS. In the Beaufort Sea, an existing network of onshore and nearshore infrastructure based out of Prudhoe Bay serve to improve the economic viability of OCS development relative to the Chukchi Sea. However, development in the Beaufort Sea also depends on a successful exploration program leading to the development of economically viable oil and gas fields that will rely on substantial OCS infrastructure investment to develop. If access to a substantial portion of OCS lands and resources overlapping geologic plays are limited through exclusion of several Environmentally Important Areas, the result could have economic implications and affect industry interest. For the Beaufort Sea lease sale, BOEM has determined that there would be no meaningful difference in the level of national benefits if the sale were held in 2020 or 2019.

Table 5-8: Incremental Net Benefits for Proposed Final Program Options

Program Area	Program Option	Net Benefits		
		(\$ billions)		
		Low	Mid	High
Beaufort Sea	Targeted Lease Sale Option (Beaufort Sea Lease Sale in 2020)	-2.46	42.90	162.24
	Beaufort Sea Lease Sale 255 in 2019	-2.46	42.90	162.24
	Targeted Lease Sale Option with exclusion of Barrow Canyon, Camden Bay, Cross Island, and/or Kaktovik	*	*	*
	Beaufort Sea No Sale Option	0.00	20.40	73.28
	<i>Incremental Beaufort Sale Value</i>	-2.46	22.50	88.96
Chukchi Sea	Chukchi Sea Lease Sale in 2022	-0.42	90.15	229.84
	Targeted Sea Lease Sale Option with exclusion of Hanna Shoal walrus foraging area and/or movement corridor	*	*	*
	Chukchi Sea No Sale Option	0.00	43.99	90.89
	<i>Incremental Chukchi Sea Sale Value</i>	-0.42	46.16	138.95
Cook Inlet	Cook Inlet Lease Sale in 2021	1.99	11.88	25.42
	Targeted Lease Sale Option with exclusion of designated Cook Inlet Beluga Whale Critical Habitat	*	*	*
	Cook Inlet No Sale Option	1.57	6.40	11.22
	<i>Incremental Cook Inlet Sale Value</i>	0.42	5.48	14.20
GOM	Region-wide Leasing Option	50.09	187.16	432.29
	Modified Traditional Leasing Option: Western GOM Lease Sales	11.50	24.84	55.81
	Modified Traditional Leasing Option: Central and Eastern GOM Lease Sales	38.59	162.32	376.47
	Baldwin County, Alabama, 15-mile No-Leasing Buffer Option	50.09	187.16	432.29
	GOM No Sale Option	39.44	121.89	234.71
	<i>Incremental GOM Sale Value</i>	10.65	65.27	197.58
All Program Areas	Lease Sale Option in all Program Areas	49.21	332.09	849.79
	No Sale Option in all Program Areas	41.01	192.68	410.10
	<i>Incremental All Program Areas Sale Value</i>	8.19	139.41	439.70

Note: The low price-case is \$40/bbl and \$2.14/mcf. The mid-price case is \$100/bbl and \$5.34/mcf. The high price case is \$160/bbl and \$8.54/mcf. All values are discounted at a real discount rate of 3 percent. All price scenarios represent a constant, inflation-adjusted price throughout the life of the program. Under the forecasted E&D scenarios, only exploration activities are anticipated for the Beaufort and Chukchi Seas in the low-price case scenario. At this price, there are only negligible UERR. Companies may still engage in exploration activities in these areas with the expectation that prices will rise in the future. The results of the net benefits analysis are additive. That is to determine the impact the total net benefits of different combinations of program areas, simply add the desired areas together.

Key: *=The exclusion of any individual Environmental Important Area could result in relatively small incremental changes in the Net Benefits analysis over the Sale Option. However, potential substantial aggregate impacts similar to those of the No Sale Option could occur if multiple areas are excluded.

For the Cook Inlet Program Area, BOEM has not calculated a specific change in net benefits for the option to exclude, or provide mitigations in, the Beluga Whale Critical Habitat Environmentally Important Area, but estimates that any effect on the net benefits estimates presented with the Sale Option

would be insignificant. Given the small acreage of the possible exclusion area, companies will likely be able to develop other resources in the region with relatively minimal impacts to the net benefits estimates presented.

For the GOM, although there could be impacts in the pace of leasing, BOEM does not think that the Region-wide and Modified Traditional Leasing Options would provide meaningfully different net benefits. Activities such as the eventual exploration or production in these regions will be based on other factors (e.g., prices, rig availability, company operating budget) rather than on the number of lease sales. As part of the Modified Traditional Leasing Option, Table 5-8: Incremental Net Benefits for Proposed Final Program Options provides an estimate of net benefits that would result from the Central and Eastern portion of the GOM Program Area and from the Western portion of the GOM Program Area if separate sales were held and the areas were treated separately.

The third PFP Option in the GOM Program Area to exclude acreage off Baldwin County, Alabama, would similarly not have meaningfully different net benefits. Given the amount of acreage offered throughout the GOM, this small buffer area would not meaningfully affect production or activity levels.

The Net Benefits estimates presented in Table 5-7 and Table 5-8 are based on many assumptions and are therefore highly uncertain. The values depend heavily on the estimate of anticipated production shown in Table 5-2: Anticipated Production by Program Area. Though the estimates are shown at three different price scenarios, many factors beyond price can affect the level of industry interest, activity, and ultimate production from these areas. This analysis is designed to show the Secretary, under a specific set of conditions, the benefits which could be expected from holding the indicated OCS lease sales and those expected from the energy substitutes which would be consumed in the absence of leasing in a particular program area. Chapter 10, Assurance of Fair Market Value, provides quantitative information on some of the uncertainties surrounding oil and gas consumption, all of which could affect the production and net benefits analysis that are actually realized as a result of this Program.

5.4 ASSESSMENT OF CLIMATE IMPACTS

The Net Benefits Analysis omits several conceivable effects of OCS oil and gas development, including, for both the PFP sale options and the No Sale Options, the costs associated with greenhouse gas (GHG) emissions related to oil and gas production, transport, processing and end use consumption. A key reason for not incorporating these costs is that benefits and costs in the net benefits analysis are appropriately assessed at the domestic or national level, not at a global scale. For example, the air quality module in the OECM examines, among other impacts, adverse human health effects associated with increases in ambient PM_{2.5} and ozone concentrations in the program area where they occur. Additionally, consumer surplus estimates from the *MarketSim* model are constrained to the national level. In contrast, GHGs and their associated impacts occur on a global scale such that the resulting effects cannot appropriately be isolated for inclusion in the net benefits analysis.

Nonetheless, BOEM believes it is in the public interest to disclose the potential climate impacts of OCS leasing decisions as part of its planning processes. As a first effort in this regard and due to the differences in the way these costs are incurred (i.e., domestically versus globally), BOEM has chosen to examine the potential social and environmental costs associated with GHG emissions in a separate technical report. The report, *OCS Oil and Natural Gas: Potential Lifecycle Greenhouse Gas Emissions*

and Social Cost of Carbon (BOEM 2016c), estimates social and environmental costs associated with GHG emissions from the Proposed Program and No Sale Option, as well as impacts from current and prior leasing programs. In the report, BOEM analyzes both the “upstream” GHG emissions (emissions associated with the initial exploration, production, and transport of OCS oil and gas resources) and “downstream” GHG emissions (consumption of OCS oil and gas resources). BOEM has completed this initial analysis to estimate the lifecycle (from upstream through to downstream) GHG emissions and estimated social cost of those emissions globally. The results of analyses of this type depend on the methodology and assumptions used to address considerable uncertainties. The report discusses the methodology and assumptions. As reflected in the analysis, the emissions and associated social costs from the Proposed Program and the no action alternative are relatively similar, in large part due to the assumed substitution of more GHG-intensive oil and gas sources in the absence of a new OCS leasing program (see Section 6.4, Possible OCS Production Substitutes). In addition, consistent with this 2017–2022 program analysis, the report assumes current laws and policies. Future policy changes aimed at reducing U.S. GHG emissions could affect the assumptions underlying this analysis.

By completing this analysis, BOEM is taking an important step toward a more complete disclosure to the public of the contribution of BOEM-permitted OCS oil and gas exploration, development and production activities to national GHG emissions. BOEM intends to revisit this analysis in the future, as new data and techniques become available.

For information on climate change impacts related to GHGs, refer to Chapter 4 of the Final Programmatic EIS. Refer to the Economic Analysis Methodology (BOEM 2016b) for an expanded discussion of other costs not included in the environmental and social cost calculation.

Chapter 6 Program Area Location Considerations

6.1 INTRODUCTION

Chapter 6 includes discussion of several different Section 18(a)(2) factors that the Secretary must consider when determining the timing and location of lease sales. Specifically, this chapter will focus on those factors having to do with regional and national energy markets, the policies and laws of affected states, and industry interest.

6.2 NATIONAL ENERGY MARKETS

The following sections discuss national energy markets and the location of OCS program areas relative to the needs of national energy markets, a factor the Secretary must consider under Section 18(a)(2)(C). U.S. energy markets are considered in the presence of a persistent, though recently shrinking, gap between domestic production and consumption; low oil and natural gas prices; continuing concerns over the United States' negative balance of payments in world trade; and the recent expansion in domestic onshore production. To assist the Secretary in her decisions on the size, timing, and location of OCS lease sales, this chapter includes an analysis of the markets for crude oil, natural gas, and refined petroleum products.²⁸

6.2.1 *Recent Developments in Oil Markets*

Oil markets change frequently, but have recently been affected by a few defining characteristics. First, onshore production in the United States has grown rapidly. This has caused ripple effects throughout national and global oil markets, leading in part to a second fundamental change in oil markets, low prices. A third, more recent change, which has had a smaller impact on the oil markets, but is still notable, is the elimination of oil export limitations in the United States.

Over the past decade, the United States has experienced a significant increase in oil and natural gas production from shale and tight formations. This game-changing development has resulted in a significant decline in U.S. dependence on imported petroleum (EIA 2016a). Recent U.S. production growth has centered largely in a few onshore regions and has been driven by advances in the application of horizontal drilling and hydraulic fracturing technologies.

The low oil prices, which began in late 2014, have been a major characteristic of recent oil markets. These low oil prices have affected offshore and onshore production in different ways, given a different level of price sensitivity between the two production sources. Onshore production, specifically from tight formations, is a more price-responsive source of supply than offshore production, given the short time required to drill and complete tight oil wells and the fact that planned or existing projects can be ramped

²⁸ Petroleum products are the output of refineries and made from crude oil (e.g., gasoline, diesel fuel, jet fuel, kerosene). The OCS Lands Act focuses on crude oil and natural gas; therefore, petroleum, or “refined” products are included in this analysis primarily because they represent the form in which end users consume oil that, in its crude form, is used only by refineries.

up or down relatively quickly (EIA 2016b). Alternatively, OCS projects can take 10 years or more from lease award to initial production, and are, therefore, subject to general long-term price expectations rather than short-term price swings. OCS projects generally provide a steady and more predictable source of oil and gas for long periods once production begins.

The different level of price sensitivity between offshore and onshore production has been apparent during the current low oil price environment. Active rigs in the lower 48 states onshore fell by 78 percent from October 31, 2014, to April 15, 2016. The EIA projects that lower 48 onshore crude oil production will fall from 7.41 million barrels per day in 2015 to 6.46 million barrels per day in 2016 and 5.76 million barrels per day in 2017 due to low oil prices and the decline in onshore drilling rigs. However, EIA projects that the impact on total U.S. production will be mitigated by increases in offshore production, which it projects will increase in 2016 and 2017 given the long-term nature of offshore projects (EIA 2016c). Even in the less sensitive offshore region, the persistence of low oil prices has had an effect on offshore operators, as they have begun to respond with reduced exploration, fewer active rigs, and restructured rig contracts (EIA 2016b). More information is included in Section 6.2.6, The Contribution of OCS Oil and Natural Gas.

Another recent change in oil markets has been caused by the December 2015 legislative change eliminating decades-old oil export limitations. The recent removal of export restrictions will affect net imports, but the actual amount of that impact is largely unknown due to the influence of other market factors. Since the elimination of the export restrictions, U.S. crude oil has been exported overseas to the Caribbean, Latin America, Europe, and Asia (EIA 2016d). BOEM continues to study the change to oil markets in response to the elimination of the oil export limitations.

With increased domestic production, both net and gross imports of crude oil have been declining, reducing U.S. dependence on imported petroleum. However, net imports are expected to remain above zero throughout the period (2016–2040) covered by EIA’s 2016 Annual Energy Outlook (EIA 2016e). A recent EIA report (EIA 2015a) showed that the elimination of the oil export limitations would result in only a very low rate of decline in net imports through 2025, the last year of projections. An additional factor that could affect net imports is the adjustment of the domestic industry to current low prices. If prices remain lower than anticipated, it could provide both downward pressure on domestic production and upward pressure on demand, leading to higher imports. Additional information on oil imports and exports is included in the next section.

6.2.2 Relevant Developments in Domestic Petroleum Markets

Petroleum refineries are the primary market for crude oil, which generally is not consumed in its raw state. Refineries use crude oil as feedstock to create an array of petroleum products shipped to various markets around the country and the world. The refined petroleum products market changed significantly over the past several years as the abundance of domestic oil production changed the supply and consumption patterns in domestic crude oil markets.

Onshore tight oil has returned the United States to the position it once held as the top oil and petroleum liquids producer in the world. As mentioned above, the recent increase in domestic oil production has provided a number of benefits and driven major changes in supply and consumption patterns in domestic crude oil markets. One major change in the domestic oil markets is that the vast majority of the oil

produced from tight formations is light, sweet crude, in contrast to the heavier sour crudes that generally come from both other domestic production, including offshore, and imported sources. In fact, roughly 90 percent of the nearly 3 million-barrel-per-day growth in U.S. production from 2011 to 2014 consisted of light, sweet grades, which are higher-quality crudes than the medium-to-heavy sour crude traditionally found on the OCS (EIA 2015b). The light, sweet crude from the increase in onshore production was not traditionally handled by U.S. refineries and transportation infrastructure. As a result, many domestic refineries spent tens of billions of dollars retooling their facilities (Auers and Couture 2015) and the U.S. oil transportation network to adjust to the different crude quality.

This phenomenon has reduced the overall need for imported oil and, beginning in 2011, led U.S. exports of refined petroleum products to exceed imports. However, these overall numbers mask a dramatic change in the composition of remaining imports. Figure 6-1: U.S. Crude Oil Imports by Grade shows the extent to which huge quantities of domestic light crude oil have replaced light crude imports. As shown in the graph, in 2009, light crude imports were more than 20 percent of all imports, but given the increase in domestic light crude production, light crude imports have fallen to less than 10 percent of all imports. The decline in medium and heavy crude imports has been much smaller, with heavy crudes now making up more than half of all imports. While it is possible that a combination of increased onshore production and reduced domestic consumption will allow the trend toward lower imports to continue, the large amount of heavy crude imported indicates there is still a need for the medium-to-heavy crudes found offshore.²⁹

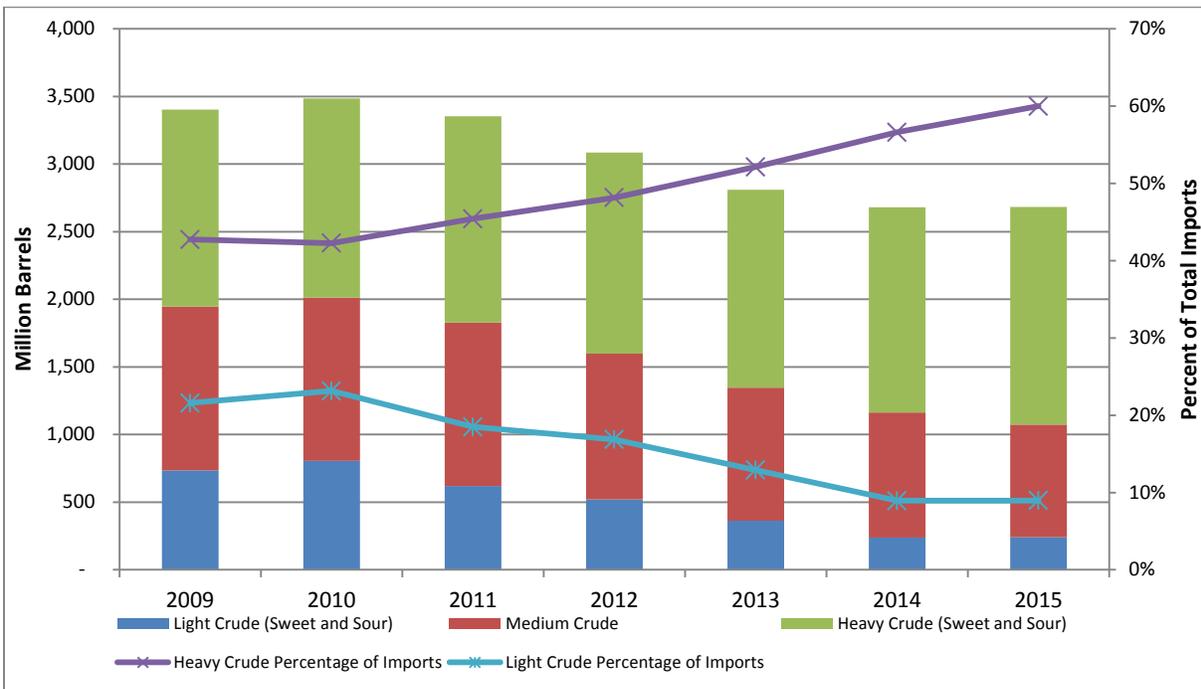
In addition to changing the composition of U.S. oil imports, the light, sweet crude from tight formations has also affected prices within the United States. Given the time it took refineries to adjust to the increase in light, sweet crude and the long distances between production sites and refineries designed for the higher-grade crudes, producers were forced to sell their product at discounted prices. This discount was further increased by market inefficiencies from the former limitations on oil exports. This discount can be seen in the “spread” between prices for the two major “benchmark crudes,” Brent and West Texas Intermediate (WTI).³⁰ The spread between Brent and WTI increased dramatically in early 2011 (EIA 2013), but as markets adjusted (e.g., refineries adjusting to plentiful light crude, rail and truck routes being added or used more heavily, and a few pipelines reversing direction³¹) this discount decreased. In addition, elimination of the oil export limitations in December 2015 further reduced this spread. As markets continue to adjust to the additional domestic production and the elimination of the oil export

²⁹ Markets for crude oil and refined petroleum products should not be confused. While the U.S. has been a net exporter of petroleum products since 2011, EIA projections do not show the U.S. ever becoming a net exporter of crude oil in any of its four cases (EIA 2016f). The focus of the OCS Lands Act is on crude oil and natural gas; therefore, the focus of this discussion of oil markets and refineries generally is on the demand for, and availability of, crude oil as an input, and it does not include extensive information on refined products.

³⁰ Because prices differ for numerous types and locations of crude oil, and are in constant flux, it is helpful to state the current price of any given crude in relation to the current price of a well-known, widely available “benchmark” crude. Two benchmark crudes commonly used to represent “the price of oil,” whether for traders or outside observers, are Brent and WTI. WTI is a light, sweet crude that historically sold for a slightly higher price than Brent crude, which comes from the Atlantic basins such as the North Sea.

³¹ For example, the Seaway Pipeline was constructed to carry crude oil from southern Texas to the oil storage hub in Cushing, Oklahoma, where the unforeseen boom in tight oil production later caused a regional glut and downward pressure on prices for WTI and other crudes from landlocked production sites. The regional imbalance of supply and demand led to underutilization of the pipeline, and its direction of flow was reversed so that it could carry crude from Cushing to Gulf coast refineries, where there was a greater need (reflected in higher prices) (Bloomberg 2011, Reuters 2012).

Figure 6-1: U.S. Crude Oil Imports by Grade



Source: EIA 2016g.

limitations, the spread in Brent and WTI prices will continue to change.

The formerly wide spread between domestic prices and world prices, as indicated by the difference between WTI and Brent, gave U.S. refineries an important feedstock advantage over foreign competitors. A wider spread benefits U.S. refiners as they have access to cheaper crude oil than international refineries and receive prices benchmarked to Brent crude for the sale of refined products (Bandz 2015). Refineries took advantage of the spread, giving them an important feedstock advantage over foreign competitors, partially offsetting the higher operating costs driven by adapting to the light sweet crude from new domestic sources. These cost advantages, which also include U.S. refineries' use of and accessibility to inexpensive natural gas to run their operations, are presumably the major factor that allowed the United States to become a net exporter of petroleum products in 2011. Now, as the spread in Brent and WTI prices narrows, U.S. oil producers receive a benefit as they are selling their domestic product for prices more consistent with those received by international companies for foreign product benchmarked to Brent crude.

6.2.3 Relevant Developments in Domestic Natural Gas Markets

The surge in the use of new technology to develop large onshore tight-formation plays initially focused on natural gas. This early success led to significant downward pressure on gas prices, to the point that producers began to direct their attention to projects that yielded gas only in association with the more valuable liquids. Nevertheless, plentiful domestic natural gas production has kept domestic natural gas prices far below benchmark prices in many other parts of the world. Companies are constructing permitted liquefied natural gas (LNG) export terminals, hoping to take advantage of world prices that can be more than twice the level of U.S. prices.

While natural gas, like oil, varies in its characteristics and serves as a feedstock for non-fuel products such as fertilizer and plastics, processing natural gas is simpler than refining crude oil. The downstream markets are not as varied, however, and the challenge is transporting the gas overseas, which is what has prompted recent applications to build or convert LNG export terminals.

Less expensive natural gas has reduced manufacturing energy and feedstock costs and has enabled manufacturing companies to increase U.S. operations or return manufacturing from overseas. This natural gas renaissance is helping to stem the long-term decline in U.S. manufacturing jobs and helping to provide a competitive advantage for the U.S. manufacturing industry.

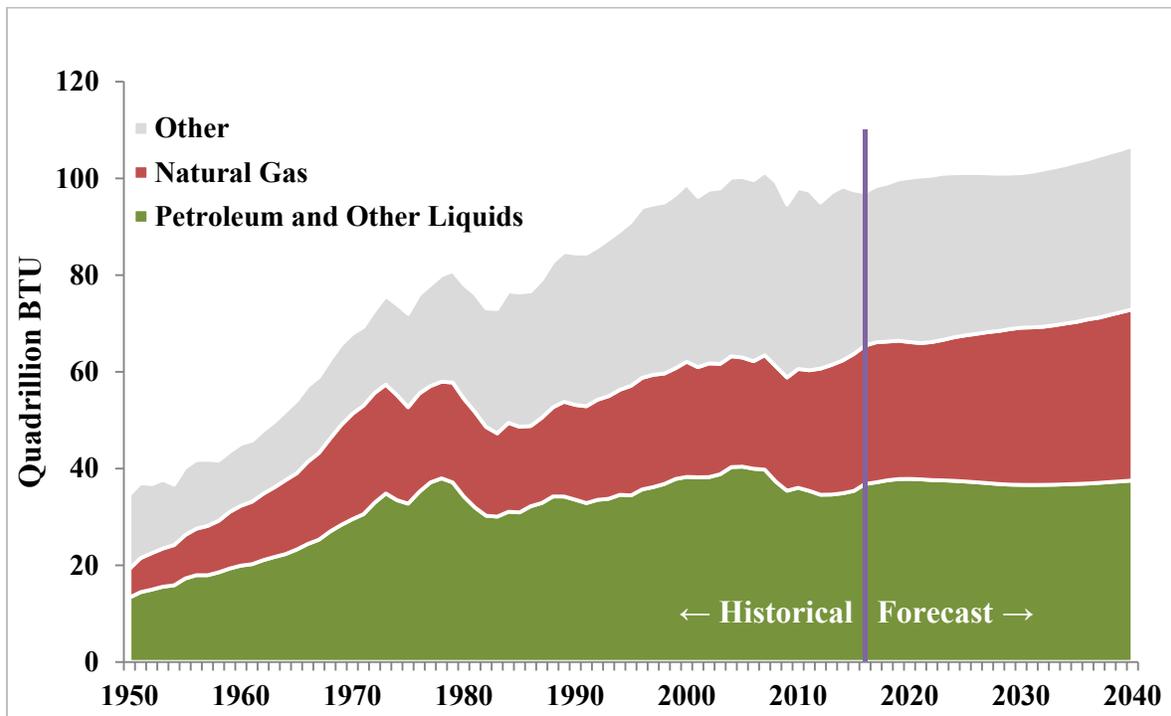
6.2.4 Oil and Natural Gas Consumption and Production Estimates

EIA's reference case analysis projects that the United States will continue to heavily rely on oil and natural gas to meet its energy needs under current laws and regulations. In 2015, 65 percent of energy consumed in the United States came from oil and natural gas, and the EIA forecasts, based on current laws and regulations, that this percentage will remain fairly constant through 2040. Figure 6-2: Historical and Forecasted U.S. Energy Consumption by Fuel Type shows total U.S. energy consumption by fuel source from 1950 to 2015 and includes the EIA's *Annual Energy Outlook 2016* projections from 2016 through 2040. The projections shown in Figure 6-2 indicate that while the share of energy obtained from oil decreases slightly, the actual amount of oil needed to meet the United States' energy needs will continue to grow until 2020 before it begins to stabilize and eventually decline. Figure 6-2 also shows that domestic natural gas consumption is expected to grow through 2040. The projections shown in Figure 6-2 are from the EIA's *Annual Energy Outlook 2016* Reference Case, which includes current laws and regulations including implementation of the Clean Power Plan. As will be described in more detail in Section 6.4, Possible OCS Production Substitutes, the projections made by EIA in the *Annual Energy Outlook* are based on current laws and regulations and do not make assumptions about future laws or changes in overall climate policy. As such, the actual level of consumption could differ from those shown here as new laws and policies are implemented.

Oil and gas production in the United States has increased rapidly in recent years. As shown in Figure 1-3: Historical and Forecasted U.S. Crude Oil Production by Region, OCS oil production as a percent of total oil production peaked in 2009 at 30 percent of domestic production but the OCS's relative contribution has fallen in recent years, largely due to increases in onshore production. The OCS contribution to domestic natural gas production peaked at 27 percent in 1990, but has fallen drastically given both declines in OCS natural gas production and increases in domestic production. The EIA projections show OCS natural gas production will increase in both quantity and percentage contribution to domestic natural gas production through 2040. Projections show a short-term increase in OCS oil production, but then a decline and relatively stable levels of OCS oil production through 2040. Figure 1-3: Historical and Forecasted U.S. Crude Oil Production by Region and Figure 1-4: Historical and Forecasted U.S. Natural Gas Production by Region in Chapter 1 show EIA's projections of US offshore and onshore oil and

natural gas production from 2015 through 2040. Again, these projections are based on current laws, regulations, and policies and assume resources are not subject to further leasing restrictions.³²

Figure 6-2: Historical and Forecasted U.S. Energy Consumption by Fuel Type



Source: EIA 2016h

6.2.5 Future Unpredictability and Possible Policy Implications

Many factors influence actual oil and gas production, prices, and consumption. These factors include domestic and foreign GDP growth rates, technology development (affecting the supply and/or demand side), a variety of geopolitical events, access to oil and gas resources, and laws, regulations, and policies. Improvements to existing technology have allowed access to hydrocarbon resources previously deemed too expensive or difficult to develop by more traditional means. This unexpected renaissance has reversed the long-term decline in U.S. oil production, catapulting the United States to the position as the world’s top crude oil producer. The U.S. produced 52.422 quadrillion British thermal units (Btus) of oil and gas in 2015 (EIA 2016i), the highest total level of oil and gas production in U.S. history.

A combination of circumstances caused the price of oil to roughly double from mid-2007 to mid-2008. As had happened when oil prices rose during the 1970s and into the 1980s, observers anticipated only increases thereafter. In both cases, industry experts were slow to see the collapse of prices in response to changing market conditions. Increasing production, combined with a worldwide recession that began in the latter half of 2008, caused oil prices to fall by more than two-thirds in the last 5 months of that year. However, in early 2009, prices began to recover fairly quickly—even if far below the previous high—and

³² EIA projections are based on current laws, regulations, and policies and, therefore, assume that all OCS areas not withdrawn or under moratoria are available for leasing as of 2017 or, for areas not included in the PFP, in later years.

expectations were such that there was only a short pause in the growing use of fracking and horizontal drilling technology that had already been set into motion by the increasing prices prior to mid-2008. The surge in production from new projects significantly added to world oil supply and kept oil prices from exhibiting sudden spikes in response to numerous world events since that time. While prices grew to about \$100 per barrel in early 2011 and remained near that price for more than three years, eventually the combination of annual increases in U.S. production and decisions by major OPEC countries not to reduce their production once again led to a decline in crude prices by more than two-thirds starting in late 2014. These low prices continue into 2016.

The factors affecting oil and gas prices are complex and often unpredictable. Prevailing prices or price trends during Five-Year Programs, not to mention the extended lifecycles of resulting projects, have often been very different from those anticipated by even the most authoritative forecasters while those Programs were being developed. Likewise, unforeseen events and trends could negate current expectations during the lifecycle of projects resulting from the 2017–2022 Program. Unknown factors could include dissipation of the onshore fracking boom, changes in worldwide consumption patterns, geopolitical conflicts, new technological breakthroughs, or substantial new energy policies. Major changes often take many years and can be costly and disruptive if they require new infrastructure, transportation networks, etc. The volatility of U.S. energy needs, oil and gas supply, and changes in prices cannot be predicted over the next 40 to 60 years. Markets will adjust to the changes that occur, but adjustments can be eased by resource availability. All other things being equal, it is better for the United States to pursue energy policies that maximize, rather than limit, the ability of markets to respond to the challenges of the future.

In addition to the future unpredictability of markets and prices, future policies outside of those directly related to OCS leasing could affect OCS exploration and production. As the nation finds ways to deal with the ongoing challenges of GHG emissions and climate change, and to meet targets identified in the Paris Agreement of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), new policies will almost certainly be considered. Substantial policy changes could affect the Nation's energy markets and the contribution of oil and gas to those markets. While the information provided by the present analysis does not include speculation about specific future policies, throughout the implementation of the Five-Year Program, the Secretary has flexibility to re-evaluate the nation's energy needs and current market developments and can reduce or cancel lease offerings. Revised energy policies could prompt companies to bid on fewer leases, develop fewer projects on those leases, or abandon fields sooner, regardless of decisions in this Five-Year Program. Changes in energy policies will continue to be studied in future analyses in regards to this and future Five-Year Programs.

6.2.6 The Contribution of OCS Oil and Natural Gas

As discussed earlier, the OCS is a major long-term supplier of reasonably predictable conventional crude oil and, to a lesser extent, natural gas. From a national energy and economic security standpoint, OCS production is an important part of the President's energy strategy to maintain domestic oil supplies to meet domestic demand (Executive Office of the President 2014). All domestic production serves to reduce exposure to the unpredictability of some foreign oil sources and resulting price volatility. OCS oil production complements other conventional sources and tight oil production, leading to greater stability in world markets overall. Broadly defined, the United States now has two general sources of domestically

produced oil and natural gas supply: relatively quick-turnaround, onshore tight oil projects that produce higher-quality crude, and longer-term, traditional projects that generally produce medium-to-heavy sour crudes. Projects like those on the OCS provide a fairly stable source of oil and gas that is less susceptible to changes in markets or assumptions about undiscovered resources, prices, technology, recovery rates, etc.³³ This overall stability allows for longer-term planning for infrastructure and other needs. More information on the importance of OCS production is described in the next two sections. Also, as described in Section 1.2, Energy Needs, in addition to its contribution to energy markets as providing oil and gas fuel and refinery feedstock, the OCS program provides for significant benefits including billions of dollars of revenues to Federal, state, and local governments, as well as important employment benefits.

6.2.6.1 Ability of OCS Production to Fulfill Short-term Needs

OCS areas can provide oil and natural gas base load production for decades to come. While OCS production is not as responsive to price changes as is production from tight formations, it is more sensitive to low prices than to high prices, indicating that long-term planning to increase flexibility to respond to unexpectedly high energy needs may be more important than planning for adjustments to unexpectedly low energy needs in the future (see discussion of price sensitivity in Section 6.2.2, Relevant Developments in Domestic Petroleum Markets). Given the nature of offshore oil and gas development, the OCS 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.³⁴ OCS projects take years to develop and even then, development can be further delayed by rig unavailability, time required to construct facilities, and other factors. Companies cannot simply explore and develop fields only to postpone production until a national need suddenly arises. Even if carrying excess capacity were not expensive, the OCS Lands Act necessitates due diligence in production of economic resources.

The legal constraints governing the OCS Oil and Gas Program leasing and development processes effectively restrict offering acreage to quickly make available additional undiscovered resources in response to changing energy needs. Should conditions warrant the need for energy production from areas not on the approved schedule of proposed lease sales, absent new legislation, the multi-year process of preparing a new Five-Year OCS Leasing Program must be undertaken, and it would take years before new lease sales could be held and leases awarded. Following lease award, it would still take many more years before industry could begin production on new projects capable of noticeably increasing overall production, even in the Western and Central GOM. In frontier areas, there would be further delays to devise exploration strategies, to obtain and transport needed exploration rigs, and to build the infrastructure/facilities needed to support development and production. Thus, when making decisions for this OCS Leasing Program, an important consideration is the value of allowing the Program and energy markets the option of responding to energy needs in the coming years, or even decades into the future.

³³ Many of the resource estimates for tight oil are necessarily tentative, given the associated data availability and unforeseen technological/efficiency advances.

³⁴ Crude oil prices are set on the world market. Changes in supply and demand will affect not only prices that refineries pay for imports, but also what they pay for domestic crude. This was true even before the lifting of oil export restrictions. Refineries will sell their petroleum products where prices are the most favorable, so U.S. markets will compete with the rest of the world for those products. In a free market, companies can put their resources where they bring the highest return, and attempts to control domestic prices have been shown to create disruptive, unintended consequences and to discourage investments that lead to increased domestic supply.

Conversely, if the United States' need for oil and/or gas declines relative to supply, the USDOJ can respond fairly quickly by cancelling or limiting lease sales and the OCS industry can also respond quickly by bidding on fewer leases or delaying development (within the limits of the initial period of the lease). Lease sales can be cancelled, companies can bid on fewer blocks in the lease sales that are held, and operators can decide to postpone or abandon plans to explore, develop, or produce on leased blocks. Recent GOM bidding activity has declined in response to relatively low oil and natural gas prices due primarily to the marked increase in oil and natural gas supply coming from onshore plays.³⁵ The decline in bidding activity has been most pronounced on the GOM shelf, which is rich in natural gas deposits.

6.2.6.2 *Importance of OCS Production*

Although overall net petroleum import levels have been decreasing, OCS production is still important to U.S. energy markets. Not all oil is equal—the medium-to-heavy sour crudes produced from the OCS are still greatly needed in U.S. refineries. Partly because Gulf coast refineries are equipped for medium and heavy crude rather than the light, sweet crude being produced in such abundance in recent years, there is a continued need for OCS crude, and there is an existing network of pipelines from producing areas to nearby refineries.

New production from the OCS would help meet the United States' continued energy demand and maintain a diversity of supply. Diversity of supply mitigates the effects of import disruptions and cushions the consequences of other disruptive forces. Volatile energy prices and continued dependence on foreign energy, especially for crude oil, raise important energy policy issues about energy supply options and their effects on the economy and the environment. The recent increase in domestic oil production, when added to OCS and existing onshore production, has helped to increase world oil supply. The larger base of world supply has created more price stability, as supply disruptions of a given volume would no longer cause the same percentage change in overall supply. Increases and decreases in U.S. production affect the world market for oil, influencing prices, the flexibility of the United States to respond to international problems, and other such factors. This relationship may have become even more direct with the recent lifting of oil export restrictions. Any significant declines in OCS oil production would therefore offset the increased supply and other benefits flowing from the recent U.S. fracking boom.

6.3 REGIONAL ENERGY MARKETS AND THE LOCATION OF THE PROGRAM AREAS

In making the decisions on size, timing, and location of OCS oil and gas leasing for the Program, the Secretary must consider "...the location of [OCS] regions with respect to, and the relative needs of, regional and national energy markets" (Section 18(a)(2)(C) of the OCS Lands Act). Given that crude oil and natural gas are both multi-product (and varied) compounds, the following "regional energy considerations" discussion provides information on the immediate markets for these resources as well as overall energy production and consumption. To analyze energy markets regionally, BOEM uses

³⁵ For example, only two blocks received bids in water depths of 0 to 200 meters in the Western GOM Planning Area Sale 246 in 2015 (totaling less than \$300,000), as opposed to 67 blocks in Western GOM Planning Area Sale 207 in 2008 (totaling \$75.55 million).

Petroleum Administration for Defense Districts (PADDs) from the EIA to group all 50 states by five separate districts.³⁶ The PADDs, shown in Figure 6-3: Petroleum Administration Defense Districts, allow users, including BOEM, to analyze regional movements of natural gas and petroleum.

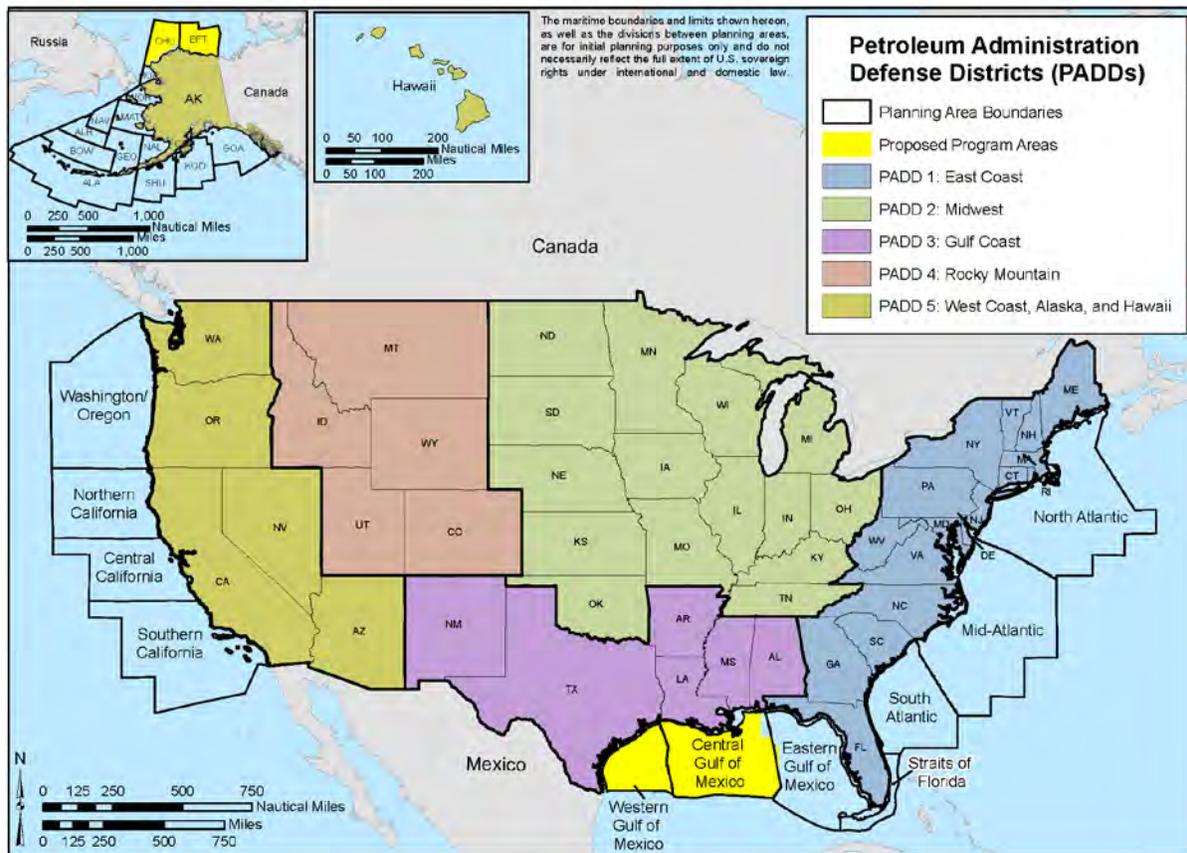
6.3.1 Regional Production and Consumption

Regional energy markets are defined by the amount of crude production, refining, and consumption that occurs in each region. Figure 6-4: Contribution to Oil Production by PADD and Figure 6-6 shows proportional petroleum production and consumption by region in the United States in 2015.

Figure 6-5: Contribution to Marketed Natural Gas Production by PADD and Figure 6-7: Natural Gas Consumption by PADD similarly shows production and consumption by PADD for natural gas. To show the differences between Alaska and the rest of the West Coast PADD, Alaska is shown separately in Figure 6-4 through Figure 6-7. One noticeable theme is that the Gulf Coast PADD is responsible for a majority of both domestic oil and natural gas production, but consumes a much smaller share. The East and West Coasts and Midwest PADDs consume close to 70 percent of the domestic oil and natural gas used in the United States, but supply only about 27 percent of domestic oil and 34 percent of natural gas production. In 2015, the GOM OCS as a whole was responsible for 16 percent of domestic oil production and 5 percent of domestic natural gas production. As shown in Chapter 5, the anticipated production from the program areas considered in this PFP analysis in the Gulf Coast PADD and Alaska portion of the West Coast PADD could be used to meet regional energy needs.

³⁶ Alaska is separated from other states in the West Coast PADD in Figure 6-4 through Figure 6-7 as it has its own OCS region, and because its large oil production and low consumption mask a very different production-consumption relationship than is found in other states. Based on data availability, Alaska is grouped with the remaining West Coast PADD states for the other tables and figures.

Figure 6-3: Petroleum Administration Defense Districts



Source: EIA 2016j

6.3.2 Regional Transportation

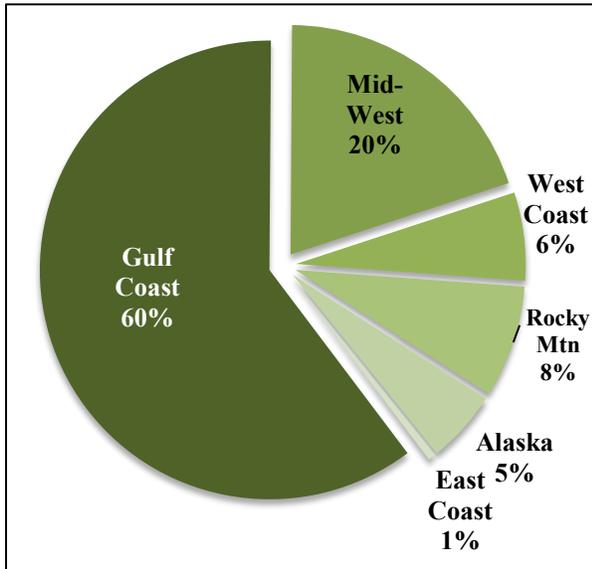
While clearly there are differences between the production and consumption levels of every PADD, resources must be transported between regions to ensure that each PADD is able to fulfill its consumption needs. Because crude oil and natural gas are rarely suitable for consumption without going through a refining/processing stage during which various final products are extracted, refineries and gas-processing facilities are the primary markets for oil and gas. Oil and natural gas are fungible resources, even more so once refined and processed, making location less relevant at later stages. Therefore, refinery capacity within a region is a key component of each region’s ability to support its own demand or the national energy demand. Figure 6-8: U.S. Refining Capacity by PADD, 2015 shows the percent of U.S. refining capacity in each PADD.

Even though the East Coast accounts for 28 percent of total U.S. oil consumption, it only contains 7 percent of the United States’ refining capacity. To fulfill the regional energy demand, a network of pipelines, trains, trucks, and barges is required to transport resources to refineries and then again to the final consumer.

Each of the PADD regions receives crude oil and petroleum products in three different ways: production, regional imports, and foreign imports. Similarly, most of the regions have at least some regional and foreign exports. Figure 6-9: U.S. Crude Oil and Petroleum Production and Import/Export by Region,

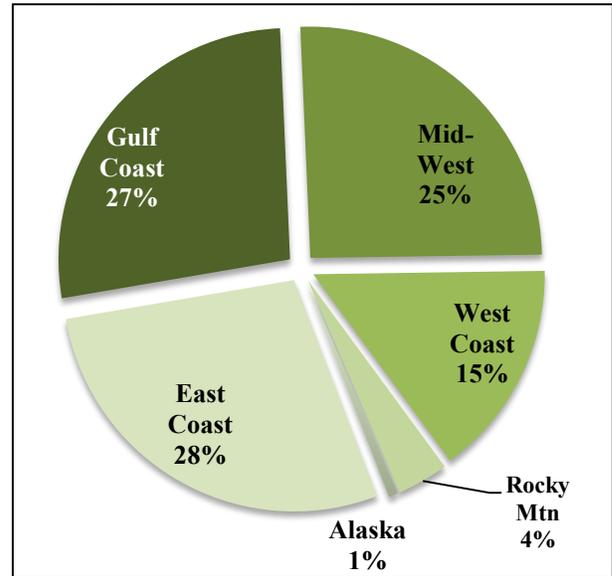
2015 shows the crude oil and petroleum production and movement by pipeline, tanker, barge, and rail for each PADD region. The Gulf Coast PADD has the most throughput of oil and petroleum products because it has the largest production and refining capacity and receives the largest amount of foreign imports. The Gulf Coast PADD provides to consumers the largest share of both foreign and regional exports.

Figure 6-4: Contribution to Oil Production by PADD



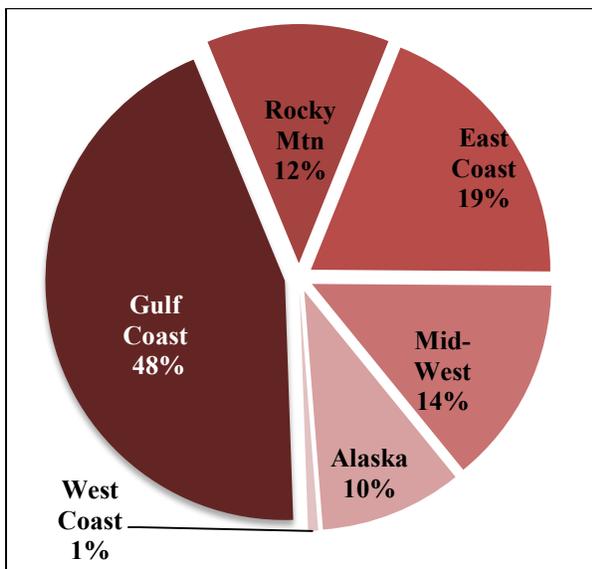
Source: EIA 2016g

Figure 6-6: Oil Consumption by PADD



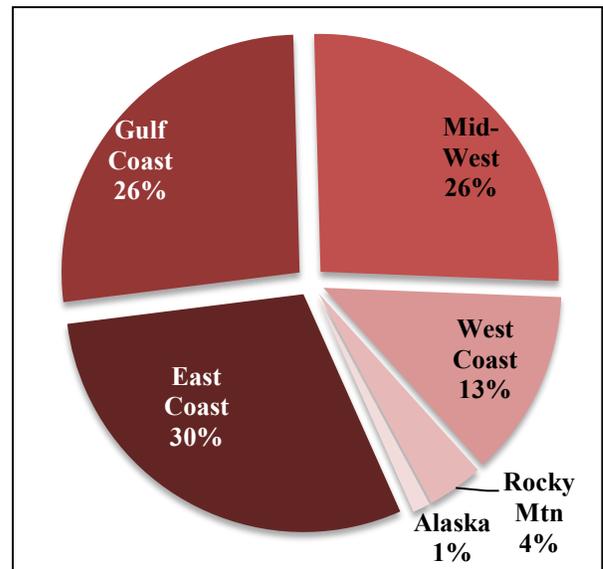
Source: EIA 2016k

Figure 6-5: Contribution to Marketed Natural Gas Production by PADD



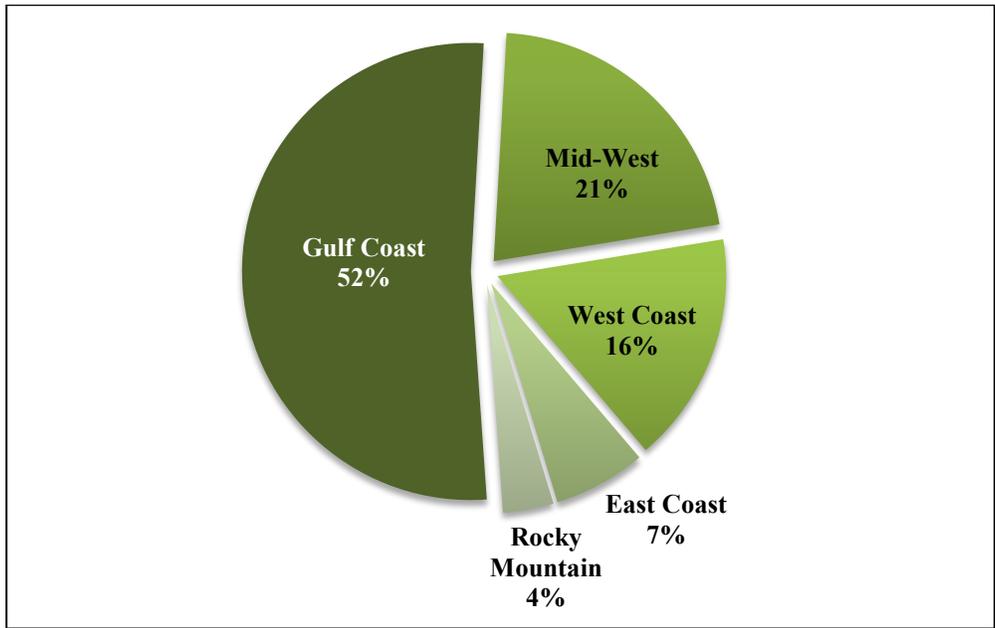
Source: EIA 2016l

Figure 6-7: Natural Gas Consumption by PADD



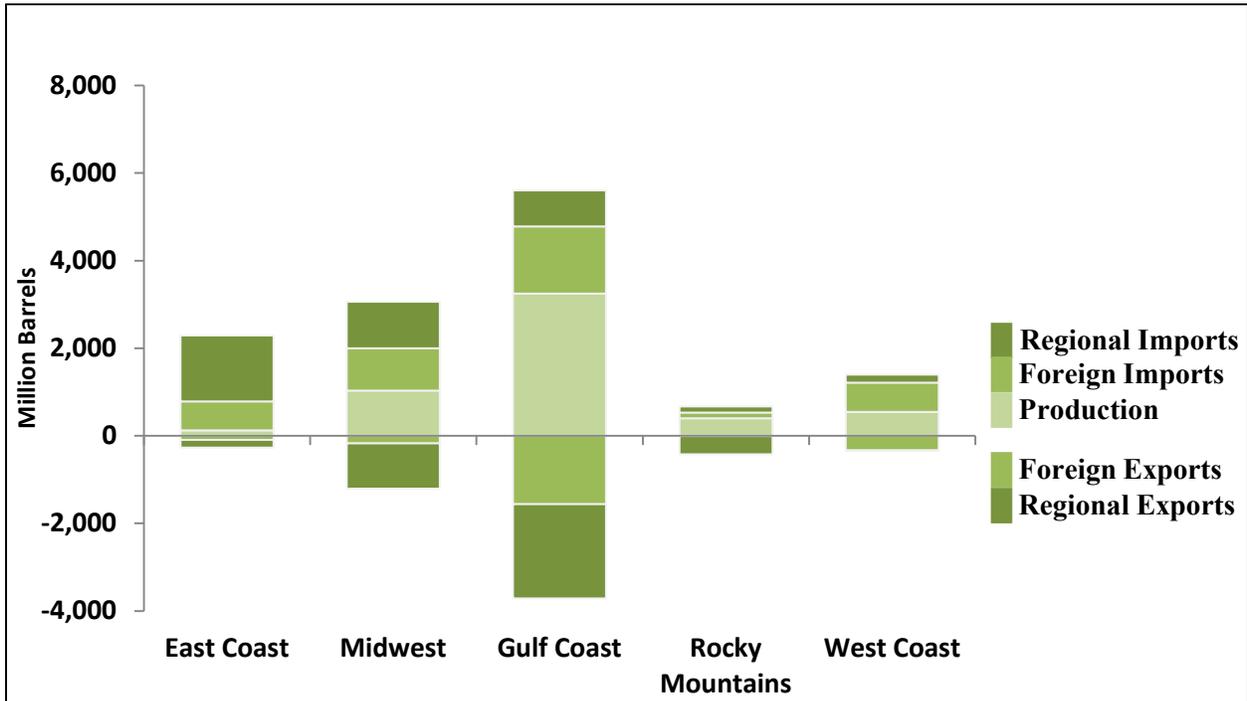
Source: EIA 2016m

Figure 6-8: U.S. Refining Capacity by PADD, 2015



Source: EIA 2016n

Figure 6-9: U.S. Crude Oil and Petroleum Production and Import/Export by Region, 2015



Note: This reflects crude oil and petroleum production and movement by pipeline, tanker, barge, and rail for each PADD region.

Source: EIA 2016o, EIA 2016p, EIA 2016q

Examining in particular the regional movement, Table 6-1 shows the 2015 inter-PADD movement of petroleum products by tanker, pipeline, barge, and rail.³⁷ Table 6-2 shows the 2015 inter-PADD movements of crude oil. Approximately three-quarters of the petroleum product movements by tanker, pipeline, barge, and rail originated in the Gulf Coast PADD, which includes the GOM offshore. More than three-quarters of these shipments from the Gulf Coast PADD went to the East Coast PADD.

Table 6-1: 2015 Petroleum Product Shipments by Tanker, Pipeline, Barge and Rail (million barrels)

PADD	From PADD 1	From PADD 2	From PADD 3	From PADD 4	From PADD 5	Total Receipts
To PADD 1 (East Coast)	-	34	1202	0	1	1236
To PADD 2 (Midwest)	148	-	253	70	0	471
To PADD 3 (Gulf Coast)	1	204	-	78	1	284
To PADD 4 (Rocky Mountain)	0	59	0	-	0	59
To PADD 5 (Pacific)	0	0	61	21	-	81
Total Shipments	148	297	1516	169	2	2131

Source: EIA 2016r

Table 6-2: 2015 Crude Oil Shipments by Tanker, Pipeline, Barge and Rail (million barrels)

PADD	From PADD 1	From PADD 2	From PADD 3	From PADD 4	From PADD 5	Total Receipts
To PADD 1 (East Coast)	-	141	16	7	0	165
To PADD 2 (Midwest)	3	-	302	185	0	489
To PADD 3 (Gulf Coast)	9	373	-	34	0	415
To PADD 4 (Rocky Mountain)	0	75	0	-	0	75
To PADD 5 (Pacific)	0	50	2	4	-	56
Total Shipments	11	639	320	230	0	1201

Source: EIA 2016o

While Table 6-1 and Table 6-2 show the inter-PADD movements, the United States exports additional petroleum products internationally, as shown in Figure 6-9: U.S. Crude Oil and Petroleum Production and Import/Export by Region, 2015. In some instances, it makes more economic sense to export refined petroleum products to other countries than to transfer them between regions. For example, most of the U.S. refined petroleum product exports come from the Gulf Coast due to a decline in U.S. demand for

³⁷ EIA does not track transport of petroleum products by truck.

gasoline and an increase in refinery capacity. Gulf Coast refineries have a competitive advantage internationally because they use the lower quality, cheaper crude; run on natural gas (which is inexpensive in the United States); and are close to the emerging Latin American markets (EIA 2012). Because of these advantages, pipeline capacity, and other regulatory issues (including Section 27 of the Merchant Marine Act [P.L. 66-261]³⁸), refineries in the Gulf Coast often export gasoline to Latin America rather than shipping it to the East Coast. The East Coast receives refined product imports from European refineries, which face stronger relative demand for diesel fuel than for gasoline. The Midwest, with its expanded production, is now much less dependent on Gulf Coast refined products (EIA 2012). Though data are not currently available, energy markets are becoming increasingly global now that U.S. limitations on crude oil exports have been removed. BOEM is continuing to analyze how this change will affect domestic and regional energy markets.

Given the interconnectedness of national and international markets, domestically produced fuel has a direct impact on U.S. energy markets, even if it is consumed abroad. BOEM does not track what portion of OCS-derived fuels is consumed domestically, but instead considers the impact of OCS production on national and international markets. This approach was upheld in *Center for Sustainable Economy v. Department of the Interior*, 779 F.3d 588 (D.C. Circuit 2015). The court found that “what matters in determining whether OCS-derived fuel meets national needs is not whether the additional OCS fuel is consumed domestically, but whether it helps to satisfy domestic needs for fuel security and net supply, both in aggregate and over time.”

6.3.3 Regional Energy Prices

Regional production-consumption gaps, proximity to production areas, and existing transportation constraints can affect regional prices for petroleum and natural gas products. For gasoline prices, the largest factor affecting prices is the cost of crude oil. The EIA estimates that in 2015, approximately 48 percent of the price of a gallon of gasoline was the cost of crude oil, 19 percent was from Federal and state taxes, 19 percent was from refining costs and profits, and 14 percent was distribution and marketing (EIA 2016r). Regionally, gasoline prices can vary based on taxes from both the state and local governments. Another regional factor affecting price is the costs and profits of refineries. Because the crude oil inputs vary by region and the gasoline characteristics of the output³⁹ are also different by region, price can vary greatly. After refining, gasoline is usually shipped from the refinery by pipeline to terminals and then distributed to gasoline stations by tanker truck. Thus, the distance from refinery to consumption point can greatly affect the cost (EIA 2016r).

6.3.4 Alaska Regional Energy Markets

As shown previously in Table 5-2: Anticipated Production by Program Area, the Alaska OCS program areas as a whole appear to have huge, if uncertain, oil and gas resource endowments. Arctic areas (Beaufort Sea and Chukchi Sea) have especially promising oil and gas potential. In particular, Arctic

³⁸ The Merchant Marine Act requires that all goods transported by water between U.S. ports be carried on U.S. flagships, constructed in the United States, owned by U.S. citizens, and crewed by U.S. citizens and U.S. permanent residents.

³⁹ States and some local jurisdictions have responded to air quality requirements with varying standards for gasoline composition, creating the need for refineries to modify their output for specific markets. Specific refineries will produce only a subset of the gasoline varieties required for different markets.

OCS oil may be important to Alaska for continued operation of the TAPS. Declining onshore production from Prudhoe Bay is affecting the usefulness of TAPS, which requires a certain level of throughput to operate without posing major technological challenges. Depending on circumstances such as timing and oil prices, new OCS production could help provide the additional throughput needed to extend the life of TAPS, allowing it to continue to carry oil from Northern Alaska for many years in the future (NETL 2014). The State of Alaska and others raised the issue of the long-term viability of the TAPS pipeline and the role that OCS production could play in extending its life in comments on the development of this Program.

Though BOEM and industry estimates indicate that the Chukchi Sea and Beaufort Sea program areas contain vast resources, significant infrastructure would need to be developed before major new production could begin. Outside of Cook Inlet, which is close to infrastructure that can accommodate activities on state leases, as well as commercial markets, the Alaska OCS is fairly remote. Heavy investments in new infrastructure would be required.

With the exception of the No Sale Option, selection of the supplemental options in the Alaska program areas would be unlikely to have any major impact on national and regional energy needs. Moving the year of the sale in the Beaufort Program Area would not have a meaningful impact on the area's contribution to energy needs and markets. Exclusion of an individual Environmentally Important Area would likely have an insignificant effect on the resources that would be available to meet the needs of regional and national energy markets compared to what could be expected with the entire program area. However, if several Environmentally Important Areas in the Arctic program areas are excluded that substantially overlap geologic plays, there could be economic implications that affect industry interest. In the Chukchi Sea, development depends on a successful exploration program leading to the discovery and subsequent development of at least one economically viable oil and gas field to warrant the infrastructure construction necessary to produce and transport hydrocarbons to TAPS. In the Beaufort Sea, an existing network of onshore and nearshore infrastructure based out of Prudhoe Bay serve to improve the economic viability of OCS development relative to the Chukchi Sea. However, development in the Beaufort Sea also depends on a successful exploration program leading to the development of economically viable oil and gas fields that will rely on substantial OCS infrastructure investment to develop. If access to a substantial portion of OCS lands and resources with geologic plays are limited through the exclusion of several Environmentally Important Areas, the result could have economic implications and affect industry interest.

6.3.5 Gulf of Mexico Regional Energy Markets

The GOM OCS region has by far the greatest resource potential of the four OCS regions and is located such that it can supply oil and gas to the United States' top three consuming PADDs: the East Coast, Gulf Coast, and Midwest. Given the different qualities of crude discussed earlier, production from the OCS is very important to U.S. energy markets to fulfill the demand at the Gulf Coast refineries for heavy crude.

With the exception of the No Sale Option, selection of any of the options in the GOM Program Area is unlikely to have any major impact on the national and regional energy needs. The difference in production and outcomes associated with the selection of the region-wide or planning-area specific lease sales are expected to be minimal and thus not to affect the region's energy markets. Similarly, selection

of the Baldwin County, Alabama buffer is unlikely to have an impact on the region’s activity and production.

Selection of the No Sale Option in the GOM could impact national and regional energy markets. As discussed, the GOM OCS provides oil and gas to other regions throughout the U.S. and without new OCS leasing in the GOM, absent other changes in assumptions or policy, substitute energy sources would be required to fulfill domestic demand. These possible substitutes are discussed in Section 6.4, Possible OCS Production Substitutes.

6.4 POSSIBLE OCS PRODUCTION SUBSTITUTES

A reduction in OCS oil and gas production will not lead to an equal reduction in the quantity of oil and gas demanded by energy markets. Instead, other energy sources (e.g., more imports, onshore production, coal, reduction in consumption) would substitute for some of the forgone OCS production. Table 6-3 shows the energy market substitutions under current law and policies that would occur in the event the No Sale Option were selected in all of the OCS program areas.

Table 6-3: Energy Market Substitutions in Absence of New OCS Program

Energy Market Substitutions	Percent of Anticipated OCS Production Replaced
Oil Imports	63%
Onshore Natural Gas Production	22%
Reduced Consumption	7%
Coal	<1%
Onshore Oil Production	3%
Other Energy Sources	3%
Production from Existing State/Federal Offshore Leases	1%
Electricity from sources other than Coal, Oil, and Natural Gas	1%
Natural Gas Imports	<1%

As described in Chapter 5 and in more detail in the Economic Analysis Methodology paper (BOEM 2016), BOEM uses the *MarketSim* model to estimate the amount and percentage of substitutes the economy would adopt in the absence of all, or even some, new OCS production.⁴⁰ *MarketSim* is based on authoritative and publicly available estimates of price elasticities, which reflect the changes in quantities supplied and demanded in response to changes in price.

Based on the current analysis using the 2016 AEO data, most of the forgone OCS production would be replaced with increased petroleum imports, increased onshore oil and gas production, and other energy sources. Further, a relatively small amount of forgone production would not be replaced because overall oil and gas demand would be reduced due to marginally higher prices. As shown in Table 6-3: Energy Market Substitutions in Absence of New OCS Program, *MarketSim* estimates that in the absence of a new

⁴⁰ See BOEM 2015a for a detailed discussion of the data and methodology underlying the *MarketSim* model.

OCS program, approximately 63 percent of the production that would have occurred with a program would be replaced with imports. The model also estimates that approximately 7 percent of the production would not be replaced due to reduced consumption. Most of this reduction would likely be from lower natural gas usage, with the remainder coming from lower oil usage. This estimated reduction in domestic consumption resulting from selection of the No Sale Option is net of a slight increase in consumption of electricity and coal. An important note to reiterate about these percentages is that they reflect substitution for forgone OCS oil and natural gas production, not proportional changes in consumption for the entire United States, which would be much lower. For example, the 63 percent replacement of OCS production by higher crude oil imports is equivalent to a 14 percent increase in the baseline level of U.S. net imports under the mid-price scenario. The reduction in natural gas usage would be equivalent to a 0.09 percent decrease in baseline national natural gas demand, and the lower oil usage would be equivalent to a 0.06 percent decrease in baseline national oil demand. The increased consumption of electricity and coal would be equivalent to increases in national electricity and coal demand of less than 0.1 percent.

For the PFP analysis, the *MarketSim* model uses as its baseline data the 2016 Reference Case from the EIA's AEO. This baseline reflects all laws, regulations, and policies in effect prior to the full release date of September 15, 2016 (EIA 2016s). EIA's long-standing practice is to base the Reference Case on current laws, policies, and regulations in the AEO and to consider its alternative assumptions in supplemental analyses and policy reports.

BOEM adopts the same practice as EIA in regard to baseline assumptions about future energy policies. This PFP analysis is based on AEO's 2016 Reference case, which includes the Clean Power Plan. BOEM uses a version of the EIA's Reference Case for its baseline analysis throughout this PFP decision document, providing additional information throughout where alternative policies may lead to different results. The program analyses provide the Secretary with a picture of how new OCS production will fit with current and projected energy needs under current conditions. The analysis has limitations as it does not predict future policy, but it does provide an objective view grounded in current reality on which the Secretary can make her decision. The information provided throughout this and the other Five-Year Program analyses is intended to provide the Secretary information on the direct effects of her decision.

Using the current laws, regulations, and technology assumptions inherent in the Annual Energy Outlook's Reference Case, the lost resource of future OCS production in the absence of a new OCS program will be made up from energy industries likely to increase production or generation incrementally in response to small market changes. While this may, in some instances, be the more mature renewable energy technologies, the reality of many renewable energy markets is that its growth is predicated on policy initiatives, rather than simply small relative increases in price. Additional renewable energy production is certainly likely throughout the life of the leases issued under this program, as domestic and global markets adjust to climate change and potential future policies.

Data from EIA indicate that, in the context of this PFP, renewable energy sources are not likely to be a major substitute for forgone production resulting from selection of the No Sale Option in any of the program areas. This likely is because energy of different kinds can be used differently. For example, in terms of end use, about 28 percent of total U.S. energy consumption in 2014 was for transportation, of

which 92 percent is fueled by petroleum fuels (EIA 2015c)⁴¹. The predominant use of renewable energy in the U.S. is to generate electricity.⁴²

While EIA analysis forecasts that oil and natural gas will remain important contributors to our energy mix throughout the foreseeable future, renewable energy sources will continue to mature over the next decade and beyond. Policies or other factors such as technological change could substantially increase the use of renewable energy sources during the life of this Program. Additional information on substitute energy sources is included in *Forecasting Environmental and Social Externalities Associated with Outer Continental Shelf (OCS) Oil and Gas Development – Volume 2* (BOEM 2015b).

6.5 ENERGY MARKETS CONCLUSION

The OCS Lands Act requires long-term planning for OCS oil and gas sales in the form of an OCS leasing program. The program development process allows the Secretary to consider the current and likely future energy needs of the United States. This market analysis, consistent with the EIA 2016 AEO, is focused in large part on assumptions reflecting current laws and policies. These assumptions provide consistent data for the Secretary to consider at this programmatic stage and allow her to see the impacts of her decisions. However, within the five-year life of the Program, the Secretary has the authority to limit the number of sales or areas available for lease for many reasons, which allows her to re-evaluate specific decisions once new information is available (e.g., prices, industry interest, future policies). Though domestic energy markets have undergone major changes in recent years with an abundance of new onshore production and low oil prices, the OCS remains a vital source of stable energy production. Regionally, OCS production contributes to the local energy markets. In the absence of a new OCS program, energy markets would adjust and substitute energy sources would be necessary.

The PFP Options provide the Secretary the opportunity to provide the Alaska and Gulf Coast PADDs with additional energy resources. These resources can then enter the energy market and be transported, refined, and consumed as market forces direct.

6.6 OTHER USES OF THE OCS

Section 18 (a)(2)(D) requires the Secretary to consider OCS regions “with respect to other uses of the sea and seabed, including fisheries, navigation, existing or proposed sea lanes, potential sites of deepwater ports, and other anticipated uses of the resources and space of the outer Continental Shelf.” This section provides a summary discussion about other uses of the OCS, including commercial fishing, state oil and gas activities, Department of Defense (DOD) and National Aeronautics and Space Administration (NASA) activities, tourism and recreation, commercial shipping and transport, coastal recreation (including recreational fishing and diving), and subsistence use. This section also provides information

⁴¹ Because of this huge market share, even recent advances in renewable fuel vehicle technology and large increases in consumer preference for electric and hybrid-electric vehicles are causing only small annual changes in market share.

⁴² Renewable energy can serve as part of the “base load” and generate at full capacity because of its minimal variable-input costs. While natural gas can be used as a base-load fuel as well, its use (in terms of both quantity and facility capacity) will vary throughout the day to provide immediate response to the constant fluctuations in demand for electricity. In addition, because natural gas is not costless as an input, demand for gas over time is responsive to its price. In these respects, biofuels are more like oil and natural gas, and biofuels are included in “Other Energy Sources” in Table 6-3: Energy Market Substitutions in Absence of New OCS Program.

on the status of BOEM’s renewable energy leasing and non-energy marine minerals leasing⁴³ in the program areas. Unless otherwise noted, the principal source of information on the economic and public uses of the OCS and the surrounding coastal region for the different program areas is BOEM’s report entitled *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event Within OCS Regions* (BOEM 2014a; hereafter referred to as the “Inventory Report”). See the full Inventory Report for detailed information and data on the economic and public use categories for each of the OCS planning areas.

Appendix A contains a summary of the individual comments that BOEM received in response to the Proposed Program related to other uses of the OCS and potential conflicts between these other uses and oil and gas leasing program activities. Many of the comments received from Federal agencies, state agencies, Governor’s offices, and environmental advocacy groups highlight the critical importance of other existing, diverse coastal and ocean uses to both regional and statewide economies and request that BOEM fully consider any potential use conflicts.

6.6.1 Alaska Program Areas

For purposes of this discussion, Sections 6.6.1.1 and 6.6.1.2 apply to all three Alaska program areas. The Beaufort Sea and Chukchi Sea Program Areas are grouped together in Section 6.6.1.3 because of their close proximity (however, note that the discussion of NASA activities only applies to the Beaufort Sea Program Area); the Cook Inlet Program Area is discussed separately in Section 6.6.1.4.

6.6.1.1 Renewable Energy and Non-energy Marine Minerals

BOEM has not received applications for renewable energy or marine mineral leasing in any of the Alaska program areas and is not aware of any specific plans or proposals to develop OCS renewable energy resources in these areas at this time. Therefore, BOEM does not expect that commercial leasing for OCS renewable energy resources would occur in the Alaska program areas during the 2017–2022 timeframe. Any renewable energy leasing that could occur during the approximate 40- to 70-year lifespan of the producing leases issued during the 2017–2022 Program will need to be coordinated during the later stages of BOEM’s oil and gas leasing process (e.g., lease sale, exploration plan, and development and production plan stages). BOEM has not issued any leases or agreements for non-energy, marine minerals in the Alaska program areas.

6.6.1.2 Military Uses

BOEM-DOD coordination aims at preventing interference between military operations and oil and gas activities related to construction, operation, and maintenance of OCS oil and gas facilities, pipelines, helicopter flights, and vessel traffic in support of seismic testing. The military activities that DOD commonly seeks to protect from interference include military munitions practice using offshore areas; the spatial use of water and airspace for port access and offshore ship and plane maneuvers; potential launch-

⁴³ BOEM’s Marine Minerals Program issues agreements and leases for offshore non-energy marine minerals, primarily for sand resources for use in coastal resiliency projects. Although there has been some interest expressed in rare earth minerals, manganese nodules, and gold, no competitive leases have been issued. For more information, see <http://www.boem.gov/Non-Energy-Minerals/>.

abort areas for missile launches from military bases and secure military communications. Close coordination with DOD is also part of the BOEM G&G permitting process.

DOD conducts training, testing, and operations in offshore operating and warning areas, undersea warfare training ranges, and special use or restricted airspace on the OCS. These activities are critical to military readiness and national security. The U.S. Navy utilizes the airspace, sea surface, sub-surface, and seafloor of the OCS for events ranging from instrumented equipment testing to live-fire exercises. The U.S. Air Force conducts flight training and systems testing over extensive areas on the OCS. The U.S. Marine Corps amphibious warfare training extends from offshore waters to the beach and inland. The Department of Homeland Security's U.S. Coast Guard conducts search and rescue missions, science missions, exercises for maritime preparedness, protection of the environment, and coordinates with the U.S. Navy to conduct ice thickness and acoustic surveys.

6.6.1.3 Beaufort Sea and Chukchi Sea Program Areas

Commercial activity in the Beaufort Sea and Chukchi Sea program areas is limited. There is oil and gas production in state waters adjacent to the Beaufort Sea Program Area. Fishing activity is limited to subsistence and recreational fishing, as commercial fishing is prohibited in U.S. waters north of the Bering Strait. Among Alaska native communities, such as the Iñupiat along the Beaufort and Chukchi seas, subsistence fishing and hunting activities hold a high cultural value and provide a substantial portion of many communities' annual diets. Based on a survey conducted by the Alaska Department of Fish and Game, 63 percent of households in the Arctic harvested game, while 92 percent of households used game, reflecting the wide sharing of subsistence foods (ADFG 2014). The harsh Arctic climate and the difficulty of physically accessing the area limit most recreational activity in the Arctic. The patterns and amount of vessel traffic in the Arctic are highly affected by seasonal variability and ice cover. Because of the limited infrastructure in the region, water transportation is an important means of transporting fuel and supplies for area residents.

NASA activities would not impact the Chukchi Sea Program Area. However, newly-disclosed potential conflicts could occur in the Beaufort Sea Program Area from NASA activities at the Poker Flat Research Range (PFRR), a University of Alaska Fairbanks-owned facility located outside of Fairbanks, Alaska.

Several configurations of PFRR-launched sounding rockets have the potential to land within the boundaries of the Beaufort Sea Program Area; it is estimated that at least 70 PFRR-launched rocket motors and payloads have landed within the Beaufort Sea since the range's inception (NASA 2013). In the future, it is likely that a greater percentage of NASA missions will need to land within the Beaufort Sea due to the trajectories of the higher performing rockets that are more frequently specified by researchers.

In principle, the future year-round presence of high value oil and gas infrastructure and additional people within the PFRR flight and impact corridor could place further restrictions on allowable launches due to mandatory flight safety considerations. Such restrictions could require NASA to design its missions such that jettisoned flight hardware lands farther north in the Beaufort Sea, requiring lower launch elevations to move these items a greater distance offshore. This would result in a lower apogee (the highest point in flight), which in turn could reduce the scientific value of the flight.

As such, the potential for space-use conflicts exists should exploration, development, and production occur as proposed in the 2017–2022 Program. However, several key factors render the potential for conflict low. First, the vast majority of sounding rocket launches from PFRR occur during the winter months (October through April), a time at which the presence of sea ice would preclude most, if not all, exploration and construction activities in the OCS. Second, it would be highly unlikely that any air- or land-based recovery operations would occur for items jettisoned into the OCS. Therefore, recovery operations, regardless of season, would not likely have spatial overlap with oil and gas activities. Finally, given the estimated number of oil and gas structures envisioned under the Proposed Program, the near shore location (i.e., on the continental shelf) of the oil and gas activities, and the typical distances from the coast at which jettisoned sounding rocket items land in the Beaufort Sea (planned impact points are generally 300 km offshore), there would only be a very small overlap between the potential leasing areas and rocket dispersions;⁴⁴ resulting in a very low probability for interaction.

However, until further details are known in later phases of the leasing process, NASA cannot perform a quantitative assessment of potential effects. Therefore, beyond the 2017–2022 five-year program development stage, NASA will continue to monitor oil and gas activity in the Beaufort Sea, and will coordinate with BOEM to assess (and mitigate, as necessary) the potential space-use conflicts at more action-specific stages of planning (e.g., the leasing stage).

6.6.1.4 Cook Inlet Program Area

Commercial fishing, seafood harvesting and processing, tourism and recreation, and commercial shipping are all important industries in and adjacent to the Pacific Margin subregion. Both commercial fishing and seafood harvesting and processing are economically important industries along Cook Inlet. Tourism is a critical component of the Cook Inlet Program Area’s economy. The subregion is also important for commercial shipping. The Port of Anchorage on the eastern end of Cook Inlet is an essential port for many Alaska residents; an estimated 90 percent of the merchandise goods for 85 percent of Alaska’s populated areas pass through the port (Port of Anchorage 2015). There is oil and gas production in state waters adjacent to the Cook Inlet Planning Area.

Important public uses in and along the subregion include coastal recreation, recreational fishing and hunting, and subsistence fishing and hunting. The Cook Inlet Program Area is a popular site for outdoor recreational activities, particularly fishing, hiking, boating, hunting, and wildlife viewing. Subsistence fishing and hunting is a critically important public use of coastal and marine resources in the Cook Inlet Program Area. Communities engage in subsistence hunting and fishing for their economic, social, cultural, and spiritual value, and to meet basic nutritional needs. While species of salmon are the primary subsistence source in and near the Cook Inlet Program Area, halibut and shellfish (particularly crab) are also important. Subsistence fishing and hunting comprise a substantial portion of many communities’ annual diets. For example, one-third of residents on the Kenai Peninsula and more than 15 percent in

⁴⁴ There is a level of uncertainty associated with a sounding rocket’s impact location because of the variables associated with each launch, including payload weight, wind, temperature, and variations in the performance of the solid rocket fuel. As such, a planned impact location has bands of uncertainty associated with it (the “dispersion”) that can vary north and south (downrange) and east and west (cross-range). Using these dispersion estimates, it is possible to determine the statistical probability of landing within a certain area.

Anchorage (both of which are adjacent to Cook Inlet) report that they obtain 25 to 50 percent of their food supply from subsistence fishing and hunting (BOEM 2014a).

6.6.2 Gulf of Mexico Program Area

The GOM Program Area is comprised of three planning areas: the Western, Central, and Eastern GOM Planning Areas not under congressional moratoria or other withdrawal. The most notable “other uses” in terms of economic contribution are coastal tourism and recreation, commercial fishing and seafood harvesting, and commercial shipping.

Millions of individuals participate in a variety of recreational activities in the region’s coastal environment each year, including recreational fishing, boating, beach visitation, wildlife viewing, and swimming. Texas, Louisiana, and Florida have significantly more coastline and more coastal population centers than Alabama or Mississippi. However, the tourism and recreation industries in Alabama and Mississippi still comprise sizable portions of GDP as a percent of each state’s total employment. On an annual basis, coastal tourism and recreation industries contribute more than \$1 billion in GDP to the states adjacent to the Western and Central GOM Planning Areas and more than \$10 billion in GDP to the states adjacent to the Eastern GOM Planning Area (BOEM 2014a).

The commercial fishing and seafood industries also contribute billions to state GDP on an annual basis (most notably in and along the Eastern GOM Planning Area, with more than \$4 billion in GDP [BOEM 2014a]). The commercial fishery sector is largest in Louisiana, followed by Texas and then Florida. However, Florida contributes most to GDP because of its contributions further along the seafood supply chain (e.g., processors, retailers). Aquaculture, or the farming of seafood species, is becoming more common along the Gulf coast. As stated in its comment letter on the Proposed Program, the NMFS would work with BOEM to identify potential conflicts between oil and gas activities and aquaculture activities. This coordination would occur during the later stages of BOEM’s oil and gas leasing process (e.g., lease sale, exploration plan, and development and production plan stages). Commercial shipping is also important economically. As measured by the amount of cargo flowing through the ports on an annual basis, more than half of the 20 largest U.S. ports are along the Gulf coast (mostly along the Central and Western GOM Planning Areas) (BOEM 2014a). All five Gulf coast states have had some historical oil and gas exploration activity and, with the exception of Florida and Mississippi, currently produce oil and gas in state waters.⁴⁵ While very little data exist to track its economic contribution, subsistence fishing and seafood harvesting is also an important public use of coastal and marine resources along the three GOM planning areas, particularly to rural communities. Traditional subsistence harvesting including fishing and hunting continues among some ethnic and low-income groups (MMS 2003).

6.6.2.1 Renewable Energy and Non-energy Marine Minerals

BOEM has not received applications for renewable wind energy leasing in the GOM Program Area and is not aware of any specific plans or proposals to develop OCS renewable energy resources in this area at this time. Therefore, it appears unlikely that commercial leasing for renewable energy resources will proceed during the 2017–2022 timeframe. Noting that leases with discoveries of oil or gas can be held

⁴⁵ For recent information on state oil and gas leasing programs in the GOM, see Section 3.3.2 of BOEM’s *Final Supplemental EIS for Central Planning Area Lease Sales 235, 241, and 247* (BOEM 2014b).

for as long as commercial production continues, any renewable energy leasing that could occur during the approximately 40- to 70-year lifespan of the producing leases issued during the 2017–2022 Program will need to be coordinated during the later stages of BOEM’s oil and gas leasing process (e.g., lease sale, exploration plan, and development and production plan stages).

BOEM has issued leases and agreements, and anticipates receiving future requests, for OCS sediment for coastal restoration projects along the GOM, specifically, offshore the western coast of Florida, and the coasts of Mississippi and Louisiana. BOEM’s GOM Marine Minerals Program expects to be a significant resource to the Gulf coastal region as funds from the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (commonly referred to as the RESTORE Act; P.L. 112-141) are used for restoration projects by coastal states. Typically, resource borrow areas are in water depths of less than 90 feet and are in close proximity to the coast.

6.6.2.2 *Military Uses*

BOEM-DOD coordination aims at preventing interference between military operations and oil and gas activities related to construction, operation and maintenance of OCS oil and gas facilities, pipelines, helicopter flights, and vessel traffic in support of seismic testing. The military activities that DOD commonly seeks to protect from interference include military munitions practice using offshore areas; the spatial use of water and airspace for port access and offshore ship and plane maneuvers; potential launch-abort areas for missile launches from military bases and secure military communications. Close coordination with DOD is also part of the BOEM G&G permitting process.

The DOD conducts training, testing, and operations in offshore operating and warning areas, undersea warfare training ranges, and special use or restricted airspace on the OCS. These activities are critical to military readiness and national security. The U.S. Navy utilizes the airspace, sea surface, sub-surface, and seafloor of the OCS for events ranging from instrumented equipment testing to live-fire exercises. The U.S. Air Force conducts flight training and systems testing over extensive areas on the OCS. The U.S. Marine Corps amphibious warfare training extends from offshore waters to the beach and inland.

Some of the most extensive offshore areas used by the DOD include Navy at-sea training areas. Training and testing could occur throughout the U.S. GOM OCS waters, but will be concentrated in Operating Areas and testing ranges. These activities may vary depending on where they occur (e.g., open water versus near shore). Major Operating Areas in the GOM include the GOM Range Complex, the Naval Surface Warfare Center, Panama City Division, and the Key West Complex off the southwestern tip of Florida.

Chapter 7 Environmental Consideration Factors and Concerns

7.1 ENVIRONMENTAL SETTING, ECOLOGICAL CHARACTERISTICS, AND POTENTIAL IMPACTS ON ENVIRONMENTAL RESOURCES

As previously discussed in Section 2.2, the environmental setting, ecological characteristics, and potential impacts on environmental resources are presented in the Final Programmatic EIS.

7.2 RELATIVE ENVIRONMENTAL SENSITIVITY AND MARINE PRODUCTIVITY

7.2.1 Summary of Methodology

BOEM is required, per Section 18(a)(2)(G) of the OCS Lands Act, to consider the relative environmental sensitivity and marine productivity of the OCS when making decisions regarding the schedule of lease sales for the Five-Year Program. For the 2017–2022 Program, BOEM built upon previous assessments of these two environmental considerations using an improved model to analyze relative environmental sensitivity and taking advantage of technological advancements to estimate marine primary productivity. The environmental sensitivity and marine productivity analyses are intended to be used by the Secretary as one of many considerations when developing the Program. Analyses presented within this section are approximations using the best available information and reflect changes made at earlier stages of the 2017–2022 Program development process based on BOEM decisions and public comments received.

The current approach to determining relative environmental sensitivity takes into account both the vulnerability and resilience of an OCS region’s ecological components to the potential impacts of OCS oil and gas activities within the context of existing conditions (e.g., climate change). For this PFP analysis, only the areas of the OCS under consideration for oil and gas development during the 2017–2022 Program after issuance of the DPP and Proposed Program were included in the sensitivity analysis. The same methods that were used in the DPP and Proposed Program analyses were employed for the PFP analysis.

Primary productivity estimates for program areas still under consideration for leasing were generated using satellite-based measurements of chlorophyll, available light, and photosynthetic efficiency (Balcom et al. 2011). These parameters were input into the Vertically Generalized Production Model (VGPM) to provide estimates of net primary productivity (NPP). These methods are identical to the methods used in the previous stages of the 2017–2022 Program development and represent an updated approach to that used for the previous 2012–2017 Program.

7.2.2 Relative Environmental Sensitivity

7.2.2.1 Background

Relative environmental sensitivity is not a commonly applied concept in ecology. BOEM previously examined environmental sensitivity using two different approaches in the development of the

2007–2012 Program. The first analysis employed the NOAA environmental sensitivity index (ESI) (CSA 1991a, CSA 1991b, NOAA 2002), which quantifies the sensitivity of shorelines based on geology, biological resources, and human-use resources. This original approach only considered shoreline impacts from oil spills and did not consider impacts on other ecological features, such as benthic and pelagic fauna and habitats. BOEM presented an expanded relative environmental sensitivity analysis in the revised 2007–2012 Program and the 2012–2017 Program in an effort to expand three variables: (1) the geographical extent; (2) the BOEM-regulated impacts considered; and (3) the ecological components considered in the analysis. This methodology combined the potential impacts on vulnerable organisms into an index of sensitivity. This index incorporated four model components, including coastal habitats, marine habitats, marine fauna, and marine primary productivity.

Building upon this expanded analysis, the approach for the 2017–2022 Program incorporates not only the sensitivity of the OCS, but also accounts for its “resilience,” which is the ability of the OCS ecosystem to resist fundamental change and to recover from impacts. Relative environmental sensitivity thus incorporates both the vulnerability and resilience of a region’s ecological components to the potential impacts of OCS oil and gas activities in the context of existing environmental conditions. This new method was first applied at the initial draft stage of this Program in the DPP. Here, the same methodology has been adapted to assess the relative environmental sensitivity of those areas of the OCS that remain available for leasing at this stage in the Program development.

7.2.2.2 Methods

BOEM’s current approach to relative environmental sensitivity builds upon earlier methods. This method was developed through a BOEM-funded contract with the objectives of repeatability and scientific rigor. Several alternative methods were evaluated and considered; however, none of these alternative methods met BOEM’s mission needs. The chosen approach treats all regions of analysis equally without bias to area, presence of existing BOEM activities, or differences in species composition. This current method is not biased by spatial inequalities of data availability, and weighs all species and habitats equally. It also allows unbiased comparison of geographic areas of differing size. A full description of the method developed for BOEM is available in Niedoroda et al. (2014). Since its development, this method has been adopted in a simplified form for use by NOAA for oil spill planning and response in Alaska (NOAA 2015a).

7.2.2.3 Geographic Scope

For the analysis of environmental sensitivity, an ecosystem-based approach was used. BOEM’s program areas are administratively constructed designations that do not necessarily correspond to ecosystem boundaries. For this PFP analysis of the program areas, the OCS was divided into three regions, referred to here as BOEM Ecoregions (see Figure 7-1: Relative Environmental Sensitivity for the GOM Program Area and Figure 7-2: Relative Environmental Sensitivity for the Alaska Program Areas).

The boundary designations for these BOEM Ecoregions were informed by the original ecoregion concept (Spalding et al. 2007) and were based primarily on the Large Marine Ecosystem (LME) boundaries (Sherman and Duda 1999). Marine ecoregions are areas that are differentiated by species composition and oceanographic features (Spalding et al. 2007, CEC 2009). LME boundaries are based on bathymetry, hydrography, productivity, species composition, and trophic relationships. BOEM Ecoregions account

for the distinct physical and ecological characteristics of the various OCS regions while simultaneously meeting BOEM’s mission needs.

In addition to the numerical scores provided for the GOM and Alaska Program Areas in Figure 7-1: Relative Environmental Sensitivity for the GOM Program Area and Figure 7-2: Relative Environmental Sensitivity for the Alaska Program Areas, the intensity of the shading corresponds to the magnitude of these scores. The outlines of the BOEM Ecoregions, which are the geographic units of analysis, are also shown.

The seaward extent of the BOEM Ecoregions used in this analysis is largely governed by the U.S. EEZ and BOEM program areas’ seaward boundaries. The use of BOEM Ecoregions allowed for the analysis of geographic regions that are ecologically similar and contain similar habitat types and faunal assemblages. Niedoroda et al. (2014) used the terms “broad OCS region” and “ecoregion” somewhat interchangeably. However, the boundaries of the broad OCS regions used in this analysis do not fully align with North America’s ecoregions, as traditionally defined (CEC 2009). Thus, to avoid confusion or inaccuracies, the spatial unit of analysis for environmental sensitivity will only be referred to as a “BOEM Ecoregion” in this document.

Although it is possible to conduct a sensitivity analysis for each program area, the model relies upon available data for each BOEM Ecoregion. The bulk of the scientific information available for this analysis was ecosystem-based or focused on individual faunal groups and their ecologies. In an effort to treat all regions of the OCS equally and not bias the analysis through data patchiness, the BOEM Ecoregions were created with boundaries that were ecologically meaningful and for which sufficient data were available for model input.

Modifications were made to the geographic scope of the environmental sensitivity analysis for the PFP by removing those areas of the OCS that were eliminated from consideration for leasing at the DPP and Proposed Program stages. BOEM sought to maintain ecologically relevant areas of analysis while also supporting BOEM decision making by providing results in a usable and comparable format. The areas on the OCS that remain under consideration consist of four program areas: Beaufort Sea, Chukchi Sea, Cook Inlet, and the GOM. The three BOEM Ecoregions are: the Beaufort and Chukchi seas (together), the Cook Inlet, and the Western and Central GOM (together). The small portion of the Eastern GOM that is not under Congressional moratorium was subsumed into the Western and Central GOM BOEM Ecoregion so the entire GOM Program Area is contained within that single BOEM Ecoregion. Table 7-1: Crosswalk of BOEM Ecoregions and Program Areas, provides a crosswalk of the program areas and the corresponding BOEM Ecoregions in which they are located.

Table 7-1: Crosswalk of BOEM Ecoregions and Program Areas

BOEM Ecoregion	Program Areas
Beaufort and Chukchi Seas	Beaufort Sea
	Chukchi Sea
Cook Inlet	Cook Inlet
Western and Central GOM	GOM

Figure 7-1: Relative Environmental Sensitivity for the GOM Program Area

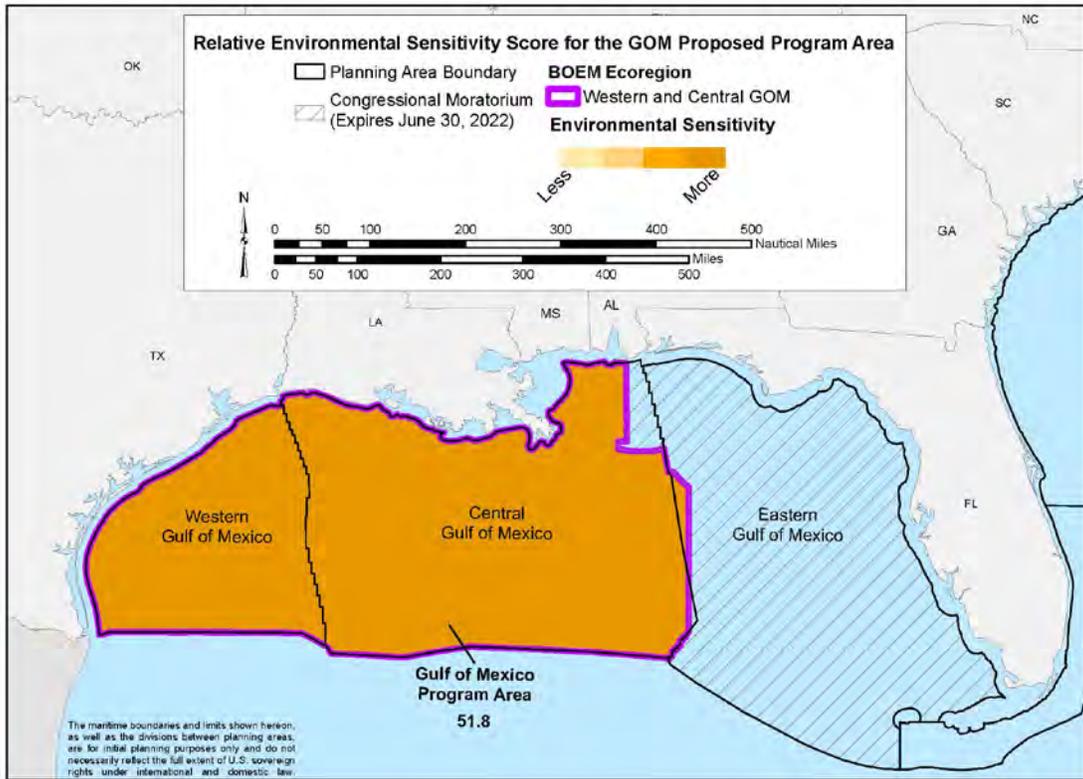
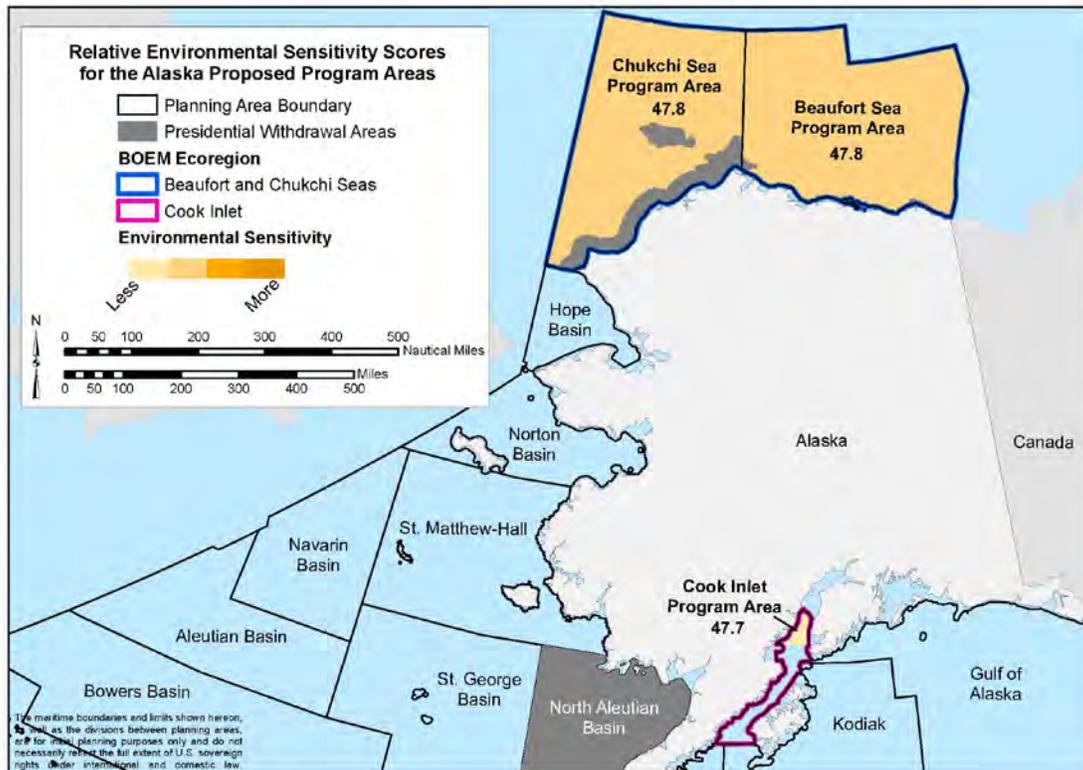


Figure 7-2: Relative Environmental Sensitivity for the Alaska Program Areas



The sensitivity scores from this PFP analysis are based on the vulnerability and sensitivity of the species and habitats within each unit of analysis—the BOEM Ecoregions. Thus, areas with the same ecological characteristics will have the same sensitivity score. An analysis using planning areas as geographic units would use the same data and would support multiple planning areas with similar ecologies. Therefore, such an analysis would be redundant and the result would be identical to an analysis conducted by BOEM Ecoregion. Distinguishing characteristics and explanations for the creation of these BOEM Ecoregions are outlined in the following paragraphs.

The Chukchi and Beaufort Seas BOEM Ecoregion is characterized by a sub-Arctic climate and considerable ice cover throughout most of the year. This BOEM Ecoregion spans two LMEs: the Chukchi Sea and the Beaufort Sea. The Chukchi Sea covers a broad shelf and water depths are primarily less than 165 feet. In contrast, the Beaufort Sea is much deeper (3,300 feet). While these two LMEs have different oceanographic characteristics, they share similar habitat and species assemblages (CEC 2009). This BOEM Ecoregion is home to roughly half of the world's population of polar bears, which are listed as threatened under the ESA. It is an important area for other marine mammals, including bowhead and beluga whales. This area provides critical habitat for numerous seabirds, including the threatened spectacled eider. Due to these shared similarities in ecosystem function, the two LMEs are roughly equivalent for the model's purposes and were therefore analyzed together as the Chukchi and Beaufort Seas BOEM Ecoregion. Thus, the Chukchi Sea and Beaufort Sea Program Areas have identical scores. For more environmental information on BOEM's program areas, refer to the Final Programmatic EIS. The Supplemental Option to move the Beaufort Lease sale from 2020 to 2019 was not analyzed independently because the method assumes all potential impacts could occur everywhere at all times (i.e., the timing of impacts is not relevant). Due to their relatively small and variable size, it is not practical to analyze the environmental sensitivity of the Environmentally Important Areas Options separately.

Previously, the Cook Inlet was included in the Gulf of Alaska BOEM Ecoregion, which was composed of the U.S. waters of the Gulf of Alaska LME. However, at this stage of analysis, a portion of the Cook Inlet is the only portion of the Gulf of Alaska BOEM Ecoregion that is under leasing consideration. Thus, the Cook Inlet BOEM Ecoregion was created for the Proposed Program and PFP environmental sensitivity analyses. The Cook Inlet is a large estuary in the northern Gulf of Alaska and stretches from the Gulf of Alaska to Anchorage. This sub-Arctic BOEM Ecoregion typically has little to no ice cover and receives saltwater input from the Gulf of Alaska through the Kennedy Entrance, as well as riverine inputs throughout the inlet. The Cook Inlet supports several commercially important fisheries, such as all five species of Pacific salmon, Pacific herring, and eulachon (ADFG 2011). Seasonal inhabitants of this BOEM ecoregion include many species of seabirds, whales, harbor seals, and the Steller sea lion (MMS 2003). Portions of the Cook Inlet are designated as critical habitat for the beluga whale (NMFS 2015).

The GOM comprises a single LME. The GOM is tropical to subtropical and receives water inputs from the Yucatan Channel, the Straits of Florida, and large riverine systems of the United States and Mexico. The GOM supports several important fisheries, including grouper, shrimp, menhaden, amberjack, tuna, and snapper (NOAA 2014a, NOAA 2014b). The GOM is also home to a diverse set of ecosystems, including coral reefs, mangroves, wetlands, oyster beds, and deep-water seeps. However, for this PFP analysis, only the portion of the GOM that remains under leasing consideration was analyzed (i.e., the GOM Program Area). This area was analyzed as the Western and Central GOM BOEM Ecoregion. This

ecoregion's boundaries are not simply administrative; there are several physical and biological justifications for its borders. The eastern edge of the Western and Central GOM BOEM Ecoregion follows the De Soto Canyon off the coast of Alabama and traces the eastern edge of the Loop Current, which effectively divides the GOM. This ecoregion contains the Flower Garden Banks National Marine Sanctuary (NOAA 2014c), and the outer edge of the Western and Central GOM continental shelf is dotted with numerous topographic features. Brown and white shrimp are abundant in this BOEM Ecoregion (NOAA 2014a, NOAA 2014b, NOAA 2014d, NOAA 2014e), and it is home to some of the most important nesting sites for the endangered Kemp's ridley sea turtle. Under both the Region-wide Leasing Option and the Modified Traditional Leasing Option for the GOM in the PFP, the environmental sensitivity for the entire GOM Program Area was analyzed; therefore, there is no difference in environmental sensitivity between these two Proposed Program Options. The Baldwin County Buffer Option was not analyzed separately because there would be no difference in potential impact between this PFP Option and the Region-wide Leasing Option.

7.2.2.1 Selection of Impacts, Species, and Habitats

The vulnerability and resilience of selected species and habitats to impact-causing factors were determined for each BOEM Ecoregion. A comprehensive list of impacts and impact-causing factors from BOEM-regulated activities was generated from recent EISs, notices to lessees and operators, and regulatory documents. Each specific impact factor was assessed for its comparative relevancy and overall potential impact on species and habitats on the OCS. Only impact factors considered to have the highest potential impacts were included in the analysis. These impacts were then grouped into the following categories: spills, artificial light, collisions with above-surface structures, habitat disturbance, sound/noise, and vessel strikes. In the original method, a temporal overlap of these activities with the presence of the species was incorporated into the model. However, this led to an inadvertent bias in lower sensitivity scores for those species that were not present year-round in their BOEM Ecoregions. For the analysis in the DPP, the Proposed Program, and for this PFP analysis, it was therefore assumed that all impacts and all species might occur year-round. BOEM is considering options on how to best include this temporal variability in future versions of this model.

The environmental resources that could be vulnerable to BOEM-regulated activities include not only individual fauna, but also their habitats. Thus, both habitats and species were chosen as parameters in the environmental sensitivity analysis. The species component was organized into four groups: (1) mammals and sea turtles; (2) birds; (3) fish; and (4) invertebrates. These groups were selected to ensure broad representation across the diversity of organisms that inhabit marine and coastal waters. Species were chosen using the criteria of conservation importance, ecological role, and also, for fish and invertebrates only, fisheries importance. The primary measure to determine conservation importance is Federal listing status under the ESA (NMFS 2014). The ecological role for fish and invertebrates was based on abundance and importance as a prey or keystone species. Fisheries importance was prioritized based on commercial landings weight data reported by NMFS. The species selected for the three BOEM Ecoregions in this analysis were identical to those used in the Proposed Program. As discussed in the Proposed Program, these selections were altered slightly between the DPP and the Proposed Program to account for the reduced area under consideration. Species could be scored only once for each BOEM Ecoregion. Four species each for the fish, birds, and invertebrate categories and five species for the marine mammal and turtle category were selected for each BOEM Ecoregion. The number of species in

each of the categories was determined to achieve a balance between providing adequate representation while maintaining a practical level of effort in sensitivity assessments and impact scoring. For details on the selection process for species and the data supporting these selections, see Niedoroda et al. (2014).

The habitat parameters were comprised of physical or biological features that support organisms or communities and have ecologically distinct properties. Habitat parameters were selected to ensure broad and diverse representation in coastal and marine areas within the BOEM Ecoregion. The habitat categories were shoreline, estuarine, and marine. The determination of shoreline parameters, using NOAA's ESI shoreline classification scheme (NOAA 1995, NOAA 2002), was based on all digital ESI shoreline data available as of 2012 (NOAA 2012). Only oil spills were assumed to potentially impact coastal habitats. While the bulk of BOEM-regulated activities occur in Federal waters miles from shore, shoreline habitats are at risk during spills because of the likelihood of being directly oiled when floating slicks impact the shoreline. Shoreline habitat scores used in this PFP analysis were identical to those used in the Proposed Program and were derived using the methods set forth in Niedoroda et al. (2014) using current NOAA data (NOAA 2015b). The estuarine and marine habitats were selected based on their ecological role or importance in terms of their contribution to regional biodiversity and overall productivity. For a full description of the habitat selection process, see Niedoroda et al. (2014).

The environmental sensitivity of the selected species and habitats was assessed with respect to potential impacts of oil and gas activities occurring on the OCS. This assessment was based on the quantification of the species' and habitats' vulnerability and resilience to potential oil and gas impacts. Vulnerability was evaluated as the probability that a species/habitat would be exposed to an impact and it was based on the spatial overlap between a given species/habitat and an impact. The resilience was based on the intolerance of a habitat or species to a given impact and that species' or habitat's recovery potential. Resilience was not predicated on previous exposure of a species or habitat to oil and gas impacts, but rather on best available data relating to ecological characteristics, tendencies, and trends, such as species' reproductive rates and habitat recovery potential. Likewise, sensitivity was not based on the probability of an impact occurring, as all impacts were assumed to occur everywhere on the OCS.

7.2.2.2 Impact-independent Modifiers

The model was designed to accommodate the consideration of impact-independent modifiers (e.g., climate change, productivity, and unregulated impacts). A climate change vulnerability score was included as a scaling factor, which was added to the base sensitivity scores for each ecoregion. Using the same approach as used in the Proposed Program analysis, the anticipated effects of climate change, including changes in temperature, sea ice melt and freshwater influx, permafrost thaw, ocean acidification and upwelling effects, sea level rise and saltwater intrusion, and changes in species composition, were assessed for each BOEM Ecoregion. A magnitude for each expected impact due to climate change was assigned to each BOEM Ecoregion using a relative scale (0-2 depending on intensity of effects; see Table 7-2: Scoring of Anticipated Climate Change Effects for BOEM Ecoregions). These sub-scores were summed for a total climate change score. This score was then converted to a climate change index with a scale of 0 to 4. This scale was chosen to allow an appropriate weight for impact-independent factors in the final environmental sensitivity score.

Table 7-2: Scoring of Anticipated Climate Change Effects for BOEM Ecoregions

Anticipated Climate Change Impact	Chukchi and Beaufort Seas	Cook Inlet	Western and Central GOM
Temperature Change	2	2	1
Sea Ice Melt & Freshwater Influx	2	1	0
Permafrost Thaw	2	1	0
Ocean Acidification/Upwelling Effects	2	1	0.5
Sea Level Rise & Saltwater Intrusion	0.5	0	2
Increased Storm Activity	1	1	1
Change in Species Composition	1	1	1
Total	10.5	7	5.5

Note: Total score reflects the climate change score prior to conversion to a climate change index with maximum score of four. Scores were assigned based on a scale of 0–2 and then summed for all anticipated effects. A score of 0 was given to BOEM Ecoregions in which little to no effect was expected, a score of 1 to BOEM Ecoregions in which a low to intermediate effect was expected, and a score of 2 for intermediate to high effect. Before adding the climate change index to the habitat and species sensitivity scores, the total climate change scores in the table were converted to a scale of 0–4.

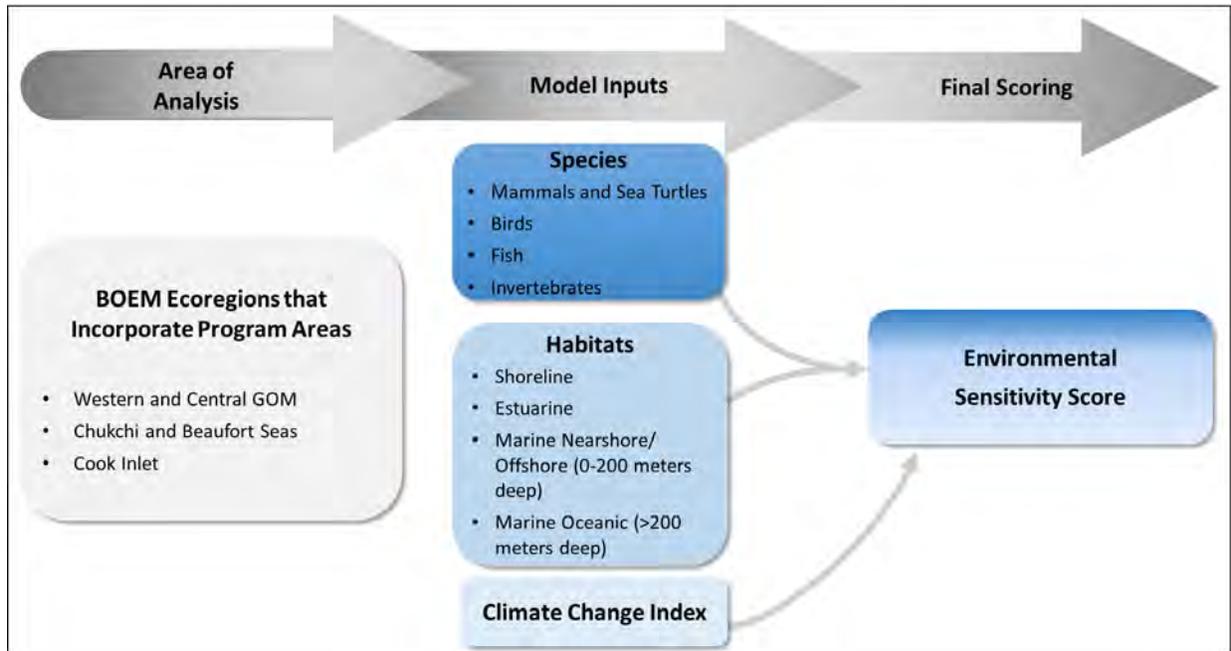
Sources: Doney et al. 2012, Ekstrom et al. 2015, Fabry et al. 2009, Haufler et al. 2010, IPCC 2014, Jones et al. 2009, Melillo et al. 2014, NOAA 2014f, NOAA 2015c, Smith et al. 2010, USEPA 2014, USGCRP 2015.

Figure 7-3: Environmental Sensitivity Index Methodology outlines the complete process for determining the sensitivity scores. Relative environmental sensitivity scores were calculated for each habitat and species selected for each of the three BOEM Ecoregions (see Table 7-3: Environmental Sensitivity Score by BOEM Ecoregion). These scores (which also include the shoreline ESI) form the foundation of the total sensitivity score. The species and habitat scores were normalized before combining them. The climate change index was then added to this base score for a final sensitivity score. No theoretical maximum sensitivity score is possible for a BOEM Ecoregion. Such a maximum is dependent upon the number of parameters included in the model (such as the number of species and habitats) and would therefore be mathematically impossible to achieve given the mechanics of the model.

Table 7-3: Environmental Sensitivity Score by BOEM Ecoregion

BOEM Ecoregion	Environmental Sensitivity Score
Western and Central GOM	51.8
Chukchi and Beaufort Sea	47.8
Cook Inlet	47.7

Figure 7-3: Environmental Sensitivity Index Methodology

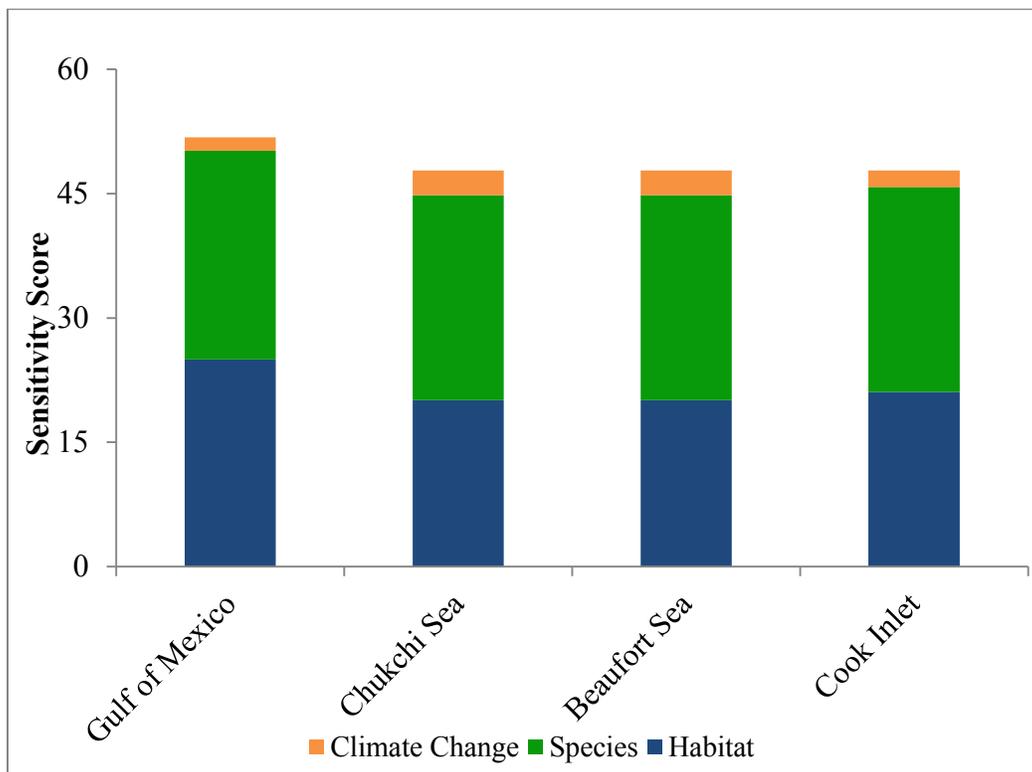


7.2.2.3 Results and Discussion

The environmental sensitivity scores for the program areas range from 47.7 to 51.8 (see Figure 7-1, Figure 7-2, and Figure 7-4). These scores are unitless and serve as an index of environmental sensitivity. The program area with the highest sensitivity score was the GOM. The lowest scoring program area was the Cook Inlet. The sensitivity scores for the BOEM Ecoregions (and therefore for the program areas) increased between the DPP and the Proposed Program and again between the Proposed Program and the PFP. The habitat and species scores are normalized across all BOEM Ecoregions before being summed for a total sensitivity score. The increase is a result of this normalization process. A smaller number of BOEM Ecoregions included in the analysis led to larger normalized sensitivity scores as the area under consideration has decreased since the DPP. The increase in score magnitude should not convey that the sensitivity of these BOEM Ecoregions necessarily increased during the Program development process. It is the relative difference between the sensitivity scores of the BOEM Ecoregions that should be considered and not the magnitude of individual scores. A description of the normalization process can be found in Niedoroda et al. (2014).

The small range in sensitivity scoring demonstrates that all program areas are sensitive to oil and gas activities—some more so than others. Further, what drives this sensitivity differs from BOEM Ecoregion to BOEM Ecoregion based on varying species and habitat sensitivities. For example, the Western and Central GOM BOEM Ecoregion had the highest cumulative species and habitat scores. The high species score was primarily driven by the high sensitivity score in the fish category, which included the threatened Gulf sturgeon, which has a high maturity age (NMFS 2009).

Figure 7-4: Aggregated Sensitivity Scores for Habitats, Species, and Climate Change by Program Area



The high species score was the result of several relatively higher sensitivities of multiple habitat categories. In the GOM, the estuarine benthic (i.e., seagrass beds), marine pelagic (i.e., the highly productive photic zone), and the marine benthic (i.e., deepwater cold seeps) habitat categories all had relatively higher scores than the corresponding habitats in the two Alaska BOEM Ecoregions.

The lower sensitivity score of the Chukchi and Beaufort Seas BOEM Ecoregion was driven primarily by its low habitat score, which was the lowest of the three BOEM Ecoregions. The shoreline sensitivity score was particularly low due to large portions of shoreline being categorized as some of the less vulnerable types (type 5 and lower). However, the high climate change index for the Chukchi and Beaufort Seas BOEM Ecoregion resulted in a higher sensitivity score than for the Cook Inlet BOEM Ecoregion. The Cook Inlet also had a low shoreline sensitivity score due to a majority of its shoreline being categorized as less sensitive types.

The relatively small differences among the environmental sensitivity scores suggest that differentiation among the BOEM Ecoregions based on the total score alone would be difficult. Rather, the environmental sensitivity is one tool of many that BOEM uses to make decisions regarding the development and exploration of oil and gas resources on the OCS. This model is driven by the best-available scientific information at the geographic scale of analysis and strives to incorporate empirical data, where available. Similar approaches can be taken to evaluate proposed activity on particular areas of the OCS on a case-by-case basis. As all program areas are sensitive to oil and gas exploration and development, each program area should be individually considered with a full understanding of the species present, their distributions, and habitat needs, and therefore, the individual sensitivity to potential oil and gas activities.

7.2.3 Marine Productivity

7.2.3.1 Background

Productivity is a term used to indicate the amount of biomass produced over a period of time. Primary productivity is the production of biomass using carbon dioxide and water through photosynthesis. The primary productivity of the marine community is its capacity to produce energy for its component species, which sets limits on the overall biological production in marine ecosystems. Primary production in the marine environment is conducted primarily by phytoplankton; macroalgae, such as *Sargassum* or kelp; and submerged aquatic vegetation like seagrasses. The rate at which this occurs is based largely on the organisms' ability to photosynthesize. The methods of measuring phytoplankton productivity are relatively standard and results normally are expressed in terms of chlorophyll-*a*, or the amount of carbon fixed during photosynthesis per square meter of ocean surface per unit of time.

Phytoplankton can occupy all surface waters of an OCS program area and fix carbon, as long as sufficient light and nutrients are available. Farther from shore, nutrient availability may limit productivity. Additionally, surface mixing due to wave action, down-welling, fronts, and convergence carry phytoplankton to depths in the water column where light is insufficient for photosynthesis to occur.

The difference between the energy produced during photosynthesis and the amount of energy expended during this process is known as NPP. The rate of NPP determines the amount of energy that is available for transfer to higher trophic levels (Ware and Thompson 2005, Chassot et al. 2010). Thus, the most critical aspect of marine productivity is NPP, which is the focus of this analysis.

The productivity of higher trophic levels (e.g., secondary and tertiary production) is more difficult to constrain than primary productivity. While some models of secondary and tertiary productivity exist for OCS regions, estimates are not available for all planning areas (Balcom et al. 2011). Unlike primary production, secondary production is difficult to validate with empirical measures. Due to the limitations of existing data and inequalities in data availability among all planning areas and habitat types (Balcom et al. 2011), secondary and tertiary production estimates are not robust and will not be presented for decision-support.

7.2.3.2 Methods

In 1991, BOEM (then Minerals Management Service [MMS]) completed a primary productivity review (CSA 1991a, CSA 1991b). The 1991 study produced estimates by tabulating the results of individual studies conducted in each planning area. These estimates relied on studies that used different methodologies, spatial scales, and/or sampling frequencies. The approach used in this PFP analysis, finalized in 2012, greatly improves on these previous productivity estimates using new tools and technology that have become available since the 1991 report.

The current primary productivity study uses satellite-based observations to provide input parameters for the VGPM to estimate NPP in each program area as a function of chlorophyll, available light, and photosynthetic efficiency. Productivity determinations were depth-integrated, extending from the ocean surface to the euphotic depth (i.e., the depth where 1 percent of the surface light, or photosynthetically available radiation, is available). This depth ranged from a maximum of 100 meters (i.e., within ocean

gyres) to a minimum of several meters (e.g., within eutrophic coastal waters). For a more detailed discussion of methods, see Balcom et al. (2011).

In the DPP analysis, each of the 26 planning areas was characterized in terms of areal coverage, mean annual NPP, annual and monthly variance, and trend (i.e., increasing or decreasing productivity) over a 12-year period (1998–2009). For the Proposed Program and this PFP analysis, only the productivity rates for the program areas are presented. The results for the GOM are presented for both PFP Options: the Region-wide Leasing Option with one rate for the entire GOM (see Table 7-4: Rates of NPP for the GOM Region-wide Leasing Option), and the Modified Traditional Leasing Option, with rates presented for the Western GOM and the combined Central/Eastern GOM (see Table 7-5: Rates of NPP for the GOM Modified Traditional Leasing Option). These rates were derived from the rates for each individual planning area as follows. For the Region-wide Leasing Option, the rate is an areal average weighted by the area of the three planning areas in the GOM Program Area (the Western and Central GOM, as well as the small sliver of the Eastern GOM). For the Modified Traditional Leasing Option, the Central and Eastern GOM NPP rates were combined with an areally weighted average, and the Western GOM planning area’s NPP is reported separately. The Baldwin County Buffer Option was not analyzed separately because the small size of the buffer area would not impact the primary productivity rankings of the program areas. The Supplemental Option to advance the Beaufort Sea lease sale from 2020 to 2019 was also not analyzed separately because the analysis of primary productivity does not account for potential impacts of BOEM’s activities or their timing. Due to their relatively small and variable size, it is not practical to analyze the marine productivity of the Environmentally Important Areas Options separately.

Table 7-4: Rates of NPP for the GOM Region-wide Leasing Option

Program Area	Areal NPP (t C km⁻²yr⁻¹)
GOM	314.4 ± 31.8
Chukchi Sea	42.0 ± 21.4
Beaufort Sea	30.5 ± 24.1
Cook Inlet	413.5 ± 28.1

Key: t C km⁻²yr⁻¹ = metric tons of carbon per square kilometer per year

Table 7-5: Rates of NPP for the GOM Modified Traditional Leasing Option

Program Area	Areal NPP (t C km⁻²yr⁻¹)
Central and Eastern GOM	323.2 ± 33.9
Western GOM	294.4 ± 27.1
Chukchi Sea	42.0 ± 21.4
Beaufort Sea	30.5 ± 24.1
Cook Inlet	413.5 ± 28.1

Key: t C km⁻²yr⁻¹ = metric tons of carbon per square kilometer per year

7.2.3.3 Results and Discussion

Productivity ranged from 30.5 (Beaufort Sea) to 413.5 (Cook Inlet) metric tons of carbon per square kilometer per year ($t\ C\ km^{-2}yr^{-1}$) (see Table 7-4: Rates of NPP for the GOM Region-wide Leasing Option and Table 7-5: Rates of NPP for the GOM Modified Traditional Leasing Option). The Alaska Region exhibited high NPP variability. It should be noted that the accuracy of primary productivity estimates for the Alaska Region may be substantially lower than in other regions for several reasons.

While some of this variability may be attributed to planning area-specific oceanographic features and/or local processes, some variability may be reflective of the data acquisition method. The accuracy of satellite-derived productivity estimates may be affected by one or more factors. For one, the presence of turbid coastal waters may adversely affect remote sensing measurements (i.e., chlorophyll-*a* concentrations can be significantly overestimated [greater than 100 percent] from satellite measurements due to algorithm artifacts in the atmospheric correction and bio-optical inversion). Variations in seasonal solar insolation effects also may result in reduced primary productivity (i.e., most of the areas in the Alaska Region have limited sunlight). Uniform application of the NPP model may be slightly problematic for marginal seas and areas of upwelling (Balcom et al. 2011).

Despite these challenges, BOEM required an approach that could be consistently applied and compared across broad areas. Field-based methods suffer from variations in analysis, geographic coverage, temporal coverage, and other standardization issues. BOEM maintains that the current methodology (i.e. satellite-based measurements) is the best method available to measure NPP for the purposes of BOEM decision making. Additionally, it should be highlighted that these are annual averages taken over a 12-year period. The Arctic is known to house high rates of NPP (Shakhaug 2004); however, these rates are measured during seasonal blooms (Springer and McRoy 1993, Hill and Cota 2005). The low light availability in the Arctic contributes to low annual averages of NPP.

The GOM exhibited high annual primary productivity per acre: $314.4\ t\ C\ km^{-2}yr^{-1}$ for the entire program area. On a regional basis, the Central and Eastern GOM region had a higher rate of NPP than the Western GOM.

The highest interannual variability in primary productivity was found in the Beaufort Sea and Chukchi Sea Program Areas. The Beaufort Sea and Chukchi Sea Program Areas exhibited interannual variability greater than 10 percent, which is due to light limitation. In contrast, most of the remaining program areas show low interannual variability (less than 10 percent). Low-latitude areas are less sensitive to cloudiness, as long as the cloud cover is not persistent.

Marine ecosystems can be affected significantly by the rates and magnitude of primary production within their boundaries. Alterations in primary production in an ecosystem will have wide-ranging effects on all dependent species and chemical processes occurring within the affected system. Having sufficient knowledge of the magnitude and rates of primary production within an ecosystem allows for an accurate understanding of the overall potential productivity within that system. This knowledge may help elucidate the potential effects that altering the base of the food chain may have on dependent species and processes. Therefore, it is important to include estimates of primary production in any analysis of environmental sensitivity related to OCS oil and gas activities. Besides any direct effects of an oil spill on higher trophic levels, any anthropogenic alteration of the base of the food chain, such as spilled oil on

the surface of the ocean decreasing light penetration, thus decreasing rates of photosynthesis of a system, would necessarily affect the functioning of the system as a whole. However, these effects on primary production most likely would be very short-term in duration and of low magnitude.

Comparison of 1990 and 2010 primary productivity determinations indicates that the model-derived estimates in the present analysis are in good agreement with field-based determinations (Balcom et al. 2011). Given the completely different assessments and independent methods in use between the two periods, this similarity provides strong support for the argument that model results (based on satellite data) provide excellent estimates of primary productivity.

In conclusion, NPP is highly variable on the OCS, with a nearly 14-fold difference between the lowest rates (found in the Beaufort Sea and Chukchi Sea Program Areas) and the highest rates (found in the Cook Inlet Program Area). These rates of NPP allow a ranking of the program areas; areas with high rates of primary production would have the greatest amount of energy available to higher trophic levels in that area (i.e., the amount of biomass that area could potentially support). The low productivity in the Beaufort Sea and Chukchi Sea Program Areas is largely due to the long periods of low light availability in the region.

Chapter 8 Equitable Sharing Considerations

8.1 DEFINITION AND INTRODUCTION

Section 18(a)(2)(B) of the OCS Lands Act requires that the Secretary base the timing and location of the OCS exploration, production, and development on a consideration of “an equitable sharing of developmental benefits and environmental risks among the various regions.” To assist the Secretary in making decisions, this analysis goes beyond the strict requirements of the OCS Lands Act and considers the sharing of benefits and risks to the U.S. population, particularly in the coastal areas that produce, or could potentially produce, oil and gas. As recognized by the court in *California II*, the OCS regions are submerged lands off the U.S. coast. Because most developmental benefits and environmental risks are experienced onshore or along the coast, BOEM uses PADDs (see Figure 6-4) to help assess the sharing of benefits and risks among onshore “regions” (see Section 8.3.1.2.2, Environmental Risks).

The regions possessing substantial oil and gas resources (and the adjacent areas) included in this program tend to both receive most of the benefits from developing OCS resources, and be subject to the associated environmental risks of developing those resources. While this relationship tends to promote equitable sharing within the areas selected for leasing, this analysis provides additional information about developmental benefits and environmental risks of OCS activities among program areas with consideration of effects on the states adjacent to those program areas that may assist the Secretary in her decisions. This analysis also considers how the developmental benefits and environmental risks would be different if the No Sale Option were selected under any of the program options. The Secretary is required to consider equitable sharing, but neither Section 18 of the OCS Lands Act nor the courts have indicated a specific standard of sharing that a new program should achieve.

8.1.1 Developmental Benefits Overview

In this analysis, developmental benefits of the Program include increased wages, additional jobs, increased tax collection, revenue sharing, and proximity of supply and consumers. These benefits were described in detail in the DPP and Proposed Program equitable sharing analyses, and are introduced again in the following paragraphs:

Increased wages. Generally, jobs in the OCS oil and gas industry tend to provide higher financial compensation than other jobs in nearby areas. The regional benefits associated with oil and gas activities include increases in employment and wages. This could manifest as a higher standard of living and increased contribution to local economies through spending and investment.

Additional jobs. In areas where there are new or expanded oil and gas activities, employment opportunities can increase due to purchases of labor, land, materials, equipment, and other factors. The direct employment also stimulates additional indirect economic activity for those companies that supply the industry with goods and services, as well as the additional “induced” spending of additional household income resulting from direct and indirect spending. The “ripple effects” of indirect and induced spending on local economies often are much greater than those of the initial industry expenditure.

This analysis includes a description of BOEM's estimates of the level of economic activity in the program areas.

In areas with new oil and gas development, it is often necessary to construct or modify supporting onshore infrastructure. While construction of onshore infrastructure can increase employment opportunities, improve access to roads, and provide other benefits, it also poses environmental risks and socioeconomic or fiscal risks, especially if the oil and gas activity is short-lived and does not provide local communities with the revenues to compensate for up-front expenditures or under-used facilities.

Increased tax collection. Increased wages and employment can result in a meaningful contribution to state and local tax revenues, as can construction and operation of support facilities subject to property taxes. Property taxes are a vital source of state and local government revenues in Alaska.

Revenue sharing. States adjacent to OCS regions producing oil and gas, with revenue sharing agreements in place, enjoy the financial compensation of sharing revenue with the Federal Government. Revenue sharing is one way to address equitable sharing of environmental risk with economic benefits. Only Congress has the authority to expand, extend, or otherwise revise revenue-sharing provisions during the period covering future Programs. Two Federal laws currently provide for revenue sharing, Section 8(g) of the OCS Lands Act and GOMESA. Section 8(g) of the OCS Lands Act applies to all coastal states adjacent to current or potential areas of OCS development and provides for coastal states and the Federal Government to share revenues earned from OCS leases in Federal waters between the state's submerged lands boundary and 3 nm seaward. BOEM shares 27 percent of these bonus, rent, and royalty revenues with the adjacent states. The 3-nm-wide area adjacent to the state's submerged lands boundary is known as the "8(g) zone." The 8(g) revenues are intended to compensate the states for drainage of oil and gas resources in state waters by companies operating on Federal leases. Because the 8(g) revenue sharing provision applies only to states that could have production of Federal oil and gas reserves within 3 nm of their seaward boundaries, creation of close-to-shore buffer areas that prohibit leasing would eliminate the possibility of any 8(g) revenue sharing for states adjacent to such a buffer. Currently, 8(g) oil and gas revenues are shared with the states of Texas, Louisiana, Mississippi, Alabama, California, and Alaska. Under GOMESA, revenues are shared with the GOM states of Texas, Louisiana, Mississippi, and Alabama. A detailed description of GOMESA is included in Section 8.3.2, Gulf of Mexico OCS Region Benefits and Risks.

Proximity of supply and consumers of energy. The transportation of energy products such as oil and gas is expensive, especially if new transportation infrastructure is needed due to major shifts in production location, and it introduces risks along the routes. Producing energy close to where it is refined or processed and consumed reduces costs incurred by energy suppliers and improves economic efficiency. Additionally, close proximity of supply and consumers results in decreased expenditures to transport resources to consumers; decreased impacts on transportation volume, air emissions, and consumption of fuel just to transport resources; and decreased potential impacts on fuel distribution due to disruptions from events such as natural disasters. This chapter highlights some of the consideration given to regional energy markets, but a more detailed review is included in Chapter 6, Program Area Location Considerations.

8.1.2 Environmental Risk Overview

The Programmatic EIS identifies and discloses the potential impacts associated with the PFP, focusing on potential moderate or major impacts. The Programmatic EIS describes the environments, species, and human activities that could be impacted by oil and gas leasing activities. The burden of environmental risk is borne primarily by the marine and coastal areas adjacent to and within which oil and gas activities occur. This is due to the fact that potential environmental impacts from oil and gas activities (and associated ramifications to the human population) are often linked to the proximity of the actions that may cause an impact. The risks associated with non-routine or accidental events such as oil spills may be higher in areas with the greatest activity or in areas where the oceanography or characteristics of the environment may lead to more oil reaching the shoreline.

The potential impacts associated with the PFP Options can vary in likelihood, extent, and intensity. Environmental risks include the potential to adversely affect (1) the quality of the human environment (e.g., water quality, air quality, accidental or catastrophic oil spill events); (2) species and habitats that are commercially or recreationally valuable (e.g., commercial fisheries, coastal tourism); (3) species and habitats that are protected by Federal environmental laws and regulations; (4) cultural and archaeological resources; (5) access to subsistence resources; or (6) overall marine productivity that may affect or diminish ecosystem services (see Chapter 7).

8.1.3 Consideration of the No Sale Option

The selection of the No Sale Option eliminates many of the developmental benefits from OCS production. This could be detrimental in areas with existing activity (e.g., the GOM) where selection of the No Sale Option will not simply fail to add new jobs but would likely lead to a reduction in OCS activity that would fail to sustain the current employment base and lead to strain on local communities. Further, existing onshore infrastructure could become obsolete. A full assessment of the environmental risks and developmental benefits considers both the risks and benefits that would occur with the inclusion of certain areas in the program and those that would occur under the No Sale Option.

Environmental risks would not be avoided by selection of the No Sale Option. Using current assumptions described in Section 5.3, Net Benefits Analysis, substitute sources of energy would be necessary to replace forgone OCS production, and these energy market substitutions present their own environmental risks. As discussed in Chapters 5 and 6, BOEM uses *MarketSim* to estimate the substitute energy sources that would replace OCS production with the selection of the No Sale Option (e.g., increased imports, onshore oil and natural gas production, fuel switching). This chapter outlines the geographical distribution of where the environmental risks might occur if the No Sale Option were selected in each of the program areas.

8.1.4 Consideration of Elements beyond the Secretary's Control

The OCS Lands Act gives the Secretary wide latitude to assess the importance of a variety of factors in deciding the size, timing, and location of sales that best meet the energy needs of the United States. In addition to the elements listed above, there are dynamics that can greatly affect the equitable sharing implications of the Program Options, but which are not under the direct control of the Secretary. One of these dynamics is the geographic distribution of oil and gas resources, which can, regardless of any

decision made by the Secretary, limit the developmental benefits an area could receive. Another element is environmental factors, such as weather and pollution from other activities in the regions besides oil and gas development, which can affect the actual incidence of environmental risk in an area.

Other factors beyond the Secretary's control include laws that may prohibit oil and gas exploration in certain areas or that can discourage companies from timely operation on the OCS. Employment, income, and tax benefits in each region can change if localities change their relevant policies and laws. While revenue sharing of oil and gas revenues, as well as impact assistance, can be important in determining the distribution of benefits to regions, they are generally established by law and are outside the scope of the Secretary's decisions. Another constraint is the variation in public attitudes and in state and local government laws, goals, and policies concerning oil and gas activities in onshore areas adjoining the various program areas. In addition, there are environmental and socioeconomic factors (e.g., presence of certain environmental risks, existing onshore infrastructure) that affect the Secretary's ability to promote an equitable sharing of benefits and risks through a proposed five-year schedule.

8.1.5 Equitable Sharing Analysis for the Proposed Program

The equitable sharing analysis in the Proposed Program outlined the developmental benefits and environmental risks, both those that are widely distributed and those that are localized to the individual program areas of the DPP options. The analysis showed the potential benefits and risks from the selection of the No Sale Option in each program area.

The analysis contained herein refines that analysis and analyzes the PFP Options considered by the Secretary in making the PFP decision. Given the Five-Year Program process, this analysis does not revisit any decisions made during previous stages of the program development process, but purely focuses on the options before the Secretary in the set of PFP decision options.

8.2 METHODOLOGY FOR THE EQUITABLE SHARING ANALYSIS FOR THE PFP

This chapter analyzes the developmental benefits and environmental costs of each program area and adjacent onshore area related to the PFP Options. A discussion is included for each broad region of program areas (i.e., Alaska program areas and the GOM Program Area) on the consequences of the selection of the No Sale Option in that region. The discussion on each broad OCS region also highlights developmental benefits and environmental risks that could be directly felt in other regions. This equitable sharing analysis concludes with a discussion of the widely distributed benefits and risks that could occur as a result of the Program.

The developmental benefits in this analysis are calculated using an economic impact approach. This differs from the benefit-cost approach used to estimate the net benefits in Chapter 5. Economic impact analysis and benefit-cost analysis offer two means of estimating certain measures of benefits and costs, and both approaches provide valuable information for the Five-Year Program decision. Each approach reflects different aspects of economic activity.

The effects measured in a benefit-cost analysis represent direct first-order real resource market outcomes, such as increased production and the accompanying increase in economic surplus, as well as the costs imposed by the program decision. Some factors, such as employment, often thought of as a benefit to

society, are treated in a benefit-cost analysis as costs paid by society to conduct the activities that result in economic value. For example, the net benefits analysis in Section 5.3, Net Benefits Analysis, starts with the calculation of net economic value of OCS leasing. In this calculation, costs of exploration, development, and transportation are netted from the gross revenue of production to estimate the net benefits of the Program Options. Alternatively, in an economic impact analysis these same costs generate income, employment, and revenues that state and local governments and residents almost always consider to be benefits. Thus, the economic impact analysis focuses on these broad macroeconomic measures, such as income, employment, wages, and revenue transfers, as they may relate to specific industries and geographical locations.

An additional distinction between the benefit-cost analysis and the economic impact analysis is the geographic scope of analysis. Because the Secretary must make programmatic decisions for the benefit of the United States as a whole, the benefit-cost approach is more appropriate for the net benefits analysis, described in Section 5.3, Net Benefits Analysis, which presents relative benefits and costs from a national perspective. The net benefits analysis does not outline costs and benefits specific to a particular area, but instead focuses on costs and benefits that accrue to the nation as a whole. However, for the equitable sharing analysis, it is the benefits enjoyed and distributed risks borne among the specific geographic regions that are most important. Therefore, the economic impact analysis is used to evaluate developmental benefits and such analysis is done at the more regional level. Though residents of local areas tend to view employment as a benefit, the Programmatic EIS acknowledges potential strains from an influx of new employment near frontier areas and from a failure to sustain employment levels in areas that support existing oil and gas activities.

BOEM used its recently updated regional economic impact models, collectively called MAG-Plan,⁴⁶ to estimate the economic effects of OCS oil and gas activities. The MAG-Plan estimates reflect the fact that OCS oil and gas activities can have sizable economic effects in the onshore areas adjacent to the offshore program areas as well as throughout the United States. Companies do business with suppliers throughout the country and the world, and offshore workers usually work shifts of 1 to 4 weeks, alternating with periods off duty, allowing them to commute long distances.

Expected effects of oil and gas activities in each of the regions depend on a number of factors, including local, national, and international economic conditions, the extent to which a local support industry exists, and the level of oil and gas activities already occurring.

A substantial part of the economic impacts reported in this section would be generated by the multiplier on oil and gas sector spending. When an industry is newly established or undergoes expansion, the local economy will generally benefit directly from the new expenditures on salaries, goods, and services. The recipients of this spending then purchase other goods and services; thus, there is a multiplier effect in which each dollar spent by the expanded industry results in additional spending throughout the economy.

⁴⁶ BOEM uses two separate MAG-Plan models to calculate economic impacts, one model each for Alaska (Northern Economics, Inc. et al. 2012) and the GOM (Eastern Research Group, Inc. 2012). MAG-Plan GOM is currently being updated, but the methodology remains consistent with that used in 2012 (Eastern Research Group, Inc. 2012).

8.3 RESULTS

8.3.1 Alaska OCS Region Benefits and Risks

8.3.1.1 Lease Sale Option

8.3.1.1.1 Developmental Benefits

Increased wages. Alaska has a fairly well-developed oil and gas industry operating onshore and in state waters, and direct and indirect employment patterns are unlikely to change significantly should the Proposed Program decision be approved in the PFP and implemented. Many, if not most, of those who would work on new Alaska OCS projects are likely to either live in Alaska now or would move there, especially in the case of extended high oil and/or gas prices. Similarly, given Alaska's relatively small population and lack of industrialization, a large percentage of the (indirect) goods and services needed for development are likely to continue to be imported from other parts of the country and world markets. The high wages paid to (direct) oil and gas workers relative to other workers should result in higher-than-normal income for those Alaskan residents who are employed to work on OCS projects. The MAG-Plan model results support this, showing much higher worker income per job for Alaska than for the "Rest of the U.S."⁴⁷ The presence of more high-paying jobs generally means more spending, income, and taxes, and more money for local businesses and municipalities. It also equates to more purchasing power and the consumption of more goods and services, which benefits employees by increasing their standard of living and contributing relatively more to the economy.

Additional jobs. Extended work schedules (e.g., one week on followed by one week off duty) allow those employed on existing Arctic projects in Alaska to live in southern Alaska, other communities in the United States, or other countries to commute to work, where they are housed in separate worker enclaves while on duty. BOEM expects a continuation of this pattern for any new projects in the Beaufort Sea or Chukchi Sea, even with vigorous OCS development. These jobs will be open to local and Alaska Native residents, but BOEM does not expect their employment patterns to change significantly with new Arctic OCS development.

Due to oil and gas activities in Cook Inlet state waters, with populated areas and existing oil and gas facilities on the Kenai Peninsula nearby, a large proportion of OCS workers and their families are likely to reside in nearby communities, and employment benefits would be shared locally. However, a significant percentage of workers could commute longer distances, especially if sustained high oil and natural gas prices drive more aggressive OCS development than anticipated.

Should the world enter a long period of sustained high prices (as in BOEM's high price case scenario), many of the skilled workers would likely be brought from the GOM Region initially, with the proportion of employed Alaska residents gradually increasing as exploration and development activities increase. Under such conditions, it also is likely that new businesses would be created or existing businesses would expand to serve the needs of new worker households. It also is plausible that Alaska would enhance its

⁴⁷ Due to a number of variable factors, the average wage premium indicated by model results differs considerably for different program areas under different scenarios.

ability to provide secondary goods and services now supplied from outside the state, generating additional employment.

Construction of onshore infrastructure may increase job creation. Given existing infrastructure in northern Alaska and the Cook Inlet area, the greatest need for new infrastructure construction is likely to be associated with successful operations in the Chukchi Sea. Benefits include development of new OCS-related industries and employment in adjacent communities. Construction and development of onshore support infrastructure would likely generate additional regional economic effects as measured by employment, labor income, and government revenues. Employment and income would be generated during the exploration, development, and production phases from the construction of any necessary onshore support infrastructure (e.g., service base, air support base, pipelines, roads, onshore processing facilities, oil spill response base). However, in the less-developed, less-populated areas of the Alaska North Slope and Bering Sea coasts, it is likely that construction work would be short-term and performed with non-local labor.

In addition to construction of new infrastructure, new OCS leasing would enable continued use of regional onshore infrastructure that depends on oil and gas. This is especially true for Alaska, where local economies—and even state and local treasuries—depend on revenues from continued use of existing infrastructure. The prime case for Alaska is TAPS. The TAPS transports large amounts of oil from the Prudhoe Bay area of the U.S. Arctic and its future viability depends on further development of either offshore or additional onshore oil to sustain sufficient throughput. Depending on circumstances such as timing and oil prices, new OCS production could help extend the life of TAPS. The North Slope Borough and the State of Alaska rely heavily on Arctic oil-related revenues, which will be lost if TAPS can no longer operate.

Increased tax collection. OCS oil and gas production increases the economic contribution to local economies through spending and investment, and provides a meaningful contribution to state and local tax revenues. In addition to employment and labor income, development of high-value onshore infrastructure to support offshore oil and gas activities would generate property tax revenues that accrue to the jurisdiction in which the infrastructure is located. Tax revenues, especially from property taxes generated by facilities serving onshore and offshore state oil and gas activities, are very important to Alaska and many of its local communities. For example, the North Slope Borough receives the vast majority of its government revenues from property taxes levied against oil and gas infrastructure in its jurisdiction. Since the North Slope Borough funds most of its government operations from these property taxes and is itself the largest employer of North Slope Borough residents, tax collections are a significant driver of indirect employment and the economic well-being of local residents. Should Alaska become an area of long-term OCS development and production, this tax revenue would contribute to state and local economies, as well. Conversely, should TAPS throughput become insufficient in the absence of new OCS production and other sources of oil, Alaska would not only forgo OCS-related tax revenues, but also lose its major source of general funding.

Revenue sharing. As in the other OCS regions, the Federal Government shares 27 percent of the bonus, rent, and royalty revenues from OCS oil and gas leases within the 8(g) zone with Alaska described in Section 8.1.1, Developmental Benefits Overview. The Beaufort Sea and Cook Inlet Program Areas include acreage in the 8(g) zone, but the coastal buffer in the Chukchi Sea Program Area excludes all

blocks in the 8(g) zone and does not provide this opportunity for revenue sharing. Table 8-1: Historical 8(g) Revenues in Alaska shows the 8(g) revenues disbursed to Alaska from 2008–2015. The revenues in 2008 included sharing from some of the eligible bonus bids from Beaufort Sea Lease Sale 202 in 2007. More recent 8(g) revenues to Alaska are from rental payments collected on active leases and royalties on a joint Federal-state production unit in the Beaufort Sea. The 8(g) revenues collected are declining as lessees relinquish their leases or the lease terms expire.

Table 8-1: Historical 8(g) Revenues in Alaska

Year	Alaska 8(g) Revenues
2008	\$17,814,997
2009	\$9,943,558
2010	\$5,601,829
2011	\$5,128,697
2012	\$3,100,756
2013	\$2,940,962
2014	\$2,519,780
2015	\$1,957,767
Total	\$49,008,346

Source: ONRR 2016a

Proximity of supply and consumers of energy. Although the Alaska Region is not in close proximity to most consumers, production of OCS oil would increase throughput of the TAPS, potentially helping to extend the life of the pipeline and providing Alaska with valuable revenue. Natural gas produced in Cook Inlet is likely to be consumed in south-central Alaska, which currently is facing uncertainties in future supply given declining production on state-owned leases. Natural gas produced on the Arctic OCS would be reinjected back into the earth to increase oil production and might later be re-produced and transported to communities in Alaska or elsewhere if improved market conditions prompt construction of a major new natural gas pipeline. More on the national and regional energy markets is included in Chapter 6.

8.3.1.1.2 Environmental Risks

The Programmatic EIS describes the important environmental, sociocultural, and socioeconomic resources of the Beaufort Sea, Chukchi Sea, and Cook Inlet Program Areas and discloses the potential environmental impacts associated with oil and gas leasing in those Program Areas. Environmental risks associated with oil and gas leasing activities in the Alaska program areas could come from OCS impacts on commercially valuable fisheries (Cook Inlet); federally protected species and habitats such as marine mammals, birds, or critical habitat areas for these species; access to subsistence resources and communities; and the introduction of noise to the marine environment. Should a large oil spill occur, it could significantly harm both offshore and coastal species and habitats as well as prevent human access to these areas. The latter could include access to recreational activities in and along the Cook Inlet, as well as subsistence activities. Although there are well-developed onshore and state-water infrastructure networks to support existing operations in the Beaufort Sea and Cook Inlet, the emplacement of onshore infrastructure to support the Chukchi Sea activities could result in modification of nearshore and onshore

habitats. Similarly, construction or expansion of infrastructure to support activities in the Beaufort Sea or Cook Inlet could affect local habitats.

8.3.1.1.3 Benefits and Risks on other Regions from Alaska OCS Activities

Lease sales and activities in the Beaufort Sea, Chukchi Sea, and Cook Inlet would enhance benefits received in Alaskan communities. Many of the jobs created by OCS activities in the Beaufort Sea and Chukchi Sea would be filled by workers in Alaska, and secondarily by workers elsewhere in the United States or other countries.

While it is likely that most of the environmental risks from direct exploration, development, and production activities on the Alaska OCS would manifest inside the Alaska region, some would occur outside the region. To the extent that Alaska OCS production is transported by tanker to west coast refineries, slight environmental risk could be experienced in these regions outside of Alaska from the risk of oil spill and air emissions. Further, the transportation of drilling supplies and equipment staging would also likely occur outside of Alaska, possibly somewhere on the west coast

8.3.1.2 No Sale Option

8.3.1.2.1 Developmental Benefits

Under the No Sale Option, Alaska would not receive any of the developmental benefits of OCS production from new leases that would have accrued under the Proposed Program decision. To the extent that the replacement of onshore production occurs outside of Alaska, the TAPS could lose a valuable source of throughput, possibly causing it to fall below threshold levels for operation, and the State of Alaska would lose its major source of tax revenues. Areas outside of the Alaska OCS that produce replacement energy would receive developmental benefits from that activity. However, to the extent that the production, at the national level, is replaced by imports, the vast majority of those benefits would accrue overseas.

8.3.1.2.2 Environmental Risks

Under the No Sale Option, no environmental risks from OCS exploration, development, and production activities from new leases would occur in the Alaska Region if none of the Arctic OCS is newly leased. However, as is the case now, in the absence of Alaska OCS production, alternative sources of energy are required to fulfill the country's demand for energy and replace what could have been produced in the Alaska Region. Substitute energy sources (e.g., increased imports, increased onshore oil and natural gas production) have their own environmental and social costs. Some of these costs associated with the selection of the No Sale Option occur in Alaska and the west coast, whereas others are felt elsewhere throughout the United States.

Using transportation data from the EIA, BOEM's environmental cost model (the OECM), includes an estimate of where substitute energy sources would be produced if OCS leasing were forgone in a particular area (BOEM 2015). To some extent, choosing the No Sale Option in any of the Alaska program areas would still pose environmental and social risks to some parts of the west coast from oil imports transported by tanker and from increased onshore production.

Table 8-2: Location of Substitute Energy Sources in Absence of Alaska Sales shows BOEM’s estimate of the distribution of replacement sources of energy throughout the United States if the No Sale Option were selected for the Alaska program areas. These estimates use the DOE’s PADDs (see Chapter 6) to describe where in the United States the substitute production would occur. The substitution amounts and underlying uncertainties in these calculations are described in Section 6.4, Possible OCS Production Substitutes. Under the No Sale Option for Alaska program areas, at least 70 percent of the energy content (on a Btu basis) that would have occurred from Federal OCS production would be replaced with substitute energy sources occurring in the West Coast PADD, 63 percent through additional oil imports to west coast ports,⁴⁸ and 7 percent through additional onshore oil and gas production onshore in Alaska, California, Arizona, Oregon, or Nevada.⁴⁹ An additional 18 percent of the replacement energy sources would be natural gas production in the Gulf Coast and Rocky Mountain PADDs. An additional 4 percent of substitute energy sources would occur through other sources such as coal, other sources of electricity, biofuels, etc. These substitute energy sources have their own environmental and social costs, which are monetized later in this chapter in Table 8-6: Mid-Price Case—Regional vs. National Allocation Comparison (\$ millions) and described in the Economic Analysis Methodology paper (BOEM 2016a). Of the forgone energy production, there will be a slight reduction in consumption (7 percent of forgone energy will not need to be replaced), which will not have any associated environmental and social costs.

Table 8-2: Location of Substitute Energy Sources in Absence of Alaska Sales

Substitute Energy Sources	PADD 1 Atlantic	PADD 2 Midwest	PADD 3 Gulf Coast	PADD 4 Rocky Mountain	PADD 5 West Coast and Alaska	Other U.S. Impacts	No Impacts
Imports	-	-	-	-	63%	-	-
Onshore Oil Production	0%	0%	0%	0%	3%	-	-
Onshore Natural Gas Production	0%	0%	9%	10%	5%	-	-
Existing Offshore Production	-	-	1%	-	-	-	-
Fuel Switching (electricity, coal, others)	-	-	-	-	-	4%	-
Reduced Demand	-	-	-	-	-	-	7%

Table 8-2: Location of Substitute Energy Sources in Absence of Alaska Sales demonstrates that with the selection of the No Sale Option, substitute energy sources would be produced elsewhere in the United States or shipped to U.S. ports, which will bring their own environmental risks. While these substitute energy sources will likely not directly affect Alaska, they will bring environmental risks to the

⁴⁸ Internal calculations not depicted in Table 8-2 show that of the imports, 32 percent would be to ports adjacent to the Central California Planning Area, 56 percent to those near the Southern California Planning Area, and 11 percent to those near the Washington/Oregon Planning Area. Less than 1 percent would arrive in the Cook Inlet. These imports are not related to any OCS production in these planning areas, but to oil imports arriving at ports in these areas.

⁴⁹ Washington and Hawaii are also in the West Coast PADD, but do not have any oil or natural gas production.

west coast. Table 8-6: Mid-Price Case—Regional vs. National Allocation Comparison (\$ millions) in Section 8.4.1, Widely Distributed Benefits, monetizes the environmental and social costs by region if the No Sale Option were selected in every Alaska program area.

8.3.1.3 Environmentally Important Area Exclusion Options

8.3.1.3.1 Developmental Benefits

Adoption of exclusions of individual Environmentally Important Areas in the Alaska program areas would likely have an insignificant effect on the equitable sharing of developmental benefits as compared to that presented in Section 8.3.1.1, Lease Sale Option. However, if several Environmentally Important Areas in the Arctic program areas are excluded that substantially overlap geologic plays, moderate aggregate effects on equitable sharing could be experienced. For example, the exclusion of several Environmentally Important Areas substantially overlapping geologic plays could result in potential reduction of available hydrocarbons. The development of the Chukchi Sea depends first on access to resources in order for industry to begin an exploration program, which could lead to the discovery, and subsequent development, of at least one economically viable oil and gas field. This would warrant the infrastructure construction necessary to produce and transport hydrocarbons to TAPS. In the Beaufort Sea, access to resources are equally vital for successful exploration and development of OCS resources although an existing network of onshore and nearshore infrastructure based out of Prudhoe Bay serve to improve the economic viability of OCS development relative to the Chukchi Sea. Therefore, the exclusion of several Environmentally Important Areas substantially overlapping geological plays in either region of the Arctic could have economic implications and affect industry interest. The developmental benefits from the No Sale Option are discussed in Section 8.3.1.2.1, Developmental Benefits. The selection of excluding several Environmentally Important Areas in the Arctic program areas that substantially overlap geologic plays could shift the benefits and risks among the program options.

8.3.1.3.2 Environmental Risks

These options allow for exclusion of specific Environmentally Important Areas within the Alaska program areas. These Environmentally Important Areas are designed to address areas of important environmental value where there is potential for conflict between ecologically important or sensitive habitats; maintenance of social, cultural, and economic resources; and possible oil and gas development. In general, the environmental risks from the Alaska program areas discussed in Section 8.3.1.1.2, Environmental Risks, would still occur even with exclusion of individual Environmentally Important Areas. However, exclusion of these areas may reduce certain environmental risks to the specific resources they are designed to protect. The Programmatic EIS provides more information on these areas and the resources they are designed to protect by limiting environmental risks.

As described in Section 8.3.1.3.1, Developmental Benefits, exclusion of several Environmentally Important Areas that substantially overlap geologic plays in the same program area or region could have economic impacts and affect industry interest. The environmental risks of the No Sale Option are discussed in Section 8.3.1.2.2, Environmental Risks.

8.3.2 Gulf of Mexico OCS Region Benefits and Risks

8.3.2.1 Region-Wide Leasing Option

8.3.2.1.1 Developmental Benefits

Increased wages. Under the Region-wide Leasing Option, leases in the GOM Region would likely sustain the current levels of activity in this established area. Therefore, this source of high wages for local communities would generally be maintained. Should the world enter a long period of sustained high prices (as in BOEM's high price case scenario), there would be additional demand for labor, as well as for supporting goods and services. This could increase the income of existing GOM-area residents and bring in new residents with higher-than-average incomes whose households contribute to local economies. Even in a situation of low oil prices, a certain level of industry activity will remain in the region sustaining a base level of wages.

Additional jobs. Because oil and gas production is well established in the GOM, it is anticipated that OCS activities resulting from including the GOM in the PFP would largely maintain the employment rate in the area, rather than create new jobs. However, as indicated previously, a long period of sustained high prices could produce a large increase in direct employment and employment in industries supporting the oil and gas industry and worker households, as has occurred in previous periods of aggressive OCS activity. Should a period of sustained low oil price occur (as in BOEM's low price case scenario), continued leasing in the GOM will maintain a certain level of employment in the region. Though the impact would be less than under a high price scenario, the number of jobs created or sustained from this program would be a vital contribution to the local economy. In the GOM, where OCS oil and gas activities have been occurring for decades, approximately 68 percent of jobs from oil and gas industry spending in these states are sustained in adjacent states (i.e., Texas, Louisiana, Alabama, Mississippi, and Florida) (see Figure 8-1: Distribution of Total Jobs Supported by FY 2015 OCS Activity in Section 8.4.1). Continuing sales in the GOM Program Area would allow maintenance of, and perhaps an increase in, benefits for states adjacent to the region.

New OCS leasing would enable continued use of regional onshore infrastructure that depends on oil and gas. In the GOM, local economies—and even state and local treasuries—depend on revenues from continued use of existing infrastructure. Communities along the GOM would benefit from continued operation of facilities constructed to service OCS operations.

Increased tax collection. The GOM has extensive onshore oil and gas infrastructure that contributes to local and state economies. Oil and gas production in the GOM would therefore continue to provide revenue to the states through tax collection. Further, states and local governments receive tax revenue from the presence of OCS oil and gas employment and business expenditures in the region. In the high price case, new employment driven by heightened OCS activity would increase the tax base of local communities, while failure to select the Region-wide Leasing Option or something similar (such as the Modified Traditional Leasing Option) could strain the fiscal health of local governments that depend on the income of workers in the OCS and supporting industries, property-tax, or other revenues from workers and infrastructure, and other support from related companies in the communities.

Revenue sharing. Most of the states adjacent to the GOM Program Area receive revenues from two different revenue sharing programs, 8(g) and GOMESA. As described in Section 8.1.1, Developmental Benefits Overview, revenue sharing will continue to contribute economic benefits to Louisiana, Alabama, Texas, Mississippi, and Florida through Section 8(g) revenue sharing to the extent that new leases are offered and leased in the 8(g) zone. Table 8-3: FY 2015 8(g) and GOMESA Revenue Sharing shows the revenue sharing from 8(g) revenues to each of these states in FY 2015.

Table 8-3: FY 2015 8(g) and GOMESA Revenue Sharing

State	8(g)	GOMESA	Total
Louisiana	\$11,925,900	\$816,729	\$12,742,629
Alabama	\$3,998,940	\$666,763	\$4,665,703
Texas	\$528,606	\$291,715	\$820,321
Mississippi	\$94,764	\$666,002	\$760,766
Florida	\$0	N/A	\$0
Total	\$16,548,210	\$2,441,209	\$18,989,419

Key: GOMESA=Gulf of Mexico Energy Security Act; N/A=Not Applicable.

Source: ONRR 2016b

In addition to the Section 8(g) revenue sharing, GOMESA also provides substantial revenue sharing. GOMESA became law in 2006 and provides revenue sharing for Alabama, Louisiana, Mississippi, Texas, their coastal political subdivisions (i.e., counties or parishes) and provides revenue to the LWCF, which distributes revenue more widely for approved projects. The GOMESA revenue sharing was designed to compensate for potential negative impacts of OCS activities. GOMESA funds are reserved for uses specified in the Act, including coastal restoration and protection.

Phase 1 of GOMESA provides for the uncapped sharing of 37.5 percent share of OCS revenues from selected areas stipulated in the law, which are included in the Central and Eastern Planning Areas.⁵⁰ As shown in Table 8-3: FY 2015 8(g) and GOMESA Revenue Sharing, in FY 2015, these states received a combined total of more than \$2.4 million in revenue sharing (ONRR 2016b). The second phase of GOMESA begins in FY 2017 and includes the sharing of additional GOM oil and gas lease revenues (limited to \$500 million annually). All revenues from applicable GOM leases issued during the 2017–2022 Program will be subject to these GOMESA revenue sharing provisions.

Proximity of supply and consumers of energy. As shown in Chapter 6, the Gulf Coast PADD consumes 27 percent of the country’s oil and natural gas production. The region produces 60 percent of the country’s oil and 44 percent of the country’s natural gas. The Gulf Coast PADD contains 52 percent of the refining capacity for the United States. Production in this region provides resources directly for refiners, which limits the environmental risk and cost from transportation. Additional analysis on how program area leasing and activity contributes to onshore energy consumption is discussed in Chapter 6 on national and regional energy markets.

⁵⁰ More information on GOMESA revenue sharing is available on BOEM’s website at <http://www.boem.gov/Revenue-Sharing/>.

8.3.2.1.2 *Environmental Risk*

The Programmatic EIS describes the important environmental, sociocultural, and socioeconomic resources of the GOM Program Area and discloses the potential environmental impacts associated with oil and gas leasing in that program area. Environmental risks associated with oil and gas leasing activities in the GOM could come from degraded air and water quality; offshore impacts on commercially valuable fisheries; reduced access to recreational activities such as sport fishing or coastal tourism; effects on federally protected species and critical habitats for marine mammals, sea turtles, birds, or other species; and the introduction of noise to the marine environment. Should a large oil spill occur, it could significantly harm both offshore and coastal species and habitats as well as prevent human access to these areas. Although there are well-developed onshore infrastructure networks to support existing operations, the emplacement or expansion of onshore infrastructure may result in modification of nearshore and onshore habitats such as coastal wetlands.

8.3.2.1.3 *Benefits and Risks on other Regions from GOM OCS Activities*

The Gulf Coast region has supported both onshore and offshore oil and gas activity for decades. As such, the region has developed an extensive oil and gas industry and large portions of the employment and other development benefits and risks are experienced within the region. However, some of the industry is supported from other parts of the United States and the rest of the world. These impacts are discussed in Section 8.4, Widely Distributed Benefits and Risks. In addition, Section 8.4 considers the environmental risks of GOM activity that could be widely distributed.

8.3.2.2 *No Sale Option*

8.3.2.2.1 *Developmental Benefits*

Under the No Sale Option, developmental benefits for the GOM Region would decline, because leasing necessary to sustain the current level of activities would not occur. While there would continue to be development on blocks leased under the current and previous programs, the decision could be interpreted by industry as a harbinger, leading to relocation of industry activities and an outflow of population, along with associated losses of employment, tax collections, and revenue sharing over a prolonged period. To the extent that industry left the region and activity ceased on current leases and no new leasing were allowed, the development benefits of the offshore oil and gas industry in the GOM would decline fairly quickly. Developmental benefits from exploration activities would be most immediately negatively impacted. Oil and gas production would not be greatly affected during the first few years because existing facilities would maintain production and existing discoveries would be developed, but the decline in exploration would lead to a gradual decline in production over subsequent years. There would be an increase in decommissioning of oil and gas structures as the use of those structures for tiebacks for new developments would be reduced. Oil and gas production would not be greatly affected during the first few years because existing facilities would maintain production, but this production would gradually decline over subsequent years.

8.3.2.2.2 *Environmental Risks*

With selection of the No Sale Option, environmental risks from oil and gas production may also decline, but would not be eliminated due to the presence of ongoing activity from previous programs. Also, some

risks would increase in regions providing the substitute sources of energy which would be required in the absence of additional GOM production, and some of the shifted risk would still take place in the Gulf Coast region, because oil imports and regional oil refining would provide some of the substitute energy. The No Sale Option would not contribute to additional environmental risks, but the risks outlined for the Region-wide Leasing Option would persist until all activity ceased in the GOM.

If leasing in the GOM were reduced or canceled during this Program, oil and gas imports and onshore production would need to increase substantially to maintain the volume of resources required by consumers. Supplemental oil and gas would be obtained through other sources, including inland domestic sources and imports. Table 8-4: Location of Substitute Energy Sources in Absence of GOM Sales shows where substitute energy sources would either be produced or imported to the United States in the absence of additional lease sales in the GOM region. Of the forgone production under the No Sale Option in the GOM, 63 percent of the energy (on a Btu basis) would be replaced with imports coming to the GOM ports. An additional 17 percent would occur within the Gulf Coast PADD through onshore production of oil and natural gas or additional offshore production on existing leases.

Table 8-4: Location of Substitute Energy Sources in Absence of GOM Sales

Substitute Energy Sources	PADD 1 Atlantic	PADD 2 Midwest	PADD 3 Gulf Coast	PADD 4 Rocky Mountain	PADD 5 West Coast and Alaska	Other U.S. Impacts	No Impacts
Imports	-	-	63%	-	-	-	-
Onshore Oil Production	0%	1%	2%	0%	0%	-	-
Onshore Natural Gas Production	3%	2%	14%	3%	0%	-	-
Existing Offshore Production	-	-	1%	-	-	-	-
Fuel Switching (including electricity, coal, and other)	-	-	-	-	-	4%	-
Reduced Demand	-	-	-	-	-	-	7%

8.3.2.1 *Modified Traditional Leasing Option*

The developmental benefits and environmental risks would be similar with the selection of the Modified Traditional Leasing Option as with the Region-wide Leasing Option.

8.3.2.2 *Baldwin County Buffer Option*

8.3.2.2.1 *Developmental Benefits*

The selection of the Baldwin County Buffer Option would have minimal impact on the developmental benefits in the region. Given the size of this area, and the amount of acreage offered elsewhere in the

GOM, it is unlikely that there would be any meaningful impact on activity levels and developmental benefits from this PFP Option.

8.3.2.2 *Environmental Risks*

Under the Baldwin County Buffer Option, current leases could be explored and developed, but new leasing opportunities could not occur in the buffer area. Therefore, with selection of the Baldwin County Buffer Option, there would be no change in environmental risks to the region as no new leasing could occur. The baseline level of risk would remain the same as activities on current leases could continue, but no new risks would be introduced.

8.4 WIDELY DISTRIBUTED BENEFITS AND RISKS

8.4.1 *Widely Distributed Benefits*

As discussed, many of the developmental benefits of the Program occur in onshore areas adjacent to the OCS program areas included for lease sale. In addition to these benefits, substantial benefits also accrue to the United States as a whole, as widely distributed benefits. The oil and gas industry is integrated with the rest of the U.S. economy; therefore, growth and profitability in the oil and gas sector have positive and far-reaching economic impacts. Current employment benefits from OCS leasing are largest in states with the most oil and gas activity, namely Texas and Louisiana. However, OCS leasing supports thousands of jobs and millions of dollars in GDP (value added) in coastal and inland states alike throughout the United States. Benefits flowing from Federal leasing revenues (bonuses, rents, and royalties) tend to be widely distributed among the geographic regions of the United States. In FY 2015, OCS oil and gas leasing provided approximately \$5 billion in leasing revenues, which accrue to the general treasury (ONRR 2016c). As general treasury revenues, the money is spent throughout the country for national defense, benefits programs, etc. Future OCS leasing and development will also contribute to the national benefits received from additional oil and natural gas production.

Though portions of certain revenues are distributed regionally to states through 8(g) and GOMESA revenue sharing programs, the vast majority of leasing revenues are disbursed into the U.S. Treasury General Fund and then appropriated by Congress for various Federal functions. Another small percentage of OCS funds is appropriated to the Historic Preservation Fund and the LWCF. The Historic Preservation Fund was created to provide grants to states, Tribes, local governments, and non-profit organizations to preserve historic places. The LWCF provides assistance to states and local efforts to acquire land for parks and recreational facilities. Because states and organizations around the country can apply for grants and assistance, these funds provide national benefits from OCS development as well as help to offset or mitigate environmental risk for communities near oil and gas activities. The Trust for Public Land conducted a study of the return on LWCF investment and found that every \$1 invested returned \$4 in economic value from natural resource goods and services (The Trust for Public Land 2010).

Taking into account all the industry spending, government revenues, and industry profit generated by OCS leasing activity in FY 2015, BOEM estimated that approximately 500,000 jobs were sustained, and more than \$48 billion of value added (representing the contribution to GDP) was generated. The OCS supported fewer jobs and generated less aggregate value added than in recent years given the decline in oil prices and the corresponding reduction in government revenues and industry spending. Much of the

impact from industry spending is proximate to the region of OCS activity, but the benefits from government spending and industry profits are distributed throughout the country. An OCS oil and gas project requires equipment and supplies for exploration, development, platform fabrication, pipeline construction, air and water transportation, and other activities. Not only does the industry purchase goods and services from vendors and suppliers across the country, but its work schedules (usually a week or more offshore, followed by the same period off duty) allow offshore workers to commute even from thousands of miles away. Such employees may live, and spend their wages, far from the areas adjacent to the OCS, thereby contributing money from OCS jobs to local economies perhaps hundreds of miles from the OCS.

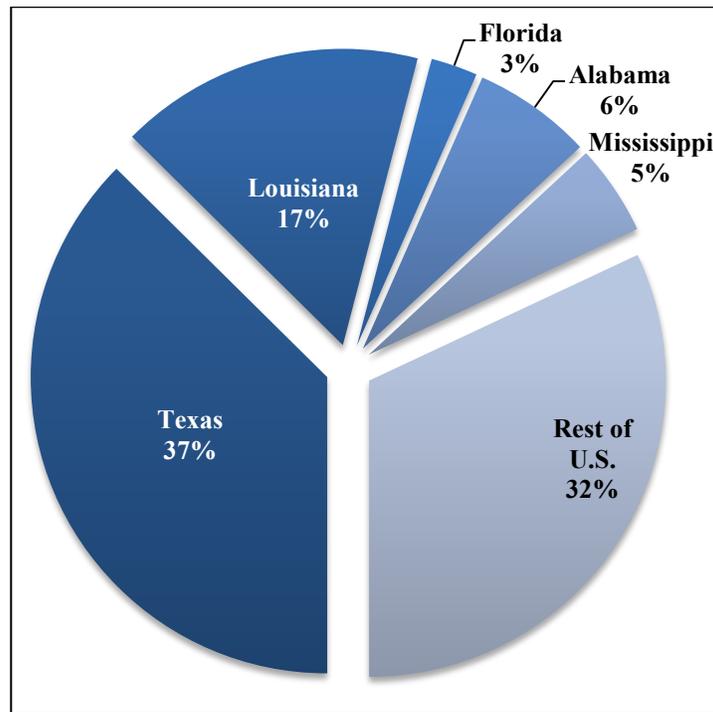
In FY 2015, BOEM estimated that more than half of the current total employment and GDP contribution of GOM OCS activities are concentrated in the GOM states, whereas the remainder is shared throughout the United States. Table 8-5: Total Economic Impacts from FY 2015 OCS Activity and Figure 8-1: Distribution of Total Jobs Supported by FY 2015 OCS Activity show BOEM's estimate of economic impacts in FY 2015 from current OCS activity including industry spending, company spending of profits, and government revenue. Figure 8-1 shows the distribution of total jobs to the GOM states and to the rest of the United States. Table 8-5 and Figure 8-1 represent BOEM's estimate of the current level of economic activity based on current OCS leasing and activity. As sales occur in upcoming programs and exploration and development occurs in other regions, these estimates and locational distributions will change, but historical values are included to illustrate the types and magnitudes of impacts that could be expected.

Table 8-5: Total Economic Impacts from FY 2015 OCS Activity

Area	Total Output (\$ billions)	Total Value Added (\$ billions)	Total Jobs (thousands)
Alabama	\$4.5	\$2.3	32
Florida	\$2.2	\$1.3	13
Louisiana	\$15.5	\$7.3	82
Mississippi	\$3.7	\$1.8	24
Texas	\$33.2	\$18.8	184
Rest of the U.S.	\$27.4	\$16.9	157
Total	\$82.0	\$48.4	492

Note: Includes government spending of OCS revenues, industry profits, and industry spending. Totals may not sum due to rounding. Methodology is explained in USDOJ 2016. Total output is the total estimated value of production of goods and services supported by GOM activity. Value added is the difference between estimated total output and the cost of intermediate inputs (contribution to GDP).

In addition to employment benefits, OCS oil and gas activities generate substantial industry profits that provide dividends to shareholders, and serve as a source of investment capital to ensure future growth and innovation. These outcomes positively impact the entire economy to a significant degree.

Figure 8-1: Distribution of Total Jobs Supported by FY 2015 OCS Activity

In addition to monetary benefits to the United States from OCS activities, development of the OCS provides other national benefits that are less easily quantified. One of these benefits is a reduction in the U.S. trade deficit, with reduced dependence on imported oil. Domestic energy production also reduces risks to national security and adds to supply that can fulfill U.S. energy needs. These national benefits from OCS production are discussed in more detail in Chapter 1.

In addition to receiving the financial and national security benefits that result from OCS oil and gas development, the United States benefits through reduced use of substitute energy sources when OCS oil and gas are consumed. As discussed in Section 5.3, Net Benefits Analysis, in the absence of OCS production, energy markets will respond to the slightly higher oil and gas prices by substitution of energy from other sources and, to a much smaller extent, reduced consumption. The production of OCS resources reduces the United States' need for additional onshore oil and natural gas production and oil imports, and it prompts some fuel switching from coal and other sources of electricity. According to the analysis presented in this document, overall energy consumption would be reduced modestly in the absence of any given quantity of OCS oil and gas. Substitute sources of energy have their own environmental and social costs, which are avoided with OCS production (e.g., air emissions, oil spill risks).⁵¹ These energy substitutes and their environmental and social costs can change over time given changing market conditions and policies. The analysis in this PFP provides the Secretary with information on the likely energy market reactions assuming current policies and projections.

⁵¹ BOEM does not include environmental and social costs imposed outside the jurisdiction of the United States (e.g., the costs imposed on countries exporting oil such as Canada or Venezuela). The OEMC does include the impact of imports (through increased oil spill risk and air emissions) once they enter U.S. waters.

Section 5.3, Net Benefits Analysis, presents the incremental environmental and social costs of the program, which net the environmental and social costs of these energy substitutes with the environmental and social costs of the PFP Options. BOEM conducts the incremental environmental and social costs calculation in the net benefits analysis of Section 5.3 from a national approach where the costs and benefits to the United States as a whole are represented. The analysis shows that the environmental and social costs of energy substitutes are greater than those of the Program in every program area. This means a benefit of OCS production is avoided environmental and social costs. In Chapter 5, Valuation of Program Areas, the costs of the energy substitutes are presented with the program area in which they would be required if the No Sale Option were selected in that area. In some cases, the areas that have OCS production will be the same areas where environmental and social costs of substitutes would occur (e.g., OCS production from the GOM reduces the need for additional imports, resulting in lower risks of spills from tankers traveling through the GOM). However, in other instances, the social and environmental costs of OCS production are not necessarily realized proportionally in the same region as the benefits of not relying on the energy substitutes (e.g., Alaska OCS production reduces the need for additional foreign imports, resulting in different transportation flow patterns and risk in Alaska, which could, in the absence of such Alaska OCS production, be borne elsewhere in the country). This equitable sharing analysis considers the regional aspects of OCS leasing and presents these No Sale Option costs in the program area in which they would occur in the absence of a new OCS leasing program.

Table 8-6: Mid-Price Case—Regional vs. National Allocation Comparison (\$ millions), shows a comparison of the regional and national cost allocation for the mid-price case. The first data column of Table 8-6 shows the environmental and social costs of the Program activity for the mid-price case. The second and third columns show the environmental and social cost of selecting the No Sale Option in all program areas (i.e., no proposed OCS lease sales anywhere). As shown, total environmental and social costs are equivalent under both the national allocation approach (second data column) and the regional allocation approach (third data column). Under both approaches, the OECM calculates the estimated environmental and social costs of the No Sale Option in the area in which they are expected to occur. Under the regional allocation approach, these costs are allocated to the planning areas in which they would occur (or to the non-coastal U.S.). Alternatively, under the national allocation approach, these same costs are allocated to the program areas where the resources that must be replaced are located (i.e., the program areas for which the No Sale Option would be selected). The national perspective is appropriate for the net benefits analysis, because it allows the Secretary to easily determine the level of benefits and the level of costs to the United States likely to result from selection of each Program Option. However, the regional allocation approach also provides important regional information on the trade-offs between having and not having OCS lease sales. The only difference between the two columns in Table 8-6 is whether the costs are attributed to the areas in which the forgone resources are located or to the areas that would experience the environmental and social costs likely to result from producing and getting those resources to market.

Table 8-6: Mid-Price Case—Regional vs. National Allocation Comparison (\$ millions)

Planning Area	Program Costs	No Sale Option Costs: National Allocation	No Sale Option Costs: Regional Allocation	Incremental Environmental and Social Costs: National Allocation	Incremental Environmental and Social Costs: Regional Allocation
Beaufort Sea	230	3,852	0	-3,622	230
Chukchi Sea	154	3,593	0	--3,375	218
Cook Inlet	20	404	0	-384	20
Washington-Oregon	0	0	29	0	-29
Central California	0	0	109	0	-109
Southern California	0	0	235	0	-235
Western Gulf	750	1,700	335	-950	415
Central Gulf	3,443	8,580	151	-5,137	3,292
South Atlantic	0	0	0	0	0
Mid-Atlantic	0	0	0	-0	0
North Atlantic	0	0	2	0	-2
Non-Coastal U.S.	0	0	17,268	0	-17,268
Total	4,661	18,129	18,129	-13,468	-13,468

Note: For easy comparison with results from the national perspective, planning area names are used to show the rough distribution of environmental and social costs to both the planning areas and those coastal states adjacent to them. The impacts on the Non-Coastal United States represent impacts that are experienced from the production of onshore sources of energy. These environmental impacts could be experienced in coastal states to the extent that onshore sources of energy are produced in those states.

For example, given the level of anticipated production in the Chukchi Sea and the likely sources of replacement energy, the OECM calculates that the environmental and social costs of the No Sale Option are \$3,593 million. As shown in the “national allocation” column of Table 8-6: Mid-Price Case—Regional vs. National Allocation Comparison (\$ millions), under the national allocation approach these costs are attributed to the Chukchi Sea Program Area. However, as demonstrated earlier in Table 8-2: Location of Substitute Energy Sources in Absence of Alaska Sales in Section 8.3.1.2.2, these No Sale Option costs would actually occur elsewhere in the United States. As that table shows, 63 percent of the forgone production from the Alaska program areas would be replaced with imports to the west coast. Thus, a portion of the \$3,593 million in environmental and social costs under the Chukchi Sea Program Area No Sale Option are attributed to the west coast planning areas under the regional allocation approach. This is shown in the “regional allocation” column of Table 8-6 where there are no costs associated with the Chukchi Sea Planning Area, but there are costs in the Washington-Oregon, Central California, and Southern California Planning Areas. Again, from Table 8-2: Location of Substitute Energy Sources in Absence of Alaska Sales in Section 8.3.1.2.2, an additional 25 percent of the forgone production from the Alaska Program Areas is replaced by onshore production. Under the regional allocation column, these costs are included in the Non-Coastal United States row, which is the last line in Table 8-6.

The key to Table 8-6 is that the national and regional allocation approaches produce the same levels of cost (the United States incurs \$18 billion dollars in total environmental costs), but those costs can either

be attributed to the planning areas where the forgone resources are located or to the general locations where the costs would be experienced, and these geographic allocations can be very different. The last two columns in the table show the incremental environmental and social costs under both the national and regional allocation approach. These numbers represent the environmental and social costs of the program by planning area. Therefore, a negative number is an avoided cost (i.e., a benefit of having the program). For example, the states along the North Atlantic Planning Area avoid \$2 million in environmental and social costs as a result of the OCS program because tankers, which would have brought imports to North Atlantic ports, are no longer necessary given the additional domestic offshore production. Under the regional approach, the five areas with OCS activity (comprising the four program areas) as a result of this program show net costs, but the benefits of avoided costs for other areas result in a net national benefit of \$13 billion. These regional allocation costs show the Secretary the regional trade-offs in environmental and social costs in the absence of an OCS program. The avoided costs of having an OCS program are a widely distributed benefit of the program.

8.4.2 Widely Distributed Risks

Environmental risks that accrue on a national level from oil and gas leasing activities could result in a direct impact on human health or economic stability. However, there are many risks that are not easily quantified and that could present short- or long-term implications on a national scale.

Human health and well-being are affected by numerous, interrelated and unrelated activities, including the exploration, development, and production of oil and gas resources on the OCS. The primary direct impact pathway from oil and gas exploration, development, and production activities to human health is degradation of air quality through emissions. Air emissions affect directly both the health and quality of life of humans (e.g., increased prevalence of asthma or other respiratory illnesses) and contribute broadly to the effects of global climate change. BOEM also recognizes that the marine and coastal ecosystems that may be impacted by oil and gas activities provide a variety of other ecosystem services including food, carbon sequestration, recreation, and aesthetics.

Risks associated with air quality are largely regional. However, there are also risks of national (and international) scale because GHG emissions are one of the causes of climate change. Climate change is a global phenomenon, so predicting climate change impacts requires consideration of worldwide GHG emissions, not just local emissions. In addition, because some GHGs like carbon dioxide can persist in the atmosphere for up to a century after emission, the potential impacts of any source could extend well beyond the active lifetime of the source or even the Program. Refer to the report, *OCS Oil and Natural Gas: Potential Lifecycle Greenhouse Gas Emissions and Social Cost of Carbon* (BOEM 2016b), for estimates of GHGs that may be emitted as a result of the activities associated with the PFP decision and those associated with energy substitutes under the No Sale Option.

The environmental risk of a low-probability, catastrophic discharge event, such as the *Deepwater Horizon* accident, is primarily regional. However, the compensation costs for such events and for other losses not attributable to specific parties are shared by companies and individuals throughout the country. For example, after the *Deepwater Horizon* oil spill, all British Petroleum shareholders were affected by compensation liabilities associated with the spill. In that case, there was a massive transfer of funds to the Gulf coast for cleanup and compensation from an international company with widely dispersed operations and stockholders. A less dramatic example would be industry payments into the Fishermen's

Contingency Fund, which compensates U.S. commercial fishermen and other eligible citizens and entities for property and economic loss caused by obstructions related to oil and gas development activities on the OCS, representing individually small, widespread costs to provide more concentrated compensation to a few local, negatively affected entities.

The risks of environmental impacts from the Program are not limited to the United States. The contiguous United States is bounded by Canada on the north and Mexico on the south, and the Commonwealth of the Bahamas and Cuba are 50 miles and 110 miles, respectively, from the coast of Florida. In the Arctic, the Alaska OCS is bounded by Canada to the east and Russia to the west. These countries could experience environmental impacts from oil and gas leasing activities, especially if a catastrophic discharge event occurs in the vicinity, and the physical and environmental conditions (e.g., wind direction, current flow) are conducive to the spread of oil outside U.S. waters. However, just as activities from the U.S. OCS could affect these countries, these countries also conduct their own oil and gas activities that, regardless of any decision by the United States, would increase the risk to U.S. waters and coasts. Many long-lived marine species such as whales, dolphins, sharks, and tuna could have distributions that cross international boundaries, as well. Impacts on these species or populations originating within U.S. waters could be detectable within the waters of other countries and vice versa.

8.5 SUMMARY

Regions that contain a program area with oil and gas exploration and development experience both benefits and risks from those activities. Regional risks include possible environmental impacts that could negatively affect marine and coastal resources. The PFP analysis addresses a wide range of risks, which include impacts on commercial fishery stocks, other uses of the ocean, and availability of subsistence resources. These risks vary greatly depending on the sensitivity of an area to perturbation, the types and scale of oil and gas activities, existing OCS activities, and the presence and distribution of environmental resources such as fish, birds, and coral reefs. Regional benefits include the increases in employment and wages generated from oil and gas activities. Revenue sharing through the 8(g) provision of the OCS Lands Act will continue to contribute economic benefits to states where the Program Area includes lands within 3 miles of the Federal-state boundary. GOMESA revenue sharing will continue to contribute economic benefits to the GOM. Congress could also establish other revenue sharing programs.

Nationally, there are economic benefits associated with oil and gas activities, including employment and wage benefits for widely distributed workers, and the overall contribution from oil and gas revenues to the U.S. economy. National risks include threats to global climate health from damaged coastal and marine ecosystems and the introduction of additional GHGs into the atmosphere. Additional domestic oil and gas production reduces the need to obtain oil and gas from other domestic and foreign markets, reducing environmental risks from onshore oil and gas activities, coal and other substitutes, and oil imported by tanker, as well as reducing the overall trade deficit and increasing energy security.

Alaska has an established oil and gas industry onshore and in state waters. Assuming prices and other conditions were sufficient to prompt successful industry activity on the OCS, the Program would sustain and add high-paying jobs for the more populated areas of Alaska and possibly protect vital oil and gas tax revenues for the state, as well as local governments near oil and gas activity. It also would increase environmental risks for communities and natural resources near OCS blocks with significant levels of

activity. If prices remain low throughout the life of the Program, it is unlikely to provide lasting benefits or risks outside the Cook Inlet Program Area. In a sustained high-price environment, these effects would be magnified, bringing both the benefits of higher incomes and steady, increased revenue streams, but also increased risks of harmful environmental effects and possible strains on community cultures and infrastructure in some areas. Selection of the No Sale Option would shift benefits and risks almost entirely to other areas of the country (see Table 8-2).⁵² In addition, due to the questionable viability of TAPS in the face of declining North Slope production at Prudhoe Bay and the unique relationship between revenues from oil-related activities in northern Alaska and state and local government revenues, selection of the No Sale Option could have critical impacts beyond those that would be experienced in other onshore regions.

The oil and gas industry has been a major part of state and local economies along the GOM for decades. The GOM coast also hosts numerous oil refineries and gas processing facilities, and it is a major source of oil imports brought by supertankers. Decades of production have led to declining resources in some areas of the GOM; nevertheless, the Program would support existing patterns of employment and government revenue collections. In a sustained low-price environment, continued lease sales would cushion, but not prevent, negative socioeconomic impacts on local communities, while in a sustained high-price environment, lease sales could exacerbate strains on local housing and infrastructure. There would be accompanying environmental risk to GOM environmental resources, but sustained or increased production from the GOM would displace risks imposed by energy substitutes to a far greater extent than would be the case for the Alaska regions (see Table 8-4). Selection of the No Sale Option would hurt employment in those industries supporting exploration, development, and production, as well as the resulting revenue base for state and local governments. This would be less true for refinery-related jobs and revenues, given that roughly 60 percent of forgone oil production would be replaced by imports coming into GOM ports (and, to a lesser extent, by increased production from existing OCS leases). The risks of oil spills, air quality degradation, and other environmental and social harms under the No Sale Option appear to be greater for the GOM area—not just to the country, as is the case for the other regions—than those imposed by the Program.

⁵² Although Alaska is included in PADD 5, increased environmental risks from imported oil would fall almost entirely on the West Coast. Because the west coast would be a major consumer of any Alaska OCS oil, it inevitably would face environmental risks posed by oil transportation under either the PFP Options or the No Sale Option.

Chapter 9 Industry Interest and Laws, Goals, and Policies of Affected States

9.1 INDUSTRY INTEREST

OCS Lands Act Section 18(a)(2)(E) (see Section 2.2) requires BOEM to consider the interest of potential oil and gas producers. In response to the Proposed Program request for comments, BOEM received 22 responses from 21 companies and associations in the energy industry that explore for and, or produce oil and gas. Of those responses, most supported continuing to include the Proposed Program areas in the PFP without any further exclusions or deletions. Table 9-1: Summary of Energy Exploration and Production Industry Comments on the Proposed Program summarizes the comments on specific planning areas that were received by industry. Summaries of comments from industry are included in Appendix A.

Several industry comments requested that decisions related to removing or limiting access within the Environmentally Important Areas wait until the lease sale phase for a full analysis of benefits and impacts of exclusion, including on available oil and gas. How much acreage of the Environmentally Important Areas overlaps with the geologic plays and, therefore, potential oil and gas recourses, is presented in Table 4-4: Options Analyzed in this PFP Decision Document.

Table 9-1: Summary of Energy Exploration and Production Industry Comments on the Proposed Program

Energy Industry and Associations	Alaska Program Areas			GOM Program Area		Notes
	Beaufort Sea	Chukchi Sea	Cook Inlet	Western	Central/Eastern	
American Petroleum Institute (API) +5	•	•	•	•	•	Supports GOM and Alaska sales without further restrictions and disagrees that Alaska sales should be held late. Wants reconsideration of Atlantic deletion.
American Petroleum Institute (API) + 8	•	•	•	•	•	Supports keeping program areas as is without further areas being removed. Disagrees with reasons for removal of the Atlantic.
API petition	•	•	•	•	•	17,700 signers supports sales in GOM and Alaska and opening up the Atlantic.
Arena Offshore	•	•	•	•	•	Strongly supports GOM sales without further restrictions as well as Alaska sales and is disappointed in removal of the Atlantic.
ASRC Exploration	•	•				Supports Arctic sales without further restrictions and moving Beaufort sale up to 2019.
Atwood Oceanics	•	•	•	•	•	Supports GOM and Alaska sales without further restrictions and disagrees with reasons for excluding the Atlantic.
Calypso Exploration	•	•	•	•	•	Supports the 13 sales but is disappointed with removal of the Atlantic as areas should not be eliminated because of perceived use conflicts.
Chevron U.S.A Inc.	•	•	•	•	•	Supports the Proposed Program, region-wide sales in the GOM and requests that the three Alaska sales remain on the schedule. Is disappointed in removal of the Atlantic and requests reconsideration and reinstatement.
Cobalt International Energy, Inc	•	•	•	•	•	Supports GOM and Alaska sales and is disappointed in removal of the Atlantic.
ConocoPhillips	•	•	•	•	•	Advocates for region-wide sales but would support separate areawide sales in the GOM; supports moving up the Beaufort sale but is disappointed in only one sale per area; is disappointed in removal of the Atlantic.
ExxonMobil	•	•	•	•	•	Is disappointed in removal of the Atlantic and cites that decision as further reason to maintain the Proposed Program without further restrictions and expand access in the Eastern GOM.
Fieldwood Energy	•	•	•	•	•	Supports GOM and Alaska sales and is disappointed in removal of the Atlantic.
Louisiana Mid-Continent Oil and Gas Association	•	•	•	•	•	Supports the Proposed Program without additional areas being removed. Number and timing of GOM sales should be maintained without further restrictions.
Noble Drilling (U.S.)	•	•	•	•	•	Requests number and timing of GOM sales be maintained without further restrictions and that access to Alaska OCS is essential to the Nation's long term economy and energy security.
Noble Energy, Inc				•	•	Requests that GOM sales be maintained and removal of the Atlantic be reconsidered.
Offshore Operators Committee				•	•	Supports robust program in the GOM and requests expansion into new areas such as the Eastern GOM.
Ridgewood Energy	•	•	•	•	•	Supports maintaining GOM and Alaska sales and is disappointed in removal of the Atlantic.
Shell Exploration and Development Company	•	•	•	•	•	Disagrees with removal of the Atlantic and urges start of a new Program while completing work on this one, retaining all areas in GOM and Alaska.
Statoil (Houston Public Hearing)				•	•	Supports one region-wide sale per year in the GOM as there isn't enough new acreage available for two. Does not recommend going back to alternating area sales. Is disappointed in removal of the Atlantic.
Statoil	•	•	•	•	•	Supports one region-wide sale per year in the GOM as there isn't enough new acreage available for two. Does not recommend going back to alternating area sales. Is disappointed in removal of the Atlantic.
Stone Energy Corporation	•	•	•	•	•	Urges that final Program maintain all GOM and Alaska sales and is disappointed in exclusion of the Atlantic.
W&T Offshore, Inc	•	•	•	•	•	Supports Proposed Program as-is without further exclusion and number and timing of GOM sales be maintained.

Notes: Support for expansion in areas excluded from leasing in the Proposed Program decision (e.g. the Pacific, Atlantic, and most of the Eastern GOM) are not shown in this table. See Appendix A for comment summaries.

Note: Support for expansion in areas excluded from leasing in the Proposed Program decision (e.g. the Pacific, Atlantic, and most of the Eastern GOM) are not shown in this table. See Appendix A for comment summaries.

Key: •= Region was mentioned in the comment letter without specific reference to individual planning areas, or all planning areas in the specified region were mentioned.

9.1 LAWS, GOALS, AND POLICIES OF AFFECTED STATES

OCS Lands Act Section 18(a)(2)(F) (see Section 2.2) requires BOEM to consider laws, goals, and policies of affected states that are specifically identified by their Governors. BOEM received three comment letters on the Proposed Program from Governors or state agencies on behalf of the Governor. These letters identified laws, goals, and/or policies that the state deemed relevant for the Secretary’s consideration. Comments from Governors and state agencies are summarized in Table 9-2: Proposed Program Comment Summaries from Governor and State Agencies. More detailed comment summaries are presented in Appendix A. Comments by OCS region and planning area are discussed in the following sections.

Table 9-2: Proposed Program Comment Summaries from Governor and State Agencies

Commenter(s)	Comment Summary
Alaska Department of Natural Resources	Urges BOEM to hold more frequent, predictable, and area-wide sales in the Alaska OCS. Urges BOEM not to remove any Environmentally Important Areas at this stage.
Louisiana Department of Natural Resources	Supports offshore oil and gas exploration and development in the GOM.
Governor of North Carolina	Expressed disappointment in the removal of Atlantic Lease Sale 260 in the Proposed Program decision.

9.1.1 Alaska Region

The Alaska Department of Natural Resources urges BOEM to hold more frequent and predictable sales under an area wide approach. It also encourages BOEM to avoid delaying offshore OCS leasing in the three Alaska planning areas since sufficient information is available from years of data gathering and traditional knowledge to relieve adverse impacts. Additionally, it reiterated its opposition to a regionally tailored, targeted leasing strategy, instead of an area-wide approach. This includes opposition to the removal of Environmentally Important Areas, as the State believes there are mechanisms already in place, such as Conflict Avoidance Agreements, that mitigate potential impacts. No other states submitted comments on the Environmentally Important Areas. The Governor of Alaska has also repeatedly made clear his strong desire for lease sales in the three planning areas offshore Alaska.

Four Alaska Tribes or Tribal organizations were generally supportive of some activity, recognizing the economic benefits, but supported exclusion of some areas from leasing consideration to protect their subsistence culture, while others opposed lease sales in the Arctic Ocean. See Appendix A of this document for comment summaries of Tribes and Tribal organizations comment letters. See Appendix G of the Final PEIS for public comments received on the Draft Programmatic EIS from Tribes and Tribal organizations.

9.1.2 Pacific Region States

BOEM received no comments on the Proposed Program from Pacific Region states.

9.1.3 Gulf of Mexico Region States

The Louisiana Department of Natural Resources strongly supports offshore oil and gas exploration and development in the GOM. Additionally, it urges BOEM to accept the responsibility to identify and quantify the accumulating coastal impacts of OCS lease sales to Louisiana, and make provisions for appropriate compensatory mitigation for unavoidable adverse impacts.

9.1.4 Atlantic Region States

Governor McCrory of North Carolina expressed his disappointment in the removal of Atlantic Lease Sale 260 in the Proposed Program decision. The Governor requested swift approval of remaining G&G permits for the Atlantic region in order to provide policy makers and industry more accurate resource estimates with which they can make more informed decisions.

Chapter 10 Assurance of Fair Market Value

Section 18(a)(4) of the OCS Lands Act requires receipt of FMV from OCS oil and gas leases: “Leasing activities shall be conducted to assure receipt of fair market value for the lands leased and the rights conveyed by the Federal Government.” Furthermore, the OCS Lands Act states that the OCS is a “vital national 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)). The consideration of FMV is an ongoing process through the different stages of the OCS leasing process. At this programmatic stage, BOEM finds that the hurdle price analysis described in this chapter does not indicate that any of the areas in the PFP Options should be excluded based solely on the price of oil and gas. However, through the balancing considerations required in Section 18, the Secretary may exclude areas for other reasons. Through the processes described in this chapter, BOEM would assure attainment of FMV for any lands leased.

While the OCS Lands Act mandates that BOEM ensure receipt of “fair market value,” the Government Accountability Office has issued reports in recent years that refer instead to “fair return.” FMV was operationally defined by the report entitled *Procedures for OCS Bid Adequacy Including the Final Report of the OCS Fair Market Value Task Force* (USDOJ 1983) as related to the adequacy of the level of the high bid offered for a lease with given fiscal terms, not to the design or setting of the fiscal terms themselves. In contrast, the term “fair return” fully considers whether all aspects of a lease sale, including fiscal terms, are likely to give an appropriate share of revenue to the Government. This chapter considers both the specific procedures designed to ensure FMV for a specific lease as well as the broader consideration of fair return.

To secure and maintain public trust in utilizing OCS resources, BOEM uses an established set of criteria, described herein, that provide adequate returns to the general public for the OCS lease rights issued. The assurance of FMV is a multi-phase process including national Program-level analysis, lease sale-level analysis, and, finally, analysis conducted prior to the issuance of an individual lease following a lease sale.

In carrying out its FMV responsibilities at the Program development stage, BOEM has adopted screening criteria that recognize the importance of considering the value of waiting to lease. BOEM considers the importance of timing using a hurdle price analysis. This analysis, described in detail in this chapter, gives an indication of program areas where delaying a sale offering may provide greater future economic value from the entire program area. Some other factors that could affect the value of waiting to lease are discussed qualitatively in Section 8.1.1, Developmental Benefits Overview.

Another component of assuring FMV, pertinent for both the Program and individual lease sale stages, is the consideration of the size(s) and frequency of lease sales. Both size and frequency can affect FMV because they can affect competition and pace of leasing. The size of a lease sale is determined based on several factors, including FMV considerations, economic efficiency, need for orderly development, environmental sensitivity, marine productivity, and subsistence use. BOEM considers FMV during

preparation and execution of the Program. Further discussion is provided in Section 8.3.2, Gulf of Mexico OCS Region Benefits and Risks.

Following the size, timing, and location decisions formulated at the Program development stages, BOEM assesses other FMV-related components, such as bidding systems and fiscal and lease terms, at the lease sale stage to help ensure that the public receives a fair return when leasing resources. Regulations allow BOEM flexibility in tailoring these components to assure FMV in each program area at the lease sale stage. The stages and components of the FMV analysis are described herein.

The final assurance of FMV involves assessment of the bonus bids submitted for leases, which occurs for each individual lease receiving a bid shortly after a lease sale and prior to the time of lease issuance. The rules and procedures for this process were recently revised and are available at <http://www.boem.gov/Fair-Market-Value/>. These FMV assessments of the cash bonus bids are also referred to as determinations of bid adequacy, and they follow a two-stage procedure. In the second stage, the Government's assessment of the high bid is based on a stochastic simulation model of the activities, results, and outcomes anticipated to occur post-sale related to exploration, development, and production of the oil and gas resources potentially contained on the applicable tract. Therefore, the bid adequacy determinations are in part based on forecasts of future prices and discovery amounts rather than on the actual value of the oil and natural gas eventually discovered and produced. Furthermore, consistent with the private formulation of the cash bonus bids, these determinations take into account existing statutory and regulatory conditions such as drilling requirements within the lease terms that may restrict lessee flexibility in attaining certain timing milestones.

10.1 TIMING OF OCS LEASE SALES AND RELATED ACTIVITIES

In determining whether an area is ripe for inclusion at this Program stage, BOEM evaluates broad area-specific considerations, including a comparison of market prices to the calculated hurdle prices for oil and natural gas. However, in making the ultimate decisions on size, timing, and location, many other factors are considered, including coastal state, industry, or stakeholder interest as well as environmental factors (see Chapter 2).

The value of the OCS resources and associated leases is affected by the timing of leasing. Because OCS leases have fixed initial lease periods that is, primary lease terms, described in Section 10.3.2, Fiscal and Lease Terms) as required by the OCS Lands Act, lessees planning to explore and initiate development on an economic prospect must do so within that initial period. However, in certain cases, it may theoretically be better for the lessee to wait longer to explore and develop, but this cannot be accomplished if it requires waiting beyond the initial period. This situation could arise, for example, if the price of oil or gas were trending downward, but showing signs of recovery after the initial term. In this situation, the lessee cannot wait to explore and develop because the initial period would be nearing expiration, but—if indeed prices did recover after the initial term—it would be socially optimal for the lessee to wait since the value of the resources would increase. It is conceivable that greater value could be realized by waiting longer to lease in the first place, given the fixed length of the initial lease periods.

To account for the possibility of situations where the variation in future resource prices implies that exploration and development within the initial term of some leases could be privately profitable but not socially optimal, a hurdle price screen is employed.

The hurdle price screen is conducted at the Program stage to determine whether it is likely that there are any geologic fields within a program area for which a sale in this Program would provide a greater social value compared to delaying and offering for sale in a future Program. In this context, a hurdle price is defined as the program area-weighted BOE price above which immediate exploration of at least one undiscovered prospect as identified by BOEM’s resource assessment is the timing option with the greatest social value. Further, the hurdle price for the program area is compared to actual prices prior to each lease sale held under the Program. The hurdle price is one consideration, subject to uncertainty about future price projections, used to evaluate an area before a lease sale and should be considered in conjunction with other factors.

The logic of the argument that the greatest value can be obtained with consideration of the optimal timing of leasing extends beyond the volatility of price factor to include other areas of uncertainty, as discussed in Section 10.1.1, Information and Uncertainty.

10.1.1 Information and Uncertainty

At the time of lease issuance, uncertainty exists regarding not only future prices, but also as to risked resource endowments, capital and operational costs, available technologies, environmental and social costs, and the prevailing post-sale regulatory and legal environments. An objective of both the Government and industry is to manage the risks associated with these uncertainties. With its fiscal terms, the Government, as the lessor, transfers most of the fiscal risk to the lessee in exchange for an upfront bonus bid, rentals on non-producing acreage, and a royalty interest if the lease enters production. The lessee assumes virtually all of the cost risk. Other risks are managed through employment of industry best practices, legal liability, and enforcement of safety and environmental laws and regulations governing OCS operations.

All of these considerations may be reflected in the FMV of the lease. The analysis described in this chapter avoids an overly narrow interpretation of fair “market” value, and considers aspects of the value of leasing that may be viewed as “social value,” extending beyond the value that would be observed in private markets if the latter do not fully reflect externalities. Bearing that in mind, this section explains how decisions regarding the timing of leasing, at the appropriate points during preparation and conduct of the Program, may reflect consideration of how uncertainty and information might evolve.

10.1.1.1 Option Value

Option value is defined as the value of waiting to make an irreversible investment until critical new information arrives. In general, option value can be an element of the FMV of a lease, and its magnitude and significance is directly affected by components of uncertainty and information, or lack thereof. In designing the Program, BOEM provides the Secretary with information relevant to decisions on the size, timing, and location of lease sales. Public comments received about prior programs, as well as on the development of the 2017–2022 Program, have suggested that USDOJ should consider option value while performing its size, timing, and location analysis to fulfill the FMV statutory requirement. The hurdle price analysis considers the uncertainty of oil and gas prices and the expected hydrocarbon endowment. This section discusses nonmarket factors that are reflected in option value in a broad sense.

When uncertainties exist, having the option to delay activities creates value as more information can be revealed and acted on in the future. However, once an action is taken, the presence of uncertainty is known to reduce the net benefits of a project because the action eliminates the value from the option of waiting to make that decision (Arrow and Fisher 1974). In connection with socially optimal offshore oil and gas development, the gist of option value is that a decision regarding whether to use an oil and gas asset can be modeled as a perpetual call option (Davis and Schantz 2000). From the Government's perspective, offshore oil resources are a perpetual call option in that the Government has the right, but not the obligation, to offer OCS areas for lease at any time in the future (i.e., the option does not expire). The decision regarding exercising the option at a particular time can reflect price volatility as well as emerging information about resources, costs, and risks when the social value of the option is in question.

The broad form of option value here includes what can be termed "quasi-option value." The concept of "quasi-option value" was identified by Arrow and Fisher (1974) and is defined as the "benefit associated with delaying a decision when there is uncertainty about the payoffs of alternative choices and when at least one of the choices involves the irreversible commitment of resources" (Freeman 1984). While traditional option value focuses on the value of an action now versus in the future, quasi-option value of an action is based on uncertainty and the value of information that can be gained now versus in the future. An important distinction in quasi-option value is what is uncertain and how those uncertainties are resolved. There are uncertainties about both the benefits of development and the benefits of preservation when choosing to offer or withhold an OCS area for oil and gas development. In the case of the uncertain preservation benefits, these uncertainties will likely only be resolved through receipt of additional information. This is defined as "independent learning" as the uncertainties can be resolved without development of the oil and gas resource (Fisher and Hanemann 1987). However, in the case where many of the uncertainties revolve around the benefits of development, these uncertainties are likely only resolved with exploration and development of the oil and gas, demonstrating "dependent learning."

In their work on option value, Fisher and Hanemann (1987) specifically discuss the example of offshore oil leasing, acknowledging the "dependent" nature of uncertainties given that the largest uncertainty lies in estimating the quantity of oil and gas resources, which can only be resolved by exploratory well drilling. Therefore, if the desired information regarding environmental and social costs is, or can be, obtained without drilling, which by nature embodies some degree of risk, then it is "independent" information, and the case for significant option value and exclusion is strengthened. Conversely, if there is no way to obtain information other than by conducting exploration activities, then this aspect of option value is ambiguous. As described by Fisher and Hanemann (1987), "[i]t surely requires no algebra to show that, if the information about the consequences of an irreversible development action can be obtained only by undertaking development, this strengthens the case for some development. The practical importance of this observation depends on the answers to two empirical questions. Is it true that the information can be obtained only by undertaking development? How much development is required in order to obtain the information?" To answer these questions, we must first consider the nature of the information being sought based on the many uncertainties surrounding offshore oil and gas development and how these uncertainties can be resolved.

10.1.1.2 *Considering Uncertainties for the Five-Year Program*

To determine whether the possibility exists for significant option value associated with delayed leasing, BOEM considers the uncertainties surrounding OCS activities and how these uncertainties could impact the value of OCS acreage. Resolving uncertainties can reduce risk and greatly change the value of a lease and corresponding societal value. The following sections discuss the uncertainties that can affect the potential value and possible risks of OCS oil and gas and how these uncertainties could be resolved. Major uncertainties surrounding oil and gas development are discussed in context of independent and dependent learning. Many include components of both, and these uncertainties tie to components of the net benefits analysis discussed in Section 5.3, Net Benefits Analysis.

The discussion of uncertainties and option value must always consider the pyramidal structure of the Program development and lease sale processes. The Program development process begins by considering all leasing areas, and the potential areas are winnowed down into what is ultimately the final lease sale schedule. Program areas can be removed at any stage of the Program development process, but cannot be added back in once they are removed. Further, the Secretary has the flexibility to cancel a sale even after the Program is approved. Given these procedures, to maintain the maximum option value, USDOJ may consider retaining Program Options in the Program in order to potentially hold sales in these areas during the next 5 years, should some of the independent information become available. Theoretically omitting any area from the Program could cause a loss of option value to the Government. USDOJ retains the greatest flexibility, and therefore option value, by including areas in the Program, but it is also true that there can be instances where the Secretary may be justified in excluding an entire area from the program. These reasons could include the possibility that major environmental or comparative studies would not be completed and no new information would be available within the 5 years of the Program, or if the estimated developmental value of an area is marginal and the probability of generating sufficient information to improve its value is negligible, limiting the value of including it in the Program. Excluding very marginal areas also reduces administrative and study costs. Further, as described in the balancing considerations of the Section 18 requirements, the Secretary may remove areas from the PFP for many reasons through weighing all of the enumerated factors. Through BOEM's FMV processes, FMV would still be assured for lands leased under the 2017–2022 Program.

The Secretary may choose to cancel lease sales if any important informational uncertainties have not been satisfactorily resolved at the lease sale stage. Further, sales could be scheduled later in the Program, to allow for additional information to be collected, as was done in the previous 2012–2017 Program. That Program deliberately scheduled Alaska planning area sales late in the Program to allow for further development of “scientific information regarding the oil and gas resource potential in these areas, as well as sensitive habitats, unique conditions and important other uses, including subsistence hunting and fishing, that are present in Alaskan waters and must be reconciled with energy resource development” (BOEM 2012). Ultimately, the Secretary chose to cancel the Beaufort Sea and Chukchi Sea lease sales in response to low industry interest and low oil prices. By including the Beaufort Sea and Chukchi Sea Program Areas in the 2012–2017 Program, the Secretary created option value for these sales, which could have been held if different market conditions or levels of industry interest prevailed.

While it is possible to reevaluate and cancel sales during the sale planning process, it is important to be aware of the industry need for predictability and orderly leasing. An intended benefit of the Program

lease sale schedule is that a schedule of possible lease sales within the period facilitates industry planning, operations, and scheduling, thereby increasing the value of OCS acreage. In contrast, a process in which there is no presumption that a program sale will actually be held as scheduled imposes costs on industry and decreases the value of OCS acreage.

At the Program stage, no irreversible commitment of resources occurs because, as discussed, the Secretary can always choose to cancel a sale. For this reason, the lease sale stage is a more appropriate place to consider quasi-option value because that is when the irreversible leasing decision is made. However, the Program stage is where BOEM holistically considers all program areas and therefore it is helpful to discuss the nature of OCS oil and gas leasing and the resolution of uncertainty.

In addition to obtaining FMV for OCS resources, the OCS Lands Act mandates that OCS resources must be made available for expeditious and orderly development. The Congressional declaration of purposes in the OCS Lands Act Amendments of 1978 states that one of the purposes of the OCS Lands Act is to “make such resource[s] available to meet the Nation’s energy needs as rapidly as possible” (43 U.S.C. § 1802(2)(A)). A further purpose is to “encourage development of new and improved technology for energy resource production which will eliminate or minimize risk of damage to the human, marine, and coastal environments” (43 U.S.C. § 1802(3)). Any decision to delay leasing based on the possibility of greater future value must be balanced with the requirement to expeditiously make prospective OCS oil and gas resources available. Through the Program development process and lease sale design process, the Secretary can evaluate decisions in conjunction with both mandates.

The next subsections consider the many different uncertainties that exist in OCS oil and gas development. Most of these uncertainties are discussed qualitatively with reference to the nature of the uncertainty and how the uncertainties could resolve themselves over time. This discussion is included because BOEM acknowledges the possibility for additional information that could affect the value of OCS resources over time. This value was also recognized by the court in *CSE v. Jewell* (779 F.3d 588 (D.C. Cir. 2015)).⁵³ While discussed, BOEM does not quantify the quasi-option value of each of these uncertainties given difficulties in quantifying the informational value of delay and lack of well-established methods to quantify such considerations.⁵⁴ BOEM is evaluating what literature exists on quantifying the informational value of delay and could incorporate these methods in future program analyses.

While the majority of the uncertainties are considered qualitatively, BOEM includes a quantitative treatment of price and resource uncertainty. These uncertainties are discussed in Section 10.1.2, Hurdle Prices, which describes the hurdle price analysis.

10.1.1.3 Resource Uncertainty

The fundamental unknown for offshore oil and gas leasing is the uncertainty of the resource endowment. The uncertainty associated with the presence and estimated quantity of oil and gas resources can only be

⁵³ “There is therefore a tangible present economic benefit to delaying the decision to drill for fossil fuels to preserve the opportunity to see what new technologies develop and what new information comes to light.” *CSE v. Jewell*, 779 F.3d 588 at 610. (D.C. Cir. 2015).

⁵⁴ The D.C. Circuit court upheld BOEM’s qualitative approach to considering option value in *CSE v. Jewell*, 779 F.3d 588 (D.C. Cir. 2015). The court found that “Interior acted reasonably in employing qualitative, rather than quantitative, measures of the informational value of delay.” BOEM continues to study ways to quantitatively measure the informational value of delay.

fully resolved through lease acquisition and subsequent drilling of OCS acreage. In this sense, “dependent learning” is required to resolve uncertainty. Private companies must spend billions of dollars to acquire leases and analyze geologic information in an effort to discover and ultimately produce new oil and natural gas reserves that are undiscovered today.

At the initial stage of Program development, there is significant uncertainty regarding the individual and aggregate volumes of oil and gas that are present on unleased acreage. The Secretary is also uncertain about the extent to which these undiscovered resources are commercially viable and when those resources that are not currently commercially viable could become so, especially in relatively less mature OCS areas. BOEM’s estimates of resources available in each of the planning areas are presented in the 2016 National Assessment (BOEM 2016a). A summary of the methodology for this assessment is presented in Chapter 5, Valuation of Program Areas.

An example of how exploration of an OCS region has changed the knowledge of resource potential is provided by experiences in the GOM Region, where estimates of undiscovered oil resources have increased dramatically since the discovery of major deepwater oil and natural gas fields. In deep water, increases in oil and gas potential have been facilitated by industry’s development of new technology to explore for and extract oil and gas resources. In all water depths, the expansion of offshore infrastructure and new technology has allowed industry to produce smaller and more geologically complex reservoirs.

Conversely, exploration also can lead to reduced resource endowment estimates. The Navarin Basin in the Alaska OCS is an example of how exploration can render an area less attractive. A resource assessment published in 1985 reported that estimates of mean risked oil volumes in the Navarin Basin of 1.30 BBO were much larger than the Chukchi Sea’s 0.54 BBO (MMS 1985). A 1983 lease sale in the Navarin Basin resulted in 163 tracts being leased for \$633 million, followed by eight exploration wells. None of the wells discovered oil or natural gas pools and the subsequent geologic analysis severely downgraded the resource potential to 0.13 BBO in the 2011 assessment (BOEM 2014). There has been little or no subsequent industry interest in this area.

Meanwhile, drilling results in the Chukchi Sea in 1990 and 1991, new technologies, and higher oil prices were key factors leading to the largest lease sale ever in the Alaska OCS, Chukchi Sea Sale 193, with 487 tracts leased for \$2.66 billion in 2008. The current risked mean technically recoverable resource estimates for the Chukchi Sea increased by a factor of 30 over the 1985 estimate, to 15.4 BBO, and by more than a factor of 25, to 76.8 Tcf of natural gas, in this frontier area. However, after the 2015 drilling season, Shell found resources “not sufficient to warrant further exploration” in the explored prospect (Shell 2015). While the aggregate resource estimates remain unchanged, this announcement, in conjunction with other market factors, led to a decline in industry interest and lease acreage held in the region. Of course, future drilling on other prospects, higher oil and gas prices, or other new information could have a great impact on the level of interest in the region. Future exploration in this area will further decrease the uncertainties regarding its oil and gas resource potential.

While drilling is the most efficient way to reduce resource uncertainty, it is also possible to reduce uncertainty through improved knowledge about the resource potential using seismic surveys and

exploration and development activities on nearby leases. Information from activities on nearby leases can only be obtained in areas where leasing already exists.⁵⁵

Because resources form the basis for the net benefits analysis, changes in perceptions of resource endowments could greatly change the ranking of the planning areas. The largest potential for resource growth or decline would be in the areas where the least exploration has occurred. However, it is unlikely that substantial information could be reliably compiled before some development has occurred. This is an example of dependent learning.

10.1.1.4 *Capital and Operating Cost and Extractive Technology Uncertainty*

Companies operating on the OCS face uncertainty regarding future capital and operating costs. This uncertainty is greater in frontier planning areas because much is still unknown about the costs of operating in those areas. In the GOM, lessees have had decades of experience and there is generally less cost uncertainty. Costs cannot be known with certainty in frontier areas until exploration and development begin.

A portion of the cost uncertainty is driven by changes in resource prices. Increased oil prices create additional competition for existing drilling rigs and investment dollars from other parts of the world, which raises the cost of exploration, development, and production. Through internal modeling efforts and validation with external sources, BOEM has estimated that costs increase at roughly half the rate of increase in resource prices. In addition to price, capital and operating costs are driven by changes in international demand for oil and natural gas extraction resources. For example, Mexico's recent energy reforms could impact U.S. OCS capital and operating costs over the next few years since oil and gas opportunities in the southern portion of the GOM could increase competition for oil and natural gas investment dollars, and drive up demand for rigs and skilled workers.

According to the logic of option value, value can be enhanced by delay of action in a case where costs are currently deemed to be high, with a probability of decreasing in the future. In the case of OCS oil and gas, there is not a reliable method to know, or to predict, whether costs will decrease in the future. In addition to the capital and operating costs, technical challenges during the exploration and delineation of a particular prospect can result in drastic cost changes. For example, unexpected challenges can greatly influence project economics, such as drilling a well into a high-temperature/high-pressure reservoir or natural events such as hurricanes. This further demonstrates dependent learning.

Uncertainties surrounding the magnitudes of capital and operating costs also influence the net benefits estimates for each program area. Because the capital and operating costs are inherent in calculating the NEV (a major component of a program area's net benefits calculation), changes in costs could alter the estimate of NEV in each of the program areas.

Over time, innovative technology may become available to more efficiently or safely extract the oil and gas resources, and/or to reduce risks associated with their extraction. Well control and containment technologies are improving operators' ability to mitigate damages of a well control incident through closing the well, capturing the flow, or assisting in clean-up operations. This further illustrates the

⁵⁵ This is the situation analyzed in the paper by Rothkopf et al. (2006), *Optimal Management of Oil Lease Inventory*.

concept of dependent learning, which is an element in the option value calculus but is oftentimes not considered in comments received regarding the importance of taking into account option value concepts in program formulation.

10.1.1.5 Environmental and Social Cost Uncertainty

Additional environmental information is always becoming available. As part of the Program decision on size, timing, and location, the Secretary considers the available environmental and social cost information.

All of the environmental or social cost estimates in BOEM's analysis, particularly the impacts estimated in the OECM, are subject to uncertainty and future revision. One can envisage a range of uncertainty around any of the point estimates provided. Viewed from an analytical perspective, the situation is similar to that of resource estimates; there is some probability that environmental and social costs might be smaller or greater than the point estimates provided, and that directly affects the magnitude of the expected option value.

In contrast to resource estimates, most environmental impacts can be mitigated, remediated, or otherwise compensated. However, even with mitigations, certain impacts could be deemed as significant and irreversible. For many years, environmental scientists and economists have examined the risks of irreversible impacts, and some researchers have applied real options theory to irreversible issues such as species extinction and climate change.

Certain studies consider the uncertainty of the chances of oil and gas exploration and development causing species extinction, and the uncertainty of the value of a given species. Abdallah and Lasserre (2008) assert that logging in a certain forest might cross an ecological threshold leading to caribou extinction. Option value models formalize the intuition that logging is not beneficial unless the implied risk is "low enough." The value lost if a species becomes extinct is also uncertain. As described by Kassar and Lasserre (2002), biodiversity relates to a "portfolio" of future uses for species.

Another study specifically considered the amenity value that would be lost with oil and gas development in the Arctic National Wildlife Refuge. Conrad and Kotani (2005) estimate a "trigger price" for oil that would justify the loss in amenity value if development were allowed in the region. In theory, a similar approach could be applied to OCS leasing. BOEM is continuing to evaluate methods in which an amenity value could be incorporated into future hurdle price analyses.

The relatively few studies that apply real options concepts to possibly irreversible environmental impacts from oil and gas activities demonstrate the serious difficulty of assessing these risks. It is not hard to envision the broad outlines of a real options model of environmental impact; but it is surpassingly difficult to specify and estimate a useful, empirical model of that type.

BOEM's Environmental Studies Program (ESP) recognizes the need for new environmental information and has funded more than \$1 billion in research throughout its 40-year history, covering physical oceanography, atmospheric sciences, biology, protected species, social sciences and economics, submerged cultural resources, and environmental fates and effects. Information collected from BOEM's Environmental Studies Program Information System and other sources is incorporated in environmental

analyses conducted by BOEM and builds the foundation for science-based decision making throughout the Program development and leasing stages.

The ESP recognizes the different needs for information in each of the OCS regions and tailors the studies accordingly. In Alaska, the ESP focuses on many topics including protected species, physical oceanography, wildlife biology, subsistence and traditional knowledge, economic modeling, oil spills, and Arctic resources. In the GOM, studies focus on a wide range of subjects including oil spill modeling and deepwater oceanographic processes, archaeological and biological research, deepwater corals and habitat mapping, protected species observations and monitoring, and socioeconomic issues. Research in the Pacific region focuses on platform biology, an intertidal monitoring program, and renewable energy development. In the Atlantic, much of the recent focus of the ESP has been on establishing environmental baseline data and on visual impacts, space use conflicts, and associated economic effects of renewable energy projects, but some research, especially that conducted historically, has focused on the impacts of oil and gas projects in the region.

BSEE also has an active safety and technology research program. For example, the long-standing Oil Spill Response Research Program researches oil spill response technologies for oil spill detection, containment, treatment, recovery, and cleanup. Part of this research is conducted at the National Oil Spill Response Test Facility, Ohmsett, which allows testing of oil spill response technologies. BSEE conducts extensive oil spill response research on Arctic conditions, which considers how sea ice, cold temperatures, and hazardous conditions could potentially interfere with oil spill response in the Arctic. In addition, BSEE also manages a Technology Assessment Program that conducts research related to operational safety and pollution prevention. This program focuses on assessing offshore engineering technology to promote safety and environmental protection.

In addition, BOEM receives information from other Federal agencies. In particular, BOEM collaborates with agencies such as NOAA and the U.S. Fish and Wildlife Service. Focusing on Alaska, the USGS published a report in 2011 outlining the additional information needs for Alaska oil and gas development,⁵⁶ and Executive Order 13580 created the Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska to define information needs. Both documents have led to interagency coordination on research projects and information sharing in the U.S. Arctic.

Further, BOEM works with non-Federal entities, such as Alaska Native groups, the scientific community, industry, and state and local governments. Valuable information has been obtained through collaboration and coordination with other entities, such as the North Pacific Research Board and the Arctic Research Council, which are involved in directing, conducting, or prioritizing science in the Arctic. Two specific examples include the close coordination between BOEM and the Interagency Arctic Research Policy Committee to help develop the Arctic Research Plan for FY 2013–2017, and BOEM scientists are working with the National Science Foundation on the “Arctic Science, Engineering, and Education for Sustainability” initiative to ensure that BOEM/National Science Foundation science efforts are closely integrated and complementary. BOEM also recently developed a partnership with the National Academies of Sciences, Engineering, and Medicine to provide independent information on environmental

⁵⁶ *Evaluation of the Science Needs to Inform Decisions on the Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska* (USGS 2011)

studies and assessment activities. The committee includes members with a broad range of expertise in the natural and social sciences, including ecology, sea ice, economics, noise, the application of science to policy, and other topics.

BOEM has the ability to include new information at all stages of development of the Program and lease sale planning process through its own research and that of other Federal agencies and non-Federal entities. BOEM also considers comments received from the public during each of the public comment periods. In developing a Program, BOEM acknowledges the ever-expanding availability of scientific information. The 2017–2022 Program includes, and, throughout its implementation, will continue to include, new scientific information and stakeholder feedback to proactively identify, and try to resolve, potential conflicts. The Programmatic EIS provides a comprehensive analysis of the environmental information under consideration in the Program decision.

While the majority of the research discussed above is driven by the possibility of oil and gas operations and conducted to inform decision makers, the knowledge gained is largely “independent” learning. This follows Fisher and Hanemann’s (1987) suggestion that needed information about environmental impacts can sometimes be obtained by research separate from drilling. To that extent, there could be option value in waiting to drill while the research is being conducted. It is conceivable that the wait for information could extend beyond the 5-year timeframe of a given leasing program, and the pyramidal structure of the Program development process allows for more refined research and analysis at the specific lease sale stage. Because the process from Program development to lease sale contains multiple steps, BOEM has several opportunities to incorporate new information and revise decisions. In particular, before a lease sale is held, an EIS is completed and additional environmental and social costs are studied in part based on new information from ongoing research.

BOEM continues to investigate social and environmental issues and to consider the relevant factual information that is currently available. In the meantime, BOEM provides qualitative information to the Secretary to consider the existing uncertainties and how new information could become available for consideration in the decisions on size, timing, and location. Detailed information on the environmental impacts of each program area is provided in the Programmatic EIS.

Environmental and social costs are an important component in the net benefits analysis. As such, the estimated benefits for a program area could change with new information. However, as discussed in Section 5.3, Net Benefits Analysis, it is important to consider the incremental aspects of the net benefits analysis. In the absence of lease sales in any of the OCS program areas, substitute sources of energy would be necessary to fulfill U.S. demand for energy. These substitute energy sources have their own environmental and social costs, which are also uncertain. More information on the environmental and social costs of these energy substitutes is included in *Forecasting Environmental and Social Externalities Associated with Outer Continental Shelf (OCS) Oil and Gas Development – Volume 2* (BOEM 2015). As shown in Section 5.3, Net Benefits Analysis, these substitute sources are estimated to have higher environmental and social costs than energy production from the OCS.

Though the hurdle price analysis calculated in Section 10.1.2, Hurdle Prices, does not incorporate in a quantitative manner the range of the uncertainty of environmental and social costs or the possibility of irreversible damage, it does incorporate estimates of anticipated environmental and social costs into the hurdle price calculation. This PFP analysis continues use of known environmental and social costs in the

hurdle price calculation. Using the same approach developed for the Proposed Program analysis, the hurdle price calculation considers both the private and social costs of exploration and development in determining the hurdle price.

10.1.1.6 Regulatory and Legal Environment Uncertainty

An objective of both the Government and industry is to manage the risks associated with OCS oil and gas operations. Operators manage these risks through use of industry best practices and prudent risk management. The Government uses legal liability, and the promulgation and enforcement of safety and environmental laws and regulations.

The ability to maintain a stable and transparent regulatory and legal environment for oil and gas industry operations is an important factor considered by lessees and operators on the OCS in choosing whether, when, and how much to invest in OCS tracts and related drilling and development activities. The legal and regulatory environment for OCS exploration and development can greatly impact project profitability. As the offshore program evolves, new regulations may need to be promulgated and existing regulations revised, and occasionally new statutory requirements and legal precedents are inevitable in the interest of ensuring safe and environmentally sound OCS operations. The goal of BOEM and BSEE is to communicate and coordinate with the industry and other stakeholders on the content and rationale of regulatory approaches and requirements. The bureaus encourage feedback, input, and suggestions for alternatives to the regulatory proposals before they are finalized.

Future legal and regulatory changes separate from the OCS program have the potential to affect OCS leasing and development, such as climate-related policies. Any such changes would be independent of any Program decisions made as a result of this document. Policy changes can also affect markets in ways that affect companies' decisions about leasing, exploration, and production on the OCS. BOEM's analyses in this document do not contemplate future policies and instead use the EIA's AEO Reference Case as a baseline assumption, and the Reference Case assumes laws and regulations that are currently in place. The pyramidal nature of the OCS program creates future decision points where, if necessary, changes could be made to the leasing program in response to new energy or climate policies.

10.1.1.7 Price Uncertainty

While the value promised by a lease sale is related to the resource endowment and the likelihood of finding economic hydrocarbon deposits, it also is heavily influenced by forecasts of future oil and natural gas prices. Mean reversion is one of several possible models that could be used to simulate oil and gas prices. The simplest model, used by Black and Scholes for valuing financial options, assumes geometric Brownian motion, which has the volatility of a mean-reversion model without the tendency to revert to a single long-run mean. In addition to the economic logic that implies that oil and gas prices tend to revert to a long-run cost, statistical tests can be applied to determine whether the oil or gas price series has a mean-reverting tendency or not. In one paper, Pindyck concluded that "over the long run, price behavior seems consistent with a model of slow mean reversion" (Pindyck 2001). Under a mean-reversion framework, uncertainty stabilizes over time as prices revert back to a long-run mean. As such, under the mean-reversion assumption there is little benefit to waiting as the uncertainty band narrows around the long-run average. However, should prices progress below the long-term trend, there could be benefit in waiting for prices to rebound.

To consider the option value of the resources related to resource price uncertainty and optimal timing decisions, the current Program includes a hurdle price analysis. It is intended to show that every area included in the Program is expected to offer rights to at least one geologic field where prompt exploration during this Program is consistent with an optimal intertemporal allocation of resources. The hurdle prices are calculated assuming a mean reverting price model. The hurdle prices are calculated for each program area in this Program and are considered again during the lease sale planning process.

10.1.2 Hurdle Prices

At the Program stage, to formally assess whether program areas should be included Program given price uncertainty, BOEM subjected the assessment of undiscovered fields in each program area to an appropriate economic analysis to determine an area “hurdle” weighted average (i.e., BOE) price. The hurdle price is defined as the market price below which the social value of delaying to a future program exploration of the largest fields in the sale area would exceed the value of immediate exploration of those fields within this program.⁵⁷ That is, when market prices are at or above the hurdle price, the value of allowing exploration for these large prospects exceeds the value of delay. Greater social value could be realized by leasing that prospect now than delaying for future leasing. Note that other timing, composition, and sale design decisions are relevant to and are considered at the lease sale stage.

This hurdle price analysis follows the approach developed in the Proposed Program analysis, which builds on the work that was conducted in the DPP decision document. It provides a more refined analysis of the resources available in each program area and the future price trend and considers different aspects of value including environmental and social costs. Expanding the hurdle price analysis to incorporate environmental and social costs provides the Secretary with more information on the importance of timing consideration in maximizing social value. Once the Program is approved, the lease sale design stage revisits the decision of whether to hold a sale that is included in the Program and evaluates which OCS blocks to offer and how to set the sale terms. Accordingly, deferring these issues to the lease sale stage rather than the earlier Program formulation stage provides more flexibility (i.e., option value) and allows decisions to be made closer to the time when economic and other conditions that influence sale decisions are better known and somewhat easier to forecast. Given the iterative process of Program development and lease sale design, there are benefits from including areas in the Program even if their hurdle prices are below current prices as further analysis can be conducted at a later stage (i.e., individual lease sale stage). Section 10.3.2, Fiscal and Lease Terms, provides more discussion on BOEM’s lease sale fiscal terms procedures.

For the PFP analysis, BOEM calculated hurdle prices for each of the four program areas. Given the differences within the GOM Program Area, the hurdle price is calculated separately for GOM shallow and deep water.⁵⁸ The hurdle price analysis is conducted considering the NSV of each program area and determines whether the value from leasing in the current Program is expected to be greater than waiting to lease an area until a future Five-Year Program. For this calculation, BOEM considers both the private and social costs of exploration and development. More information on how the hurdle price was

⁵⁷ All else being equal, the largest fields tend to have the highest net value per equivalent barrel of resources, so they are least likely to benefit from delaying leasing in anticipation of increasing resource prices. BOEM used the 90th percentile field size as the approximate largest field size available in each program area.

⁵⁸ For this purpose, shallow water is defined as water depths less than 800 meters.

expanded for this Program analysis to incorporate environmental and social costs is included in the supplemental paper *Economic Analysis Methodology for the OCS Oil and Gas Leasing Program for 2017–2022* (BOEM 2016b; herein referred to as the Economic Analysis Methodology paper).

Within each program area, BOEM selected for use in the hurdle price analysis an approximation of the large undiscovered field size, which was identified by our statistical resource estimation model. As described in the Economic Analysis Methodology paper, for the PFP, BOEM used the 90th percentile field size from the 2016 National Assessment to define the large field size available in each program area (BOEM 2016a). This field size was then used for conducting the hurdle price analysis in each program area in conjunction with private and social cost estimates appropriate for the applicable water depths and field sizes. These factors were input into an in-house dynamic programming model called WEB2 (When Exploration Begins, version 2) to generate the hurdle prices. The rationale for basing the hurdle price analysis on large fields relates to the likelihood that larger fields are more valuable to develop, even after including social costs, than smaller fields. It is possible, for certain price assumptions, that social benefits would be optimized by leasing large fields in the 2017–2022 Program while holding small fields for later leasing. Since the locations of undiscovered fields are unknown, however, a single timing decision must be made for areas in their entirety. If the area is included in the Program and leasing conducted due to the possibility of large fields, a social cost of prematurely leasing some small fields might be incurred.

Table 10-1: NSV shows the NSV for each of the program areas/locations that was analyzed. Column B in Table 10-1 shows the input field sizes for each area. Columns C and D show the assumptions made about natural gas-oil ratios for each area along with the relative proportion of oil and natural gas associated with each area as implied by that ratio. For example, in the Cook Inlet there are 1.19 mcf of natural gas for every barrel of oil. This, on a BOE basis,⁵⁹ means that on average, approximately 83 percent of a field is oil, and 17 percent is natural gas. WEB2 then estimates the BOE hurdle prices shown in Column E of Table 10-1, below which delaying exploration of an undiscovered field of the size shown in Column B is more valuable than immediate exploration. The hurdle prices are per BOE and shown in 2017 dollars. The hurdle prices for the GOM Program Area shown in Table 10-1 differ slightly from those in the DPP due to updates in the large undiscovered field size assumption and the natural gas-oil ratio reflected in the 2016 National Assessment. These parameters remained the same for the other program areas in the updated assessment. More details on the calculation of applicable oil and natural gas prices that derive from the BOE hurdle prices are included in the Economic Analysis Methodology paper (BOEM 2016b).

⁵⁹ On a thermal basis, 5.62 mcf of natural gas provides the same heat content as a barrel of oil.

Table 10-1: NSV Hurdle Prices

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>		<i>E</i>
			Oil	Natural Gas	Price per BOE
Program Area or Location	Large Undiscovered Field (million BOE)	Natural Gas-Oil Ratio	Portion of Field BOE		NSV Hurdle Price
Beaufort Sea	113	*	100%	*	\$35
Chukchi Sea	190	*	100%	*	\$33
Cook Inlet	175	1.19	83%	17%	\$20
Shallow GOM	44	8.67	39%	61%	\$22
Deep GOM	90	1.60	78%	22%	\$34

Note: The large undiscovered field size is defined as the 90th percentile field from the 2016 National Assessment field size distribution. The 90th percentile represents very large field sizes while avoiding outlier values. See the Economic Analysis Methodology paper (BOEM 2016b) for further elaboration.

Key: The asterisks (*) indicate that natural gas transportation costs exceed the *pro rata* natural gas hurdle price, meaning oil would have to subsidize the sale of natural gas. Instead, the natural gas share of BOE likely would be re-injected. For the Chukchi Sea and Beaufort Sea Program Areas, the resulting designated field size represents only the oil portion of the largest field given that gas prospects are not projected to be economic. Accordingly, the hurdle price was calculated in these cases assuming only the oil portion would be produced.

To compare the calculated BOE hurdle prices with expectations of future prices during the 2017–2022 Program, BOEM compared the BOE hurdle prices with forecasts from the EIA’s *Annual Energy Outlook* ((EIA 2016a)) and *Short Term Energy Outlook* (EIA 2016b). Table 10-2: Forecast Market BOE Prices in 2017 shows the forecasted oil and natural gas prices for 2017 (in 2017 dollars) from both of these forecasts as well as the calculated BOE price associated with each program area. The forecasted oil and gas prices are consistent across all program areas, but each relates to a unique BOE price given the specific natural gas-oil ratio in each area. The BOE prices in each area represent the expected 2017 value of the resources in that program area given the average composition of oil and natural gas. The BOE prices from Table 10-2 are to be compared with the BOE hurdle prices shown in Table 10-1: NSV Hurdle Prices.

Table 10-2: Forecast Market BOE Prices in 2017

Program Area/ Location	EIA’s AEO 2017 Forecast (from 2016 AEO)		
	Oil	Gas	BOE
Beaufort Sea	\$50.00	\$3.21	\$50.00
Chukchi Sea			\$50.00
Cook Inlet			\$44.42
Shallow GOM			\$30.61
Deep GOM			\$42.92

The weighted BOE forecast prices for 2017 under all of the price forecasts are above the NSV hurdle prices shown in Table 10-1 for all of the program areas. As such, the hurdle price analysis does not indicate that any of the areas in the PFP Options should be excluded based solely on the price of oil and gas. The range in hurdle prices is largely dependent on the relevant exploration and development costs in each region. For example, costs in the shallow water portion of the GOM Program Area and in the

relatively shallow Cook Inlet Program Area are lower than in the other deepwater or Arctic program areas. Therefore, these areas have lower hurdle prices.

BOEM notes that the calculation of hurdle prices is highly dependent on the assumptions about the future price trend of oil and natural gas and on the rate at which prices revert to that trend. More detail on these assumptions and the sensitivities of the hurdle prices are included in the Economic Analysis Methodology paper (BOEM 2016b).

The lease sale stage provides another opportunity to revisit the hurdle price analysis and consider whether to hold a lease sale. As discussed, option value is merely one component of BOEM's FMV analyses and Program formulation. Moreover, in this Program-level analysis, option value only considers uncertainty related to resource prices. Accordingly, in the Program stage the hurdle price findings should be taken as a guide only for price-based option value. Additional and more robust analysis could be conducted at later stages. This is especially important as new information becomes available that could affect the resource estimates or private or social costs for any of the program areas. To capture the option value of new information becoming available that could make an area more or less profitable to lease, the Secretary may choose to include or exclude areas regardless of the relationship between the hurdle prices and current prices.

In addition to the other considerations discussed in this chapter and throughout this document, another factor for the Secretary to take into account is the value of a predictable lease sale schedule. There is value in the stability of planned lease sales. The creation of a five-year lease sale schedule allows companies the opportunity to plan expenditures and future prospects. Choosing to cancel sales based purely on the hurdle price is not costless and could possibly have an adverse impact on company interest in the region and the value received by the public. As such, the Secretary considers many other factors in the decision of whether to include an area in the program and ultimately hold a sale.

10.2 LEASING FRAMEWORK

The size of a lease sale and the frequency of sales within a program area are other FMV considerations within the Program framework.

10.2.1 Size of a Lease Sale

With regard to the size of a lease sale, BOEM considers whether all acreage within a program area should be included in the sale, or whether a more focused area should be made available for leasing. Since 1983, GOM lease sales have been conducted under the area-wide leasing format. Area-wide leasing means that all available (unleased and not restricted) acreage in the program area is offered in the sale auction. Prior to 1983, BOEM used an industry nomination/agency tract selection process in which companies nominated acreage or BOEM selected specific acreage for lease, and only that acreage was offered. The tract selection lease sales would tend to sell fewer leases and allow more focused environmental analyses.

The State of Louisiana has requested on several occasions the use of schemes other than area-wide leasing, similar to industry nomination/agency tract selection. In 2010, BOEM contracted a study analyzing area-wide leasing. The study, *Policies to Affect the Pace of Leasing and Revenues in the Gulf*

of Mexico, evaluated the efficacy of alternative leasing schemes to the area-wide leasing model (BOEMRE 2011; hereinafter referred to as “Area-wide Leasing Study”).

The Area-wide Leasing Study suggests that Government revenues in the form of increased cash bonus bids per block leased under the nomination/ tract selection format would be largely offset by fewer blocks leased, less drilling, a reduced pace of discovery, lower rentals and royalties, and less annual future production of OCS oil and natural gas from newly issued leases. Further, in the process of considering alternative leasing approaches and fiscal systems that could enhance Government revenue and assure receipt of FMV, BOEM must be cognizant of the effects any policy changes might have on the achievement of other statutory goals of the Program. Among these are expeditious and orderly development and maintaining a diverse and competitive industry. Area-wide leasing allows smaller companies to expeditiously acquire, explore, and produce low-resource, low-risk fields, while providing larger companies an incentive to pursue technological development in deep water. Area-wide leasing also encourages innovative exploration strategies and is consistent with maintaining financially sound geophysical contracting and processing industries. In addition, the bidding system, minimum bid, and fiscal terms for a given lease sale will influence the number and value of leases sold in the sale.

BOEM has adopted a more focused approach in some program areas. In particular, a more targeted leasing approach has been used for the Alaskan Arctic, given that the Chukchi Sea and Beaufort Sea areas are less explored than GOM areas and require extensive environmental analysis and coordination with other Federal agencies, Alaska Natives, the scientific community, industry, and state and local governments before leasing decisions are made. More focused leasing is geographically targeted in scope and could be used in any OCS region to achieve an appropriate balance between making resources available and limiting conflicts with states’ CZM Plans, environmentally sensitive areas, and subsistence use by making certain determinations from the outset about which blocks within the planning area are most suitable for leasing. In the sale design for specific lease sales, BOEM will continue to analyze the use of area-wide leasing and focused leasing. BOEM will consider both FMV and other concerns such as environmental and subsistence issues when determining whether to hold area-wide or more focused lease sales in a particular area.

10.2.2 Frequency of Lease Sales

Another consideration at the program stage is the frequency of lease sales within the Five-Year Program window. Historically, Programs have included separate, annual sales in both the Western and Central GOM, with less frequent sales in other planning areas.

When deciding the frequency of sales to be held in a particular area, an important consideration is the potential for new information (e.g., geologic information, revised price forecasts, new technology) to become available between sales. In the GOM region, seismic activity, exploration well drilling, and lease relinquishments are occurring almost continuously. Thus, in the GOM region, the emerging information and tract availability could impact a company’s bidding strategy as well as the Government’s evaluation of blocks. Accordingly, and partly in response to demand, an efficient GOM sale schedule tends to involve more frequent sales. In frontier areas, there is less activity and resulting new information between sales and it is therefore more appropriate to have a sale schedule with less frequent sales.

A PFP option is to hold area-wide GOM sales in the entire GOM Program Area twice annually. This option essentially doubles the opportunities for companies to purchase acreage in the Western and Central GOM Program Areas. As acreage is offered more often, additional value can be created between the sales as information becomes available. This information (e.g., a revised price trend, information about neighboring leases, technology) can affect the value of potential blocks. Under this design, rejected blocks or newly relinquished blocks would be reoffered more frequently until they are leased again. However, for newly available blocks, or blocks recently made attractive by new information about resources or other developments, it is conceivable that there could be less competition for them initially, as fewer bidders would be able to collect data and formulate bids in the shortened time. This option moves Federal lease sales to be more aligned with state-level policies. For example, Texas and Louisiana have traditionally held state sales for offshore acreage more frequently than annually. These more frequent sales would reduce the time available for companies to update their information and develop improved value estimates for the remaining available tracts. In addition, as acreage is available more often, this approach could reduce competition and lead to a slight decline in the aggregate value of bonus bids received.

10.3 OTHER COMPONENTS OF FMV

After an area's inclusion in the Program is affirmed, and following the determination of the lease sale size and timing, the next decision is the selection of the bidding system and lease terms to be used for the sale offering. These terms are evaluated prior to each sale to ensure the terms provide the public with FMV for the rights conveyed. After the sale and before acceptance, each bid is evaluated for bid adequacy. The bidding system, lease terms, and bid adequacy review together comprise the lease sale components for ensuring receipt of FMV.

10.3.1 Bidding Systems

In designing a lease sale, BOEM determines the appropriate bidding system. The specific competitive bidding systems available under the OCS Lands Act are codified in 30 CFR § 560.110. The OCS Lands Act requires the use of a sealed bid auction format with a single bid variable on tracts no larger than 5,760 acres, "unless the Secretary finds that a larger area is necessary to comprise a reasonable economic production unit" (43 U.S.C. § 1337(b)(1)). The OCS Lands Act allows for different competitive bidding variables including royalty rates, bonus bids, work commitments, or profit sharing rates.

When Congress amended the OCS Lands Act in 1978, it instructed USDOJ to experiment with alternative bidding systems for OCS leasing, primarily to encourage participation of small companies by reducing upfront costs associated with the traditional cash-bonus bid system. USDOJ used four alternative bidding systems from 1978 through 1982. Almost all of the tested systems maintained the cash bonus bid, but varied the contingency variable with use of a sliding scale royalty, which varied depending on the rate of production; a fixed net profit share; and 12.5 and 33 percent royalty rates. These systems were not found to enhance program performance compared to the then-prevalent 16.67 percent fixed royalty rate system in shallow water. Among other things, they did not increase participation by small companies; were significantly more complex to administer; distorted bids, which made it more difficult to identify the high bid; and often were not beneficial to the taxpayer. As a result, since 1983, BOEM has chosen to use the cash-bonus bidding system subject primarily to a mid-range fixed royalty rate.

In evaluating which competitive bidding terms to use, BOEM considers the goals of the OCS Lands Act, the costs and complications of implementing the selected approach, the ability of the bidding variables to accurately identify the bidder offering the highest value, and the economic efficiency of the selected approach.

BOEM largely expects to continue using a single round sealed bid auction format with a cash-bonus competitive bidding system in the GOM and Alaska program areas, but continues to study alternative arrangements. In preparation for specific lease sales, BOEM analyzes alternative fiscal terms to offer in conjunction with the current bidding systems. These are described in Section 10.3.2, Fiscal and Lease Terms.

10.3.2 Fiscal and Lease Terms

After deciding to hold a sale and the bidding system to be used, the next set of decisions deal with the sale terms to be offered, largely the fiscal terms and duration of the initial period of the lease. The fiscal terms include an upfront cash bonus, rental payments, and royalties, with the rental and royalty terms set by BOEM and the upfront cash bonus offered by bidders subject to BOEM's minimum bid level. All of the financial obligations (bonus, rentals, and royalties) reflect the value of the lessor's (i.e., Federal Government) property interest in the leased minerals and are fiscal components of FMV. In determining the appropriate lease terms for a sale, BOEM must balance the need to receive FMV with the other policy goals in the OCS Lands Act, such as expeditious and orderly development of OCS resources. BOEM evaluates fiscal and lease terms on a sale-by-sale basis and has adjusted these in recent sales in response to emerging market and resource conditions, competition, and the prospective nature of available OCS acreage.

BOEM recently adopted formalized procedures for evaluating fiscal terms before lease sales. These annual procedures consider the effectiveness of the status quo fiscal terms in comparison to international fiscal systems and recent program performance. During these procedures, BOEM updates its in-house analytical models, conducts additional statistical analysis, reviews international fiscal system trends, and recommends either a continuation of the current policies (i.e., the status quo) or other alternative fiscal terms. BOEM's procedures include use of both discounted cash flow and real option methods for deciding the set of fiscal terms that will maximize the potential value of future leasing and production while ensuring receipt of FMV.

BOEM's procedures are informed by two recent studies that consider both international fiscal systems and alternative fiscal terms. BOEM, jointly with the Bureau of Land Management, completed a study with IHS-Cambridge Energy Research Associates entitled *Comparative Assessment of the Federal Oil and Gas Fiscal Systems* (BOEM and BLM 2011). The study compared other countries' petroleum extraction fiscal systems and terms to the U.S. Federal system and found that, from a Government perspective, the current GOM lease fiscal terms rank very favorably with the fiscal terms employed by other countries that compete with the United States for upstream oil and gas investment. As discussed previously, BOEM also conducted the 2010 Area-wide Leasing Study to consider a range of alternative fiscal terms. The study was not able to identify alternative leasing and fiscal policies that would lead to significant increases in Federal revenues.

After lease sales are held, the bidding on blocks is analyzed to determine whether the lease terms offered have enhanced bidding and competition for leases and to evaluate the necessity for additional changes or adjustments. Existing lease terms are generally evaluated annually and adjusted if market conditions warrant a change. The practice of making incremental adjustments allows BOEM to evaluate the results of a lease sale that was held with new sale terms and to further refine terms if necessary in future sales without incurring undue risk to the program. Each of the sale terms contributes to the assurance of FMV for the public's resources. BOEM holds the option to reconsider minimum bid levels, rental, and royalty rates on a sale-by-sale basis and can establish alternative rates in the event that changing conditions no longer assure FMV or are inhibiting expeditious and orderly development of OCS acreage.

10.3.2.1 Minimum Bid and Bonus Bid Amounts

For many years, the bid variable of the auction has been the bonus bid. This signature bonus is a cash payment required at the time of lease execution. A bonus bid is formulated by the bidder based on its perception of expected profit, net of other payments. A minimum bid is set as a floor value for acquiring the rights to OCS acreage. Historically, its primary utility has been to ensure receipt of FMV on blocks for which there are insufficient data to make a tract evaluation, or existing geologic or economic potential of the blocks is inadequate to support a positive tract value. BOEM increased the minimum bid in the deepwater GOM in 2011 to encourage optimal timing of leasing and drilling for low-valued blocks in deep water.

The bonus bid is paid at the outset regardless of future activity or production, if any, so the lessee bears the risk of paying more than the lease is eventually worth, while the Government bears the risk of accepting less than it is eventually worth. In contrast, the royalty has neither risk because it is based on actual production. A fiscal advantage of the bonus, nonetheless, is that it is received by the Government immediately; there is no delay of, possibly, a decade or more as with the royalty.

A higher minimum bid results in a greater proportion of offered blocks being passed over (i.e., not bid on) by bidders. To the extent these passed-over blocks are marginally valued, their retention in the Government's inventory and reoffering at the next sale could enhance the efficiency of the lease sale process and generate option value and higher bonus bids for the retained blocks. A higher minimum bid level can also serve to narrow bidder interest to the more valuable blocks offered in the sale, thereby enhancing competition on the better blocks and encouraging bidders to focus their bidding on those blocks that they are most likely to explore and develop. As discussed in Section 8.1, Definition and Introduction, the minimum bid can be adjusted to improve timing of activities where option value is found to be significant. While higher minimum bid levels can have a significant effect on decreasing the number of blocks leased, aggregate cash bonuses may be little affected or could even increase, since raising the minimum bid level can push bids to higher levels.

Though the minimum bid stipulates the lowest level a bid can be, actual bids submitted are based on the expected profitability of the field and evaluated based on geology and economic viability (as described in Section 10.3.2.5, Bid Adequacy). Bidders develop the actual amount of their bonus bid in consideration of the expected profit, net of other payments. Accordingly, the fiscal terms in effect in a sale can affect the amount of the bonus bid of a lease and changes in other fiscal terms can affect the revenues collected through bonuses. For example, a higher expected royalty or rental rate will induce bidders to formulate

lower bonus bids, and vice versa. Rentals and royalties are discussed in Sections 10.3.2.2, Rentals, and 10.3.2.3, Royalties.

10.3.2.2 Rentals

During the initial period of a lease and before commencement of royalty-bearing production, the lessee pays annual rentals that generally are either fixed or escalating. Rentals compensate the public for value of holding the lease during the initial period and encourage diligent development. BOEM has used escalating rentals for leases in the GOM and Alaska for the Chukchi and Beaufort Seas to encourage timely exploration and development or earlier relinquishment. The primary use of escalating rentals is to encourage swift exploration and development of leases, and earlier relinquishment when exploration is unlikely to be undertaken by the current lessee. Escalating rentals have also been used when the initial lease period is extended following the spudding of a well, which in some cases in the GOM must be targeted to a drill depth of at least 25,000 feet subsea.

Rental payments serve to discourage lessees from purchasing marginally valued tracts too soon since companies are hesitant to pay the annual holding cost to keep a low-valued or currently uneconomic leases in their inventory. Rental payments provide an incentive for the lessee to either timely drill the lease or relinquish it before the end of the initial lease period, thereby giving other market participants an opportunity to acquire these blocks in a more timely fashion.

10.3.2.3 Royalties

The Government reserves a royalty interest for all OCS production. Leases issued in recent years have a fixed royalty rate; by law, it must be no lower than 12.5 percent. The rate is applied to the value of oil and gas sold, net of certain transportation and processing costs. The amount collected per barrel is greater or lesser as the oil price changes, but the rate itself does not vary. It is also the lease fiscal term in which the Government shares in the risk of the lease (i.e., the Government only receives royalty revenues if production has commenced).

Royalty rates can have a significant impact on bidder interest and are a key fiscal parameter in the calculation of the underlying economic value for a block. BOEM increased the GOM royalty rate in sales held in 2007 and 2008 to capture a greater portion of revenue as oil and gas prices had risen substantially above levels that prevailed for virtually all previous years. Alternative royalty arrangements are possible in which the rate varies or no royalty is paid for certain periods. Additional royalty rate analysis is conducted when designing specific lease sales.

10.3.2.4 Initial Period of the Lease

In cases where a high bid meets the FMV requirements, the lease rights are issued to the lessee for a limited term called the initial period (also known as the “primary term”). The OCS Lands Act sets the initial period at 5 years, or up to 10 years, “where the Secretary finds that such longer period is necessary to encourage exploration and development in areas because of unusually deep water or other unusually adverse conditions....” The initial period promotes expeditious exploration while still providing sufficient time to commence development. In evaluating the initial period of the lease, BOEM considers technology and the time necessary for exploration and infrastructure development. When designing specific lease sales BOEM considers the length of the initial lease period and whether it remains

appropriate given current exploration timeframes. For example, in 2010, BOEM reduced the initial period of the lease in water depths of 800 meters to 1,600 meters to reflect the shorter time deemed necessary to explore for economic prospects.

10.3.2.5 *Bid Adequacy*

Following a lease sale, the high bids on each block are evaluated to determine whether they satisfy the FMV requirements for acceptance. The bid adequacy process, instituted in 1983, uses a two-phased system to assess the adequacy of bids received in lease sales. The first phase involves BOEM's assessment of the block's geologic and economic viability. The high bids that are not accepted during this first phase are evaluated in the second phase using detailed analytical assessment procedures to generate an independent evaluation of each remaining block's value. This procedure is employed in conjunction with the distribution of the losing bids on each block and with an adjustment for the delay cost, if any, from not selling the block in the current sale to determine each block's ultimate "reservation price." This price cannot be lower than the minimum bid set for the auction, but it may be higher for particular blocks. If the high bid does not exceed the reservation price, the bid is rejected and the block is available to be reoffered at the next lease sale in that area. Thus, BOEM reviews all high bids received and evaluates all blocks using some combination of block-specific bidding factors and detailed block-specific resource and economic evaluation factors to ensure that FMV is received for each OCS lease issued.

Since 1984, bid adequacy reviews and fair market value determinations have resulted in an average rejection rate of bids of approximately 3.7 percent. One effect of bid rejection is to encourage bidders to submit bids that will exceed the government's reservation price and thereby promote receipt of FMV. Moreover, rejection of high bids under the existing BOEM bid adequacy procedures has consistently resulted in higher average returns in subsequent sales for the same tracts, even when those tracts not receiving subsequent bids were included in the calculation of the average returns. In the GOM from 1984 through 2015, BOEM rejected total high bids of \$630 million, but when the blocks were reoffered, they drew subsequent high bids of \$1.8 billion, for a total net gain of \$1.2 billion, or an increase of 189 percent. These results indicate that BOEM's bid adequacy assessments and procedures have performed well in identifying blocks with high bids below FMV. With the possibility of bid rejection from the government and competition from other bidders, lease sale participants are encouraged to submit bids that will tend to reflect or exceed the government's reservation price. When bids exceed the reservation price, the government is confident it is receiving FMV.

BOEM occasionally conducts look-back studies to evaluate bid evaluations and actual development. These studies show that the majority of OCS leases with profitable hydrocarbon discoveries were assigned a positive value at the time of sale. However, in some cases BOEM issued leases where it estimated the block values to be negative, the blocks were issued for near minimum bid, and the lessees made discoveries of substantial size. In these cases, BOEM has documented that either new information became available after the lease was awarded, prompting a company to drill a specific target different than what was originally evaluated, or the internal evaluation of the potential oil and gas accumulation target did not coincide with that of the lessee company. In those cases where new information became available after the lease was awarded, the information tends to be either new or reprocessed geophysical data unavailable at the time of sale, or new subsurface well data acquired as a result of drilling on a

nearby lease that may indicate the possibility of material hydrocarbon deposits on the subject lease. Since it is quite common for exploration companies to acquire new or reprocessed geophysical data on leases after award but prior to exploratory drilling, these look-back studies tend to identify those wells that have been drilled to a target that sometimes is not coincident with the target that was evaluated pre-sale.

Bid adequacy procedures are dynamic; as conditions change, BOEM looks for opportunities to improve the process. The original form of the bid adequacy procedures was instituted in 1983 in conjunction with the implementation of the area-wide leasing policy, but these procedures have undergone several refinements to address FMV concerns as conditions have changed. The current procedures are available at: <http://www.boem.gov/Fair-Market-Value/>.

BOEM continues to look for opportunities to improve the process and is currently refining the tract evaluation model used in bid adequacy determinations. Moreover, in implementing the new Program, there may be revisions to the bid adequacy procedures to incorporate knowledge or to accommodate structural changes to the leasing process.

10.4 CONCLUSION

BOEM evaluates market conditions, available resources, bidding patterns, and the status of production on OCS acreage when establishing terms and conditions for each lease sale. While some components of FMV are initially discussed at the Program stage (i.e., optimal timing and leasing framework), other components (i.e., fiscal and lease terms, bidding systems, and bid adequacy) are considered on a sale-by-sale basis to incorporate new information and assure FMV is received. The program area hurdle price analysis, based on calculated BOE hurdle prices in comparison to current expectations of future prices for oil and gas, does not indicate that any of the PFP areas in the PFP Options should be excluded based solely on the price of oil and gas. Of course, this is only one consideration in the Program development process and the Secretary may remove areas based on other factors (e.g., environmental considerations, industry interest). In the event that BOEM changes any of the sale terms, bidding system, or bid adequacy procedures, the changes are announced to the public and industry through the PNOS or other notification in the *Federal Register*, typically prior to publication of the FNOS.

**PART III:
PROPOSED FINAL PROGRAM AND
LEASE SALE OPTIONS**

Chapter 11 Proposed Final Program and Lease Sale Options

In accordance with the OCS Lands Act, and as discussed throughout this PFP document, the Secretary of the Interior is required to balance the potentials for environmental damage, the discovery of oil and gas, and adverse impacts on the coastal zone while preparing the 2017–2022 Program. In addition, the OCS Lands Act states that the leasing program will consist of a schedule of proposed lease sales indicating, as precisely as possible, the size, timing, and location of leasing activities.

Table 11-1: Summary of Proposed Final Program Leasing Options and the following information present the Program Options that were identified for the Secretary’s consideration. The chosen Program Option for each planning area is indicated by **bold font**. The Summary of the Proposed Final Program Decision in the beginning of this document explains the Secretary’s decision rationale and framework for her 2017–2022 PFP decision, which is based on the OCS Lands Act Section 18 analysis contained within chapters 1–10 of this PFP decision document and the Final Programmatic EIS.

Table 11-1: Summary of Proposed Final Program Leasing Options

	Proposed Program Decision Options	Supplemental Program Options	No Sale Option
Beaufort Sea Program Area	(1) Targeted Leasing	(2) Advancing sale to 2019 (3) Barrow Canyon exclusion (4) Cross Island exclusion (5) Camden Bay exclusion (6) Kaktovik exclusion	(7) No Sale
Chukchi Sea Program Area	(1) Targeted Leasing	(2) Hanna Shoal Walrus Foraging Area exclusion (3) Hanna Shoal Walrus Movement Corridor exclusion	(4) No Sale
Cook Inlet Program Area	(1) Targeted Leasing	(2) Beluga Whale Critical Habitat exclusion	(3) No Sale
GOM Program Area	(1) Region-wide Leasing	(2) Modified Traditional Leasing (3) Baldwin County Buffer	(4) No Sale

Note: See Chapter 4, Background, Leasing History, and Status of OCS Program Areas, for maps of the supplemental Program options.

11.1 ALASKA REGION

The PFP evaluates Program options for the Alaska Region that result from a balanced and careful approach to potential leasing that considers environmental impacts, subsistence uses, and national energy needs.

For the PFP, the Secretary considered the same Arctic program areas as in the Proposed Program. Environmentally Important Areas have been analyzed in the Final Programmatic EIS and as program options, where appropriate, in Chapters 1 through 10 of this PFP.

In the Cook Inlet, the area considered in the PFP is the same as the Proposed Program, and includes the northern portion of the planning area, which balances the need to protect endangered species against the areas with highest resource potential and industry interest. Exclusions related to the protection of beluga whale and sea otter critical habitat will be further considered in the subsequent lease sale process.

The **bolded** chosen Program Options for Alaska in the PFP include one sale in Cook Inlet in 2021 and no sales in the Beaufort Sea or Chukchi Sea program areas.

11.1.1 Beaufort Sea

See Figure 4-1: 2017–2022 PFP Options for the Beaufort Sea Program Area for a depiction of Options 1 through 6 below.

- Option 1: One sale in 2020, in the program area offering available unleased acreage not subject to Presidential withdrawal.
- Option 2: One sale in 2019, in the same area as Option 1.
- Option 3: Option 1 or Option 2 with exclusion of Barrow Canyon
- Option 4: Option 1 or Option 2 with exclusion of Cross Island
- Option 5: Option 1 or Option 2 with exclusion of Camden Bay
- Option 6: Option 1 or Option 2 with exclusion of Kaktovik
- **Option 7: No sale.**
- Option 8: Other.

11.1.2 Chukchi Sea

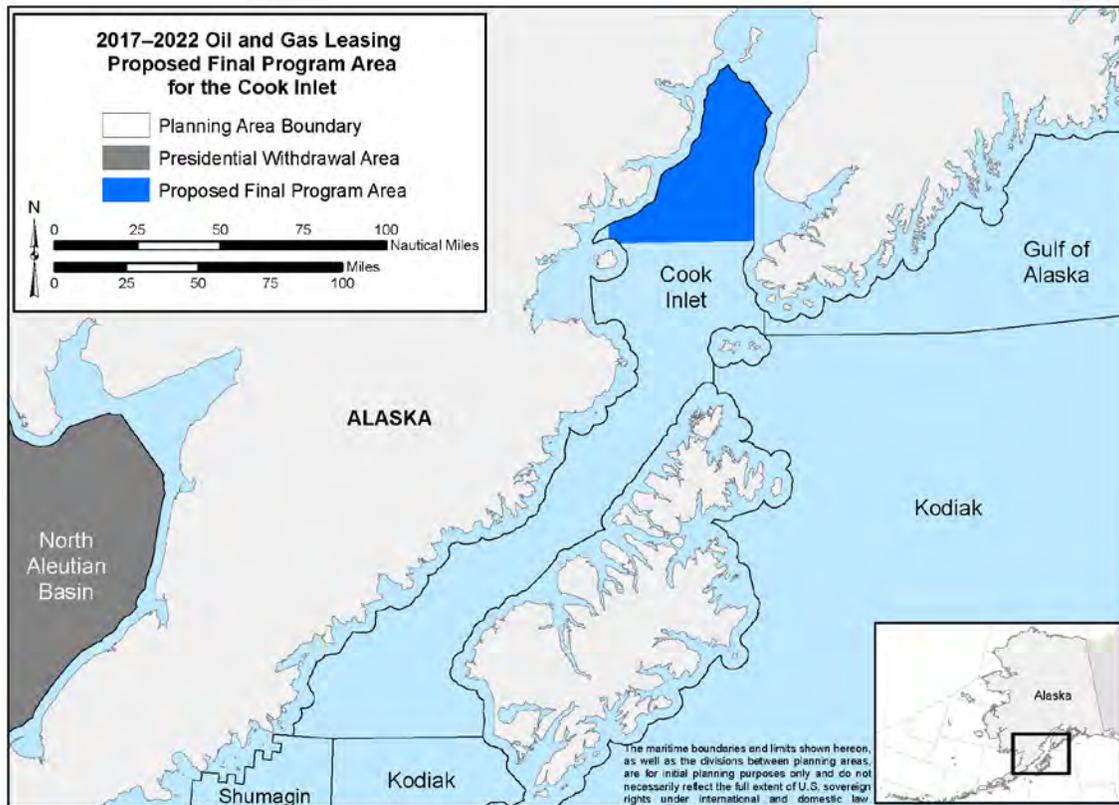
See Figure 4-2: 2017–2022 PFP Options for the Chukchi Sea Program Area for a depiction of Options 1 through 3 below.

- Option 1: One sale in 2022, in the entire program area offering available unleased acreage not subject to Presidential withdrawal.
- Option 2: Option 1 with exclusion of Hanna Shoal walrus foraging area.
- Option 3: Option 1 with exclusion of Hanna Shoal walrus movement corridor.
- **Option 4: No sale.**
- Option 5: Other.

11.1.3 Cook Inlet

- **Option 1: One sale in 2021, in the northern portion of the program area as depicted in Figure 11-1: Cook Inlet Program Area.**
- Option 2: Option 1 with exclusion of the Cook Inlet Beluga Whale Critical Habitat Environmentally Important Area within the Cook Inlet Program Area.
- Option 3: No sale.
- Option 4: Other.

Figure 11-1: Cook Inlet Program Area



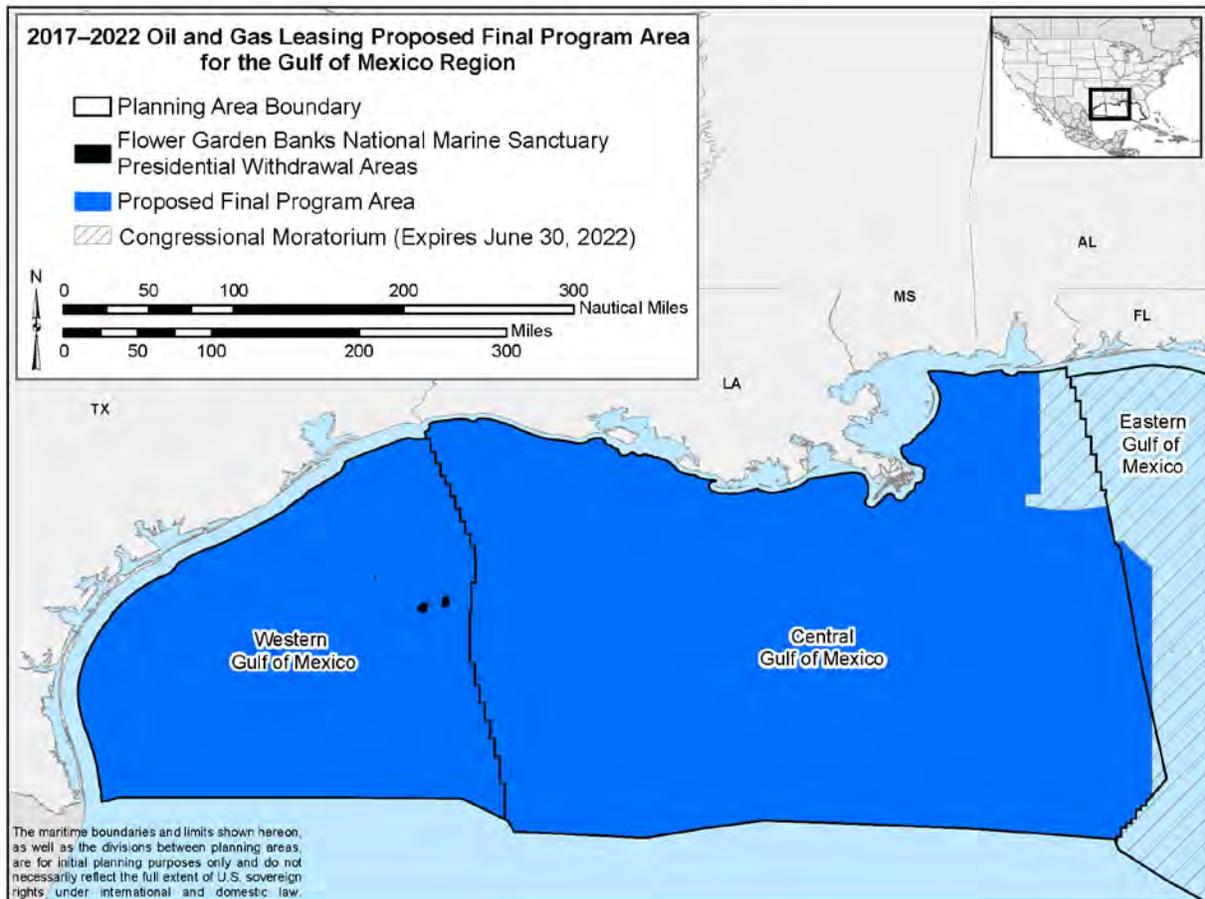
11.2 GULF OF MEXICO REGION

For the GOM planning areas, the PFP considers a schedule of 10 region-wide lease sales in the areas of the GOM not under Congressional moratorium or otherwise unavailable. No Central or Eastern GOM Planning Area blocks that are subject to Congressional moratorium pursuant to GOMESA would be included for leasing consideration. The PFP also analyzed a 15-mile no-leasing buffer south of Baldwin County, Alabama, as requested by the OCS Governors Coalition in a letter commenting on the DPP to which the Governor of Alabama was a signatory. The State of Alabama has requested a similar buffer for many years, citing visual impacts. Since Central GOM Lease Sale 169 in 1998, BOEM has required that leases within 15 miles south of Baldwin County, Alabama, be subject to a lease sale stipulation, which calls on lessees and operators of such leases to minimize visual impacts by, where feasible, limiting new

surface structures south of, and within 15 miles of, Baldwin County. The lease stipulation minimizes the visual impacts of oil and gas operations off the coast of Baldwin County while allowing leasing and oil and gas operations in the area, which could not occur with the no-leasing buffer.

- **Option 1: Ten sales total during the 2017–2022 Program, with one sale in 2017; two sales each year in 2018, 2019, 2020, and 2021; and one sale in 2022; offering available unleased acreage not subject to Congressional moratorium or otherwise unavailable in the combined Western, Central, and Eastern GOM Planning Areas in each sale. See Figure 11-2: GOM Region Program Area.**
- Option 2: Maintain an approach similar to the 2012–2017 Program, with ten sales, including five annual sales beginning in 2017 in the Western GOM offering all available unleased acreage and five annual sales beginning in 2018 in the combined Central and Eastern GOM Planning Areas offering all available unleased acreage. See Figure 11-2.
- Option 3: Option 1 or Option 2 with a 15-mile no-leasing buffer south of Baldwin County, Alabama, as requested in the comment letter on the DPP from the OCS Governors Coalition on which the Governor of Alabama was a signatory.
- Option 4: No sale(s).
- Option 5: Other.

Figure 11-2: GOM Region Program Area



11.3 SECRETARIAL PROPOSED FINAL PROGRAM DECISION

The lease sale schedule below reflects the proposed lease sales resulting from the Program options selected to create the 2017–2022 PFP. Those selections result in a schedule of 11 potential lease sales in portions of four OCS planning areas: ten sales in the GOM Program Area; and one sale in the Cook Inlet Program Area, offshore Alaska (see Table 11-2: 2017–2022 Proposed Final Program Lease Sale Schedule).

Table 11-2: 2017–2022 Proposed Final Program Lease Sale Schedule

	Year	Program Area	Sale Number
12.	2017	Gulf of Mexico	249
13.	2018	Gulf of Mexico	250
14.	2018	Gulf of Mexico	251
15.	2019	Gulf of Mexico	252
16.	2019	Gulf of Mexico	253
17.	2020	Gulf of Mexico	254
18.	2020	Gulf of Mexico	256
19.	2021	Gulf of Mexico	257
20.	2021	Cook Inlet	258
21.	2021	Gulf of Mexico	259
22.	2022	Gulf of Mexico	261

11.4 APPROPRIATIONS AND STAFFING ESTIMATES

Section 18(b) of the OCS Lands Act requires that the leasing program include estimates of the appropriations and staff needed to obtain information for preparing the program, to analyze and interpret data and information, to conduct environmental studies and prepare EISs, and to supervise operations pursuant to the leases that will be issued.

Table 11-3: Appropriations and Staffing Estimates (by Fiscal Year) presents the appropriations and staffing estimates associated with the implementation of the 2017–2022 Program.

Table 11-3: Appropriations and Staffing Estimates (by Fiscal Year)

Activities	FY 2018		FY 2019		FY 2020		FY 2021		FY 2022	
	Funds	Staff								
1	\$18,445,000	119	\$18,813,900	119	\$19,190,178	119	\$19,573,982	119	\$19,965,461	119
2	\$10,850,000	70	\$11,067,000	70	\$11,288,340	70	\$11,514,107	70	\$11,744,389	70
3	\$22,630,000	146	\$23,082,600	146	\$23,544,252	146	\$24,015,137	146	\$24,495,440	146
4	\$2,015,000	13	\$2,055,300	13	\$2,096,406	13	\$2,138,334	13	\$2,181,101	13
Total	\$53,940,000		\$55,018,800		\$56,119,176		\$57,241,560		\$58,386,391	

Note: Funding estimates are in thousands of dollars; staffing estimates are in full-time equivalent positions.

Key:

- (1) Resource Information [section 18(b)(1)]
- (2) Exploration Data and Other Information [section 18(b)(2)]
- (3) Environmental Studies and EIS Preparation [section 18(b)(3)]
- (4) Supervise Operations [section 18(b)(4)]

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No references.

Chapter 13 Glossary

2-D Seismic — A seismic survey where a line of geophones captures enough information to generate a two-dimensional (height and length) image of the Earth's subsurface directly below the line.

3-D Seismic — A seismic survey where a three-dimensional image of the subsurface is developed by combining numerous energy sources and multiple lines of geophones. The image consists of height, length, and side-to-side information that gives better resolution to the subsurface.

Area Identification (Area ID) — The Area ID is an administrative pre-lease step that describes the geographical area of the proposed actions (proposed lease sale areas) and identifies the alternatives, mitigating measures, and issues to be analyzed in the corresponding NEPA document.

area-wide leasing — All available (unleased and not withdrawn) acreage in the program area will be offered in the lease sale.

barrel — The standard unit of measurement of liquids in the petroleum industry, which is 42 U.S. standard gallons.

barrel of oil equivalent (BOE) — The amount of energy resource (in this document, natural gas) that is equal to one barrel of oil on an energy basis. The conversion is based on the assumption that one barrel of oil produces the same amount of energy when burned as 5,620 cubic feet of natural gas.

basin — A depression in the earth's surface where sediments are deposited, usually characterized by sediment accumulation over a long interval; a broad area of the earth beneath which layers of rock are inclined, usually from the sides toward the center.

benthic — Ecological zone at the bottom of a body of water; in this document, the seafloor surface and subsurface.

benthos — Organisms that dwell in or on the seafloor; the organisms living in or associated with the benthic (or bottom) environment.

bid — An offer for an OCS lease submitted by a potential lessee in the form of a cash bonus dollar amount or other commitments responding to a variable fiscal term as specified in the final notice of sale.

block — A numbered area on an OCS leasing map or official protraction diagram (OPD). Blocks are portions of OCS leasing maps and OPDs that are themselves portions of planning areas. Blocks vary in size, but are typically 5,000 to 5,760 acres (about 9 square miles or 2,304 hectares). Each block has a specific identifying number, area, and latitude and longitude coordinates that can be pinpointed on a leasing map of OPD.

bonus bid — The cash consideration paid to the United States by the successful bidder for a mineral lease. The payment is made in addition to the rent and royalty obligations specified in the lease.

Bureau of Ocean Energy Management — On October 1, 2011, the Bureau of Ocean Energy Management (BOEM) was created. BOEM is responsible for managing development of the Nation’s offshore resources in an environmentally and economically responsible way. Functions include: Leasing, Plan Administration, Environmental Studies, National Environmental Policy Act (NEPA) Analysis, Resource Evaluation, Economic Analysis, and the Renewable Energy Program.

Bureau of Safety and Environmental Enforcement — On October 1, 2011, the Bureau of Safety and Environmental Enforcement (BSEE) was created. BSEE is responsible for enforcing safety and environmental regulations. Functions include: all field operations including Permitting and Inspections, Research Offshore Regulatory Programs, Oil Spill Response, and Training, and Environmental Compliance functions.

caprock — An impermeable rock overlying an oil or gas reservoir that tends to prevent migration of fluids from the reservoir.

catastrophic discharge event — A low-probability, unexpected, and unauthorized large discharge of oil into the environment that could cause long-term and widespread effects on marine and coastal environments.

conceptual play — Geologic plays in which hydrocarbons have not been detected, but for which geological and geophysical data, integrated with regional geologic knowledge, suggest that hydrocarbon accumulations may exist.

continental shelf — A broad, gently sloping, shallow feature extending from the shore to the continental slope, generally considered to exist to the depth of 200 meters (656 feet).

continental slope — A relatively steep, narrow feature paralleling the continental shelf, the region in which the steepest descent to the ocean bottom occurs.

conventional reservoir — A hydrocarbon accumulation in which reservoir and fluid characteristics typically allow oil or natural gas to flow readily into a well. This distinguishes the resources apart from unconventional reservoirs where there is little to no significant force driving the migration of resources to a wellbore.

conventional resources — Oil and gas resources in conventional reservoirs where buoyant forces keep resources in place beneath a caprock.

conventional recovery methods — Producing oil and gas resources using traditional extraction methods, such as natural pressure, pumping, or by using secondary methods such as gas or water injection.

critical habitat — A designated area that is essential to the conservation of an endangered or threatened species 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.

Department of the Interior (Department, USDOJ) — The Department of the Interior is a Cabinet-level agency that manages America’s vast natural and cultural resources. Under the direction of the Secretary

of the Interior, BOEM works to promote energy independence, environmental protection, and economic development through responsible, science-based management of OCS conventional and renewable energy and marine mineral resources.

development — Activities following exploration including the installation of facilities and the drilling and completion of wells for production purposes.

Development and Production Plan — A plan describing the specific work to be performed on an offshore lease after a successful discovery, including all development and production activities that the lessee proposes to undertake during the time period covered by the plan and all actions to be undertaken up to and including the commencement of sustained production. The plan also includes descriptions of facilities and operations to be used, well locations, current geological and geophysical information, environmental safeguards, safety standards and features, schedules, and other relevant information. All lease operators are required to formulate and obtain approval of such plans by BOEM before development and production activities may begin; requirements for submittal of the plan are identified in 30 CFR 550.241.

downstream greenhouse gas (GHG) emissions — includes consumption of a resource that, as a byproduct, produces any of the atmospheric gases that contribute to the greenhouse effect by absorbing infrared radiation produced by solar warming of the Earth's surface. They include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), and water vapor.

Draft Proposed Program (DPP) — Section 18 of the OCS Lands Act requires the Secretary of the Interior to prepare and maintain a schedule of proposed OCS oil and gas lease sales determined to “best meet national energy needs for the five-year period following its approval or reapproval.” Preparation and approval of a Program is based on a consideration of principles and factors specified by Section 18 to determine the size, timing, and location of lease sales. The DPP is the first of three proposals to be issued for public review before a new Program may be approved.

endangered species — Any species that is in danger of extinction throughout all or a significant portion of its range and has been officially listed by the appropriate Federal Agency (either the National Oceanic and Atmospheric Administration [NOAA] or U.S. Fish and Wildlife Service) under the authority of the Endangered Species Act; a species is determined to be endangered (or threatened) because of any of the following factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) over utilization for commercial, sporting, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; or (5) other natural or man-made factors affecting its continued existence.

environmental assessment — A concise public document prepared pursuant to NEPA and the Council on Environmental Quality regulations. In the document, a Federal Agency proposing (or reviewing) an action provides evidence and analysis for determining whether it must prepare an environmental impact statement or whether it finds there is no significant impact (i.e., Finding of No Significant Impact).

environmental impact statement (EIS) — A concise, clear, and to the point public document prepared pursuant to NEPA and Council on Environmental Quality regulations for a major Federal action significantly affecting the environment. EISs provide a full and fair discussion of significant

environmental impacts to inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts. The document is used by Federal officials, in conjunction with other relevant material, to plan actions and make decisions.

environmental sensitivity — A measure of the vulnerability and resilience of a region’s ecological components to potential adverse impacts of offshore oil and gas exploration and development activities in the context of existing conditions.

established play — Geologic plays in which hydrocarbons have been discovered and a petroleum system has been proven to exist.

Exclusive Economic Zone (EEZ) — The maritime region adjacent to the territorial sea, extending 200 nautical miles (nm) from the baseline of the territorial sea, in which the United States has exclusive rights and jurisdiction over living and nonliving natural resources.

exploration — The process of searching for minerals preliminary to development. Exploration activities include: (1) geophysical surveys, (2) any drilling to locate an oil or gas reservoir, and (3) the drilling of additional wells after a discovery to delineate a reservoir. It enables the lessee to determine whether to proceed with development and production.

Exploration Plan — A plan submitted by a lessee (30 CFR 250.33) that identifies all the potential hydrocarbon accumulations and wells that the lessee proposes to drill to evaluate the accumulations within the lease or unit area covered by the plan. All lease operators are required to obtain approval of such a plan by a BOEM Regional Supervisor before exploration activities may commence.

field — Area consisting of a single reservoir or multiple reservoirs all grouped on, or related to, a shared geologic structural feature and/or stratigraphic trap.

formation — A bed or deposit sufficiently homogeneous to be distinctive as a unit. Each different formation is given a name, frequently as a result of the study of the formation outcrop at the surface and sometimes based on fossils found in the formation.

geological data — Information derived from rocks of the seabed to provide information on the geological character of rock strata.

geological surveys — Geological surveying on the Outer Continental Shelf consists of bottom sampling, shallow coring, and deep stratigraphic tests. These data are useful in determining the general geology of an area and whether the right types of rocks exist for petroleum formation and accumulation.

geophysical data — Facts, statistics, or samples that have not been analyzed or processed, pertaining to gravity, magnetic, seismic, or other surveys/systems.

geophysical surveys — Geophysical surveys on the OCS provide data about the seafloor and the subsurface. Comprised of 2-D and 3-D seismic surveys, as well as multi-component, high-resolution, wide-azimuth, and other advanced types of seismic surveys, the surveys obtain data for hydrocarbon exploration and production, identify possible seafloor or shallow depth geologic hazards, and locate potential archaeological resources and hard-bottom habitats that should be avoided.

greenhouse gas (GHG) emissions — Any of the atmospheric gases that contribute to the greenhouse effect by absorbing infrared radiation produced by solar warming of the Earth's surface. They include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), and water vapor.

hurdle price — The price below which delaying exploration for the largest potential undiscovered field in the sale area is more valuable than immediate exploration.

hydrocarbon — Any of a large class of organic compounds containing primarily carbon and hydrogen; comprising paraffins, olefins, members of the acetylene series, alicyclic hydrocarbons, and aromatic hydrocarbons; and occurring, in many cases, in petroleum, natural gas, coal, and bitumens.

isobath — A contour line on a map that connects points of equal underwater depth.

lease — A legal document executed between a landowner, as lessor, and a company or individual (as lessee) that conveys the right to explore the leased area for minerals or other resources on the OCS for a specified period of time. The term also means the area covered by that authorization, whichever the context requires.

lease sale — A BOEM proceeding by which leases of certain OCS tracts are offered for lease by competitive sealed bidding and during which bids are received, announced, and recorded.

lease period — Duration of an OCS lease. Oil and gas leases are issued for an initial period of between 5 and 10 years. After that, the term continues as long as there is production in paying quantities.

lessee — An entity, person, or persons to whom a lease is awarded; the recipient of a lease.

lifecycle greenhouse gas (GHG) emissions — Includes upstream, mid-cycle, and downstream activities that, as a byproduct, produce any of the atmospheric gases that contribute to the greenhouse effect by absorbing infrared radiation produced by solar warming of the Earth's surface. They include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), and water vapor.

liquefied natural gas (LNG) — Natural gas is converted to LNG by cooling it to a temperature of -256°F, at which point it becomes a liquid. This simple process allows natural gas to be transported from an area of abundance to an area where it is needed. Once the LNG arrives at its destination, it is either stored as a liquid, or is converted back to natural gas and delivered to end-users.

marine productivity — Productivity is a term used to indicate the amount of biomass produced over a period of time. Primary productivity is the production of biomass using carbon dioxide and water through photosynthesis. The primary productivity of the marine community is its capacity to produce energy for its component species, which thus sets limits on the overall biological production in marine ecosystems.

marine protected area — Any area of the marine environment that has been reserved by Federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.

mid-cycle greenhouse gas emissions — includes onshore processing, storage, and distribution of OCS oil and gas activities, that, as a byproduct, produce any of the atmospheric gases that contribute to

the greenhouse effect by absorbing infrared radiation produced by solar warming of the Earth's surface. They include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), and water vapor.

minerals — Minerals include oil, gas, sulfur, 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.

moratorium — Restriction on what areas BOEM can offer for OCS oil and gas leasing.

natural gas — A mixture of hydrocarbon compounds and small quantities of various non-hydrocarbons existing in gaseous phase at the surface or in solution with crude oil in natural underground reservoirs at reservoir conditions.

nearshore waters — Offshore open waters that extend from the shoreline out to the limit of the territorial seas (12 nm).

net social value — The net social value equals the discounted gross revenues from the produced oil and natural gas minus the private, environmental, and social costs required to realize the economic value of the resources.

net economic value (NEV) — The value to society that is derived from the resources in the ground. The NEV equals the discounted gross revenues from the produced oil and natural gas minus the private costs required to realize the economic value of the resources.

Oil Spill Response Plan — A plan submitted by the lease or unit operator prior to using a facility covered by the plan and that details provisions for fully defined specific actions to be taken following discovery and notification of an oil spill occurrence (30 CFR 254).

Outer Continental Shelf (OCS) — All submerged lands seaward and outside the area of lands beneath navigable waters. Lands beneath navigable waters are interpreted as extending from the coastline to 3 nm into the Atlantic Ocean, the Pacific Ocean, the Arctic Ocean, Cook Inlet, and the Gulf of Mexico, excluding the coastal waters off Texas and western Florida. Lands beneath navigable waters are interpreted as extending from the coastline to 3 marine leagues into the Gulf of Mexico off Texas and western Florida.

operator — The person or company engaged in the business of drilling for, producing, or processing oil, gas, or other minerals and recognized by BOEM as the official contact and responsible for the lease activities or operations.

pelagic — Pertaining to the part of the open sea or ocean comprising the water column.

petroleum — An oily, flammable, bituminous liquid that occurs in many places in the upper strata of the earth, either in seepages or in reservoirs; essentially a complex mixture of hydrocarbons of different types with small amounts of other substances; any of various substances (as natural gas or shale oil) similar in composition to petroleum.

petroleum system — All of the geologic components and processes which create a suitable environment to generate, accumulate, and preserve oil and gas. Elements such as source rock, reservoir rock, and the

trapping mechanism, along with how the fluids migrate are necessary for the creation of a suitable hydrocarbon reservoir.

planning area — An administrative subdivision of an OCS area used as the initial basis for considering blocks to be offered for lease.

play (geologic play) — A group of known and/or postulated pools that share common geologic, geographic, and temporal properties, such as history of hydrocarbon generation, migration, reservoir development, and entrapment.

pool — A discovered or undiscovered accumulation of hydrocarbons.

production — Activities that take place after the successful completion of a well, including removal of minerals, field operations, transfer of minerals to shore, operation monitoring, maintenance, and workover drilling.

primary production — The production of biomass from inorganic carbon and water through photosynthesis or chemosynthesis.

Proposed Program — The second in a series of three mandated proposed leasing schedules to be issued for public review before a new Program may be approved. The Proposed Program takes into account, among other things, the comments received concerning the DPP.

Proposed Final Program (PFP) — The third in a series of three mandated leasing proposals developed for public review before the Secretary of the Interior may take final action to approve the new Program. The PFP is submitted to the President and Congress, along with copies of the comments received on the Proposed Program, and responses to recommendations from the Governors.

Record of Decision (ROD) — The final step in the EIS process. The ROD identifies the selected alternative, presents the basis for the decision, identifies alternatives considered, specifies the environmentally preferable alternative, and provides information on appropriate mitigation measures.

recoverable resources — Portion of the identified oil or gas resources that can be economically extracted under current technological constraints.

rent — Periodic payments made by the holder of a lease, during the primary lease term prior to a discovery in paying quantities for the right to use the land or resources for purposes established in the lease.

Request for Information and Comments (RFI) — The first step in the development of a Program. BOEM publishes a Federal Register notice to request information and comments from states and local governments, tribal governments, Native American and Alaska Native organizations, Federal agencies, environmental and fish and wildlife organizations, the oil and gas industry, non-energy industries, other interested organizations and entities, and the general public for use in the preparation of the Program. BOEM seeks a wide array of information including information associated with the economic, social, and environmental values of all OCS resources, as well as the potential impact of oil and gas exploration and development on other resource values of the OCS and the marine, coastal, and human environments.

reservoir — Subsurface, porous, permeable rock body in which oil or gas or both may have accumulated.

resource — Concentrations in the earth's crust of naturally occurring liquid or gaseous hydrocarbons that can conceivably be discovered and recovered. Normal use encompasses both discovered and undiscovered resources.

royalty — Payment, in value (money) or in kind, of a stated proportionate interest in production from mineral deposits by the lessees to the lessor.

secondary production — Generation of biomass of consumer (heterotrophic) organisms. Its definition may be limited to include the consumption of primary producers by herbivorous consumers, but is more commonly defined to include all biomass generation by heterotrophs.

seismic — Pertaining to, characteristic of, or produced by, earthquakes or Earth vibrations; having to do with elastic waves in the Earth.

seismic survey — A method of geophysical prospecting using the generation, reflection, refraction, detection, and analysis of elastic waves in the Earth. Seismic surveys use sound waves that are sent through the ocean floor to map the subsurface.

spudding — To begin drilling a well.

stipulation — Specific measures imposed upon a lessee that apply to a lease. Stipulations are attached as a provision of a lease; they may apply to some or all tracts in a sale. For example, a stipulation might limit drilling to a certain time period of the year or certain areas.

territorial waters — Territorial waters or a territorial sea as defined by the 1982 United Nations Convention on the Law of the Sea, is a belt of coastal waters extending at most 12 nautical miles (22.2 km; 13.8 mi) from the baseline (usually the mean low-water mark) of a coastal state.

tract — An area of the seabed that may be offered for lease. It is a designation assigned, for administrative and statutory purposes, to a block or combination of blocks that are identified by an official protraction diagram prepared by BOEM. A tract may not exceed 5,760 acres unless it is determined that a larger area is necessary to comprise a reasonable economic production unit.

trap — A geologic feature that permits the accumulation and prevents the escape of accumulated fluids (hydrocarbons) from the reservoir.

unconventional recovery methods — Enhanced technological and engineering techniques used to produce oil and gas resources, such as horizontal drilling and hydraulic fracturing.

unconventional resources — Oil and gas resources trapped in formations that have lower permeability and/or porosity than the rocks that have typically produced oil and gas resources in the past. These formations are commonly referred to as shale or tight formations. In recent years, these types of formations have been increasingly produced using hydraulic fracturing.

Undiscovered Economically Recoverable Resources (UERR) — The portion of the undiscovered technically recoverable resources that are economically recoverable under specified economic and technologic conditions, including prevailing prices and costs.

Undiscovered Technically Recoverable Resources (UTRR) — Oil and gas that may be produced from the subsurface using conventional extraction techniques without any consideration of economic viability.

upstream greenhouse gas (GHG) emissions — includes OCS oil and gas activities including exploration, development, production, and transport, that, as a byproduct, produce any of the atmospheric gases that contribute to the greenhouse effect by absorbing infrared radiation produced by solar warming of the Earth's surface. They include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), and water vapor.

well — A hole drilled or bored into the earth, usually cased with metal pipe, for the production of gas or oil. A hole for the injection under pressure of water or gas into a subsurface rock formation.

APPENDIX A

SUMMARIES OF

PUBLIC COMMENTS

Table of Contents

A.1	Request for Comments on the Proposed Program	A-5
A.2	Summary of Comments Received	A-5
A.2.1	Governors and State Agencies	A-12
A.2.2	Local Governments	A-13
A.2.3	Public Interest Groups	A-15
A.2.4	Federal Agencies	A-24
A.2.5	Energy Industry and Associations	A-26
A.2.6	Non-Energy Industry and Associations	A-33
A.2.7	State-level Elected Officials	A-45
A.2.8	Members of Congress	A-49
A.2.9	Tribes and Tribal Organizations	A-50
A.2.10	General Public	A-51
A.2.11	Petitions	A-56
A.2.12	Form Letters (from Individuals)	A-59

Abbreviations and Acronyms

AOGA	Alaska Oil and Gas Association
API	American Petroleum Institute
AXPC	American Exploration and Production Council
BOEM	Bureau of Ocean Energy Management
CAA	Conflict Avoidance Agreement
CO ₂	carbon dioxide
DNR	Department of Natural Resources
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
EIS	environmental impact statement
FR	<i>Federal Register</i>
G&G	geological and geophysical
GHG	greenhouse gas
GOM	Gulf of Mexico
GOMESA	Gulf of Mexico Energy Security Act of 2006
IADC	International Association of Drilling Contractors
IAGC	International Association of Geophysical Contractors
ID	Identification
IPAA	Independent Petroleum Association of America
MMC	Marine Mammal Commission
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act of 1969
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration

NOIA	National Ocean Industries Association
NPS	National Park Service
OCS	Outer Continental Shelf
PESA	Petroleum Equipment and Services Association
PFRR	Poker Flat Research Range
Programmatic EIS	<i>2017–2022 OCS Oil and Gas Leasing Program Programmatic Environmental Impact Statement</i>
TAPS	Trans-Alaska Pipeline System
USDOJ	U.S. Department of the Interior
USOGA	U.S. Oil and Gas Association

Appendix A Summaries of Public Comments by Commenter Category

A.1 REQUEST FOR COMMENTS ON THE PROPOSED PROGRAM

The Bureau of Ocean Energy Management (BOEM) announced the availability of and requested comments on the 2017–2022 Outer Continental Shelf (OCS) Oil and Gas Leasing Proposed Program in the *Federal Register* (FR) on March 18, 2016 (81 FR14881). The Proposed Program was distributed to interested and affected parties, including Governors and Federal agency leaders, for a 90-day comment period. BOEM received approximately 1.83 million comments on the Proposed Program (see www.regulations.gov docket identification (ID) BOEM-2016-0003). Simultaneously, BOEM published the Notice of Availability (NOA) of the 2017–2022 OCS Oil and Gas Leasing Program Draft Programmatic Environmental Impact Statement (Programmatic EIS) (81 FR 14885), and approximately 75,000 comments on the draft Programmatic EIS were submitted (see www.regulations.gov docket ID BOEM-2016-0002). A summary of comments received on the Proposed Program is provided below.

A.2 SUMMARY OF COMMENTS RECEIVED

BOEM received approximately 1.83 million comments in response to the March 18, 2016, NOA of the Proposed Program. Comments were received from several different types of stakeholders (see Table A-1). Of the 22 coastal states, BOEM received 1 comment letter from a Governor (North Carolina) and 2 comments from state agencies (Alaska and Louisiana).

Several form letter campaigns and petitions stated support for the Proposed Program decision, while several were opposed. Each summary contains a Document ID. The Document ID refers to the comment submission's docket number in the Federal Government's online comment website, www.regulations.gov, where the full comment submission can be accessed.

Table A-1: Comment Letters Received by Commenter Type reports the number of comment letters received, number of signatories on the comment letters, and the number of organizations that co-signed comment letters. Table A-2: List of Commenters provides a list of organizations that submitted comment letters.

1

Table A-1: Comment Letters Received by Commenter Type

Commenter Type	Number of Letters Received	Number of Signatories on Letter	Number of Organizations that Co-signed Letter
Governors and State Agencies	3	-	-
Local Governments	6	-	-
Public Interest Groups	54	-	269
Federal Agencies	10	-	-
Energy Industry and Associations	23	-	36
Non-energy Industry and Associations	67	-	87
State-level Elected Officials	18	41	-
Members of Congress	5	176	-
Tribes and Tribal Organizations	5	-	-
General Public	464	-	-
Petitions	23	1,258,929	-
Form Letters	568,865	-	-

Note: In order to avoid double-counting, the numbers shown in bold font were summed to determine the total comments received, which was 1,828,891.

2

Table A-2: List of Commenters

Commenter Type	Organization
Governors and State Agencies	Alaska Department of Natural Resources
	Louisiana Department of Natural Resources
	North Carolina Governor
Local Governments	Alaska—North Slope Borough
	Alaska—Northwest Arctic Borough
	Louisiana—Greater Lafouche Port Commission
	Louisiana—Morgan City Harbor Terminal District
	Louisiana—Terrebonne Economic Development Authority
	Louisiana—Terrebonne Port Commission
Public Interest Groups	350.org for 79 organizations
	Alaska Eskimo Whaling Commission A
	Alaska Eskimo Whaling Commission B
	Alaska Wilderness League A
	Alaska Wilderness League B for 16 organizations
	Alaska Wilderness League C for 16 organizations
	Arctic Energy Center
	Center for Biological Diversity for 49 organizations
	Center for Biological Diversity
	Clean Ocean Action
	Consumer Energy Alliance A
	Consumer Energy Alliance B
	Consumer Energy Alliance—Texas
	Environment North Carolina for 48 organizations
	Florida Coastal and Ocean Coalition
	Greenpeace USA
	Gulf Economic Survival Team
	Industrial Energy Consumers of America
	Institute for Energy Research

Committer Type	Organization
Public Interest Groups (continued)	Institute for Policy Integrity, New York University School of Law
	Institute of the North
	Mississippi Energy Institute
	National Audubon Society for 5 organizations
	Natural Resources Defense Council
	The Nature Conservancy
	New Progressive Alliance
	Oceana A
	Oceana B
	Oceana C
	Oceana D
	Oceana E
	Oceana F
	Oceana G
	Oceana H
	Oceana I
	Oceana J
	OffshoreAlabama.com
	Oil Change International
	One Hundred Miles
	Our Children’s Trust for 7 organizations
	Resource Development Council
	Restore Mississippi Sound
	Sabin Center for Climate Change Law
	Sierra Club
	Sierra Club, Gulf Restoration Network, and Earthjustice
	Southern Alliance for Clean Energy A
	Southern Alliance for Clean Energy B
	Southern Environmental Law Center
	Steps Coalition
	Surfrider Foundation
	Surfrider Foundation, Outer Banks Chapter
	The Wilderness Society
Wildlife Conservation Society	
World Wildlife Fund	
Federal Agencies	Department of Defense
	Department of Energy
	Department of Homeland Security—United States Coast Guard
	Department of Justice
	Department of Transportation
	Environmental Protection Agency
	Marine Mammal Commission
	National Aeronautics and Space Administration
	National Oceanic and Atmospheric Administration
Energy Industry and Associations	American Petroleum Institute (API), National Ocean Industries Association (NOIA), Independent Petroleum Association of America (IPAA), United States Oil and Gas Association (USO&GA), International Association of Geophysical

Commenter Type	Organization
Energy Industry and Associations (continued)	Contractors (IAGC), Alaska Oil and Gas Association (AOGA)
	API, NOIA, IPAA, USO&GA, American Exploration and Production Council (AXPC), International Association of Drilling Contractors (IADC), Petroleum Equipment and Services Association (PESA), IAGC, AOGA
	Arena Offshore, LP
	ASRC Exploration, LLC
	Atwood Oceanics, Inc
	Calypso Exploration LLC
	Chevron U.S.A. Inc
	Cobalt International Energy, Inc
	ConocoPhillips
	ExxonMobil
	Fieldwood Energy LLC
	Louisiana Mid-Continent Oil and Gas Association
	Noble Drilling (U.S.) LLC
	Noble Energy, Inc
	Oceaneering
	Oceaneering International
	Offshore Operators Committee
	Ridgewood Energy Corporation
	Shell Exploration and Development Company
	Statoil (B. Moore)
	Statoil (VP, Exploration USA)
	Stone Energy Corporation
W&T Offshore, Inc.	
Non-energy Industry and Associations	Air Liquide America LP
	Alaska Coalition for 15 organizations
	Alaska Process Industry Careers Consortium
	Alaska Support Industry Alliance
	Alaska Trucking Association
	Alyeska Pipeline Service Company
	American Chemistry Council
	American Iron and Steel Institute
	American Real Estate
	Aries Marine Corporation
	Associated General Contractors of Alaska
	Baker Professional Services
	Bayou Industrial Group
	Bayou Region Real Estate
	Benoit Premium Threading, LLC
	Business Council of Alabama
	Cartridge World-Houma, LA
	Cheremie+Bruce Architects
	Chet Morrison Contractors, LLC
	Committee of 100 for Economic Development, Inc.
	Crosby Tugs, LLC

Commenter Type	Organization
Non-energy Industry and Associations (continued)	Davis Block & Concrete Company
	E3 Environmental, LLC
	Era Helicopters, LLC
	Fairbanks Chamber of Commerce
	Frank's International
	Gate, Inc.
	Graystar Pacific Seafood
	Greater Port Arthur Chamber of Commerce
	Greater Tomball Area Chamber of Commerce
	Grow Louisiana Coalition
	Hassell Wealth
	Houma-Terrebonne Chamber of Commerce
	Kiewit Offshore Services, LTD.
	LA 1 Coalition
	Laborers' Local 341
	Lafourche Chamber of Commerce
	Louisiana Association of Business and Industry
	Louisiana Oil Marketers and Convenience Store Association
	Lynden, Inc.
	Magnum Mud Equipment Company
	Manufacture Alabama
	Mississippi Manufacturers Association
	Mobile Area Chamber of Commerce
	National Association of Charterboat Operators
	National Association of Manufacturers
	Palmetto AgriBusiness Council
	Palmetto Promise Institute
	Ports Association of Louisiana
	Pride Welding Services
	Princess Anne Garden Club
	Reliable Renewables
	Resources Energy, Inc.,
	Saltchuk Resources Inc.
	SolstenXP, Inc.
	South Louisiana Economic Council
	Synergy Bank
	Texas Association of Business
	Texas Association of Manufacturers
	Texas Trucking Association
	Thoma-Sea Marine Constructors, LLC (three letters)
U.S. Chamber of Commerce Institute for 21 st Century Energy	
Virginia Manufacturers Association	
Virginia Trucking Association	
W.D. Scott Group, Inc	
Workforce Logistics, LLC	

Commenter Type	Organization
State-level Elected Officials	WorkSaver Employee Testing Systems & ISR Physical Therapy
	Alaska Senator John Coghill
	Alaska Senator Cathy Giessel
	Alaska Senators Kevin Meyer, John Coghill, Mike Chenault, and Charisse Millett
	Alaska Senator Lesil McGuire
	Louisiana Senator Glenn Koepp
	Louisiana Representative Beryl Amedee
	Louisiana Representative Alfred Speer
	Georgia Senator Rick Jeffares
	Georgia Representative Don Parsons
	North Carolina Representative Bob Steinburg
	South Carolina Senator Paul Campbell
	South Carolina Senator Danny Verdin
	South Carolina Representative Davey Hoitt
	South Carolina Representative Bill Sandifer
Members of Congress	Virginia Senator Richard Black
	Virginia Senator Frank Wagner
	Virginia Delegate Ben Cline
Members of Congress	Virginia Delegate William Howell for 21 elected officials
	Alaska Senator Murkowski, Senator Sullivan, and Congressman Young
	11 Senators: Jeffery A. Merkley (OR), Sheldon Whitehouse (RI), Brian Schatz (HI), Barbara Boxer (CA), Al Franken (MN), Bernard Sanders (VT), Richard Blumenthal (CT), Cory A. Booker (NJ), Benjamin L. Cardin (MD), Kirsten E. Gillibrand (NY), Robert Menendez (NJ)
Members of Congress	88 Members of Congress: Jared Huffman (CA), Donald S. Beyer Jr. (VA), Chris Van Hollen (MD), Ann McLane Kuster (NH), Matthew Cartwright (PA), Barbara Lee (CA), Doris Matsui (CA), Zoe Lofgren (CA), Corrine Brown (FL), Paul Tonko (NY), Mark Pocan (WI), Kathy Castor (FL), Mark DeSaulnie (CA), Eleanor Holmes Norton (DC), Steve Cohen (TN), Gerald E. Connolly (VA), Alan S. Lowenthal (CA), Bill Keating (MA), Ruben Gallego (AZ), John Garamendi (CA), Frederica S. Wilson (FL), Jose E. Serrano (NY), Robert C. “Bobby” Scott (VA), Mark Takano (CA), Donna F. Edwards (MD), Luis V. Gutierrez (IL), Chellie Pingree (ME), Yvette Diane Clarke (NY), Maxine Waters (CA), Keith M. Ellison (MN), John A. Yarmuth (KY), Bill Pascrell, Jr. (NJ), Steve Israel (NY), Ted Lieu (CA), Raul M. Grijalva (AZ), Jackie Speier (CA), Tony Cardenas (CA), Pete Aguilar (CA), Alan Grayson (FL), Michael M. Honda (CA), Bonnie Watson Coleman (NJ), Derek Kilmer (WA), James R. Langevin (RI), Patrick E. Murphy (FL), Mike Quigley (IL), Carolyn B. Maloney (NY), Scott Peters (CA), Beto O’Rourke (TX), Niki Tsongas (MA), Chaka Fattah (PA), Frank Pallone, Jr. (NJ), Jared Polis (CO), Peter F. Welch (VT), Lois Capps (CA), Betty McCollum (MN), Suzanne Bonamici (OR), John Delaney (MD), Janice D. Schakowsky (IL), Ted Deutch (FL), Lucille Roybal-Allard (CA), Nydia M. Velazquez (NY), Alma S. Adams (NC), Grace F. Napolitano (CA), Robert Dold (IL), Earl Blumenauer (OR), Donald W. Norcross (NJ), Judy Chu (CA), John Conyers, Jr. (MI), Joseph Crowley (NY), Peter A. DeFazio (OR), Lloyd Doggett (TX), Tammy Duckworth (IL), Anna G. Eshoo (CA), Sam Farr (CA), Brian Higgins (NY), Ron Kind (WI), Jerrold Nadler (NY), Charles B. Rangel (NY), Albio Sires (NJ), Louise M. Slaughter (NY), Ami Bera (CA), Brendan F. Boyle (PA), Emanuel Cleaver II (MO), Rosa L.

Commenter Type	Organization
Members of Congress (continued)	DeLauro (CT), Elizabeth Esty (CT), Jim McDermott (WA), Adam B. Schiff (CA), Debbie Wasserman Schultz (FL)
	51 Members of Congress: Frank Pallone, Jr. (NJ), Donald S. Beyer, Jr. (VA), Alan Lowenthal (CA), Gerald E. Connolly (VA), Eleanor Holmes Norton (DC), Katherine Clark (MA), Raul M. Grijalva (AZ), Corrine Brown (FL), Donald Norcross (NJ), Donna F. Edwards (MD), Chris Van Hollen (MD), G.K. Butterfield (NC), Lois Frankel (FL), Sam Farr (CA), Alan Grayson (FL), Alcee L. Hastings (FL), Bonnie Watson Coleman (NJ), Patrick E. Murphy (FL), John Carney (DE), Seth Moulton (MA), Paul D. Tonko (NY), Henry C. "Hank" Johnson (GA), Ted Deutch (FL), Jim Langevin (RI), Matt Cartwright (PA), Jared Huffman (CA), Kathy Castor (FL), Maxine Waters (CA), Barbara Lee (CA), Bill Pascrell, Jr. (NJ), Mark Pocan (WI), Jan Schakowsky (IL), Mike Quigley (IL), Niki Tsongas (MA), Scott Peters (CA), Robert C. "Bobby" Scott (VA), James P. McGovern (MA), Lois Capps (CA), Chaka Fattah (PA), David E. Price (NC), William R. Keating (MA), John Delaney (MD), Albio Sires (NJ), John B. Larson (CT), Elijah E. Cummings (MD), Debbie Wasserman Schultz (FL), Alma S. Adams (NC), Earl Blumenauer (OR), Gwen Graham (FL)
	23 Members of Congress: Richard Hudson (NC), Jeff Duncan (SC), Scott Rigell (VA), Rick Allen (GA), Earl "Buddy" Carter (GA), Doug Collins (GA), Renee Ellmers (NC), Virginia Foxx (NC), Tom Graves (GA), H. Morgan Griffith (VA), Jody Hice (GA), George Holding (NC), Patrick McHenry (NC), Mark Meadows (NC), Mick Mulvaney (SC), Robert Pittenger (NC), Tom Price, M.D. (GA), David Rouzer (NC), Austin Scott (GA), Mark Walker (NC), Lynn Westmoreland (GA), Joe Wilson (SC), Robert Wittman (VA)
Tribes and Tribal Organizations	Arctic Inupiat Offshore, LLC
	Arctic Slope Regional Corporation
	Inuit Arctic Business Alliance
	Kuukpik Corporation
	Native Village of Nuiqsut
General Public	See Section A.2.10 for a summary; individual commenters are not listed.
Petitions	350.org
	Alaska Wilderness League
	American Petroleum Institute
	Center for Biological Diversity
	Consumer Energy Alliance
	Daily Kos
	Earthjustice
	Environment America
	Environmental Action
	Greenpeace USA
	League of Conservation Voters
	Ocean Conservancy
	Oceana A
	Oceana B
	Oceana C
Oil Change International	
Pacific Environment	

Commenter Type	Organization
Petitions (continued)	Sierra Club
	Sierra Club – Virginia Chapter
	The Pew Charitable Trusts A
	The Pew Charitable Trusts B
	Wildlife Conservation Society
	World Wildlife Fund
Form Letters	Form Letter A
	Form Letter B
	Form Letter C
	Form Letter D
	Form Letter E
	Form Letter F
	Form Letter G
	Form Letter H
	Form Letter I
	Form Letter J
	Form Letter K
	Center for Biological Diversity
	Consumer Energy Alliance
	CREDO Action A
	CREDO Action B
	Gulf Restoration Network
	National Resources Defense Council
	The Wilderness Society
	Waterkeeper Alliance

1 **A.2.1 Governors and State Agencies**

2 **A.2.1.1 Alaska Region**

3 **Alaska Department of Natural Resources**

4 **Document ID: BOEM-2016-0003-0119**

5 The State continues to urge BOEM to hold more frequent and predictable sales under an area wide
 6 approach. The State encourages BOEM to avoid delaying offshore OCS leasing in the three Alaska
 7 planning areas since sufficient information is available from years of data gathering and traditional
 8 knowledge to relieve adverse impacts. The State reiterated their opposition to a regionally tailored,
 9 targeted leasing strategy, instead of an area-wide approach. This includes opposition to the removal of
 10 Environmentally Important Areas, as the State believes there are mechanisms already in place, such as
 11 Conflict Avoidance Agreements (CAAs), that mitigate potential impacts.

12 The State noted that with increased exploration of the state submerged lands in Cook Inlet and the
 13 Beaufort Sea, conducting more lease sales in the adjacent federal OCA lands of the Cook Inlet and
 14 Beaufort Sea would allow interested parties to consider exploratory programs to assess the resource
 15 prospectivity on both state and federal waters. States that the Chukchi Sea planning area is by far the
 16 most prospective of all Alaska OCS areas and that although the amount of exploration activity has been

1 limited due to a number of factors, the record high lease bonuses by one leaseholder provides evidence of
2 great potential. States that recent exploration efforts are the first in decades, and access is critical to
3 ensuring that this work is allowed to continue and that BOEM's analysis of the economic impact of OCS
4 production from the Beaufort and Chukchi seas fails to adequately account for the impact that production
5 will have on the economic value of North Slope production by allowing for substantially lower Trans-
6 Alaska Pipeline System (TAPS) tariffs.

7 **A.2.1.2 Gulf of Mexico Region**

8 **Louisiana Department of Natural Resources**

9 **Document ID: BOEM-2016-0003-0118**

10 The Louisiana Department of Natural Resources (DNR) strongly fully supports offshore oil and gas
11 exploration and development in the Gulf of Mexico (GOM). DNR states that conventional sources of
12 energy continue to be the most reliable and generally available means of meeting the nation's energy
13 needs, and Louisiana's citizens and industries play a prominent role in meeting those needs. Additionally,
14 DNR urges BOEM to accept the responsibility to identify and quantify the accumulating coastal impacts
15 of OCS lease sales to Louisiana, and make provisions for appropriate compensatory mitigation for
16 unavoidable adverse impacts.

17 **A.2.1.3 Atlantic Region**

18 **North Carolina Governor McCrory**

19 **Document ID: BOEM-2016-0003-2193**

20 The Governor expresses his disappointment in the removal of Atlantic Lease Sale 260 from the Proposed
21 Program decision. The Governor requests swift approval of remaining geological and geophysical
22 (G&G) permits for the Atlantic region in order to provide policy makers and industry more accurate
23 resource estimates with which they can make more informed decisions. The Governor cites a National
24 Science Foundation seismic survey conducted in 2014 as a demonstration that seismic surveying can be
25 done safely.

26 **A.2.2 Local Governments**

27 **A.2.2.1 Alaska Region**

28 **North Slope Borough**

29 **Document ID: BOEM-2016-0003-2479**

30 The North Slope Borough (NSB) supports resource development in the OCS and in federal waters in the
31 Beaufort and Chukchi Seas as it is the only viable economic generator in the region. The NSB supports
32 one lease sale each in the Beaufort and Chukchi Seas with adequate mitigation to protect subsistence
33 resources. NSB states that mitigation should be narrowly tailored and based on good scientific
34 information including local and traditional knowledge. The NSB is concerned with the Programmatic
35 EIS alternative that discusses Environmentally Important Areas as it essentially a No-Action Alternative
36 and would have deleterious impacts on the economic future of the people of the North Slope. The
37 Borough is supportive of time-based closures and supports the Alaska Eskimo Whaling Commission's
38 request that mitigation details be determined at the lease sale stage.

1 Northwest Arctic Borough**2 Document ID: BOEM-2016-0003-2301**

3 The Northwest Arctic Borough strongly urges BOEM retain the Arctic in the five-year plan because the
4 undeveloped resources of the Arctic OCS offer a significant and unparalleled opportunity to expand
5 economic security for the community and others and can be developed in conjunction with their lifestyle.
6 States that failure to take advantage of this opportunity will leave Alaskans with severe and potentially
7 irreversible economic uncertainty.

8 A.2.2.2 Gulf of Mexico Region**9 Greater Lafourche Port Commission****10 Document ID: BOEM-2016-0003-0417**

11 The Greater Lafourche Port Commission, the busiest port servicing the oil and gas industry in the GOM,
12 supports a continued robust OCS leasing program. States that the offshore oil and gas industry is an
13 integral part of Louisiana's economy and society and its coastal environmental restoration efforts are
14 dependent on continued leasing, exploration and production.

15 Morgan City Harbor Terminal District**16 Document ID: BOEM-2016-0003-2292**

17 The Morgan City Harbor Terminal District supports a robust OCS leasing program in the GOM because
18 the offshore oil and gas industry is an integral part of Louisiana's economy, our society and our coastal
19 restoration efforts. States that Louisiana has demonstrated firsthand how to balance the development of
20 our Nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife
21 industry. The District respectfully requests that BOEM continue to provide leasing opportunities in the
22 GOM as well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

23 Terrebonne Economic Development Authority**24 Document ID: BOEM-2016-0003-2076**

25 The Terrebonne Economic Development Authority urges BOEM to finalize a 2017–2022 Program and
26 Programmatic EIS that includes the GOM without further exclusions or restrictions. States that continued
27 and expanded access to all areas of the GOM will increase these economic gains for Gulf Coast residents
28 and businesses and ensure that the Gulf Coast continues to supply American consumers across the
29 country with reliable crude oil, petroleum products, and natural gas.

30 Terrebonne Port Commission**31 Document ID: BOEM-2016-0003-2199**

32 The commenter states that it supports a robust OCS leasing program in the GOM because the offshore oil
33 and gas industry is an integral part of Louisiana's economy, our society and our coastal restoration efforts.
34 States that Louisiana has demonstrated firsthand how to balance the development of our Nation's oil and
35 gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry. The
36 Commission respectfully requests that BOEM continue to provide leasing opportunities in the GOM as
37 well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

A.2.3 Public Interest Groups

350.org for 79 organizations

Document ID: BOEM-2016-0003-2456

The commenters argue all offshore oil and gas lease sales in the GOM, the Arctic, and Cook Inlet should be removed from the Proposed Program. Oil and gas development in these regions is inconsistent with President Obama's commitment to combat climate change. The commenter states that through these changes, the U.S. can be a climate leader and live up to its international promises.

Alaska Eskimo Whaling Commission A

Document ID: BOEM-2016-0003-0121

The commenter expresses support for BOEM's ongoing efforts related to its Proposed Program but encourages the Open Water Season CAA process to be considered in the decision-making process in order to balance economic development, habitat protection, and cultural values. The commenter also encourages BOEM to consider environmental justice issues within its analysis, as oil and gas activities will disproportionately impact Alaskan Native populations.

Alaska Eskimo Whaling Commission B

Document ID: BOEM-2016-0003-2466

The commenter expresses support for including lease sales in the Beaufort and Chukchi Seas and the continued consideration of the Open Water Season CAA process to help with decision-making and mitigation of the Program impacts on habitats and cultural values while also encouraging economic development. The commenter also urges BOEM to fully consider all aspects of the program that would impact environmental justice concerns of Alaskan Native populations.

Alaska Wilderness League A

Document ID: BOEM-2016-0003-2406

The commenter urges BOEM to remove the Arctic from all lease sales in the Proposed Program. The commenter appreciates BOEM recognizing certain Environmentally Important Areas but suggests BOEM expand them based on the best available science.

Alaska Wilderness League B for 16 organizations

Document ID: BOEM-2016-0003-2412

The commenter submitted a letter signed by 16 organizations describing the importance of protecting the Beaufort Sea, citing oil spills, pollution, polar bears and other terrestrial mammals, the scenic and aesthetic qualities, noise, air pollution, and industrial infrastructure as reasons to exclude the Beaufort Sea from oil and gas leasing.

Alaska Wilderness League C for 16 organizations

Document ID: BOEM-2016-0003-2596

The commenter submitted a letter signed by 16 organizations supporting the Administration's decision to remove the Atlantic lease sale. The commenters urge the Administration to reexamine oil and gas development in the Arctic, citing climate change, safety, and oil spills. The commenters assert that BOEM's assessment of the costs and benefits of the Program is flawed, stating that the climate context improperly skews the analysis in favor of leasing; the quantification of only six narrow costs obscures the

true risks and costs; BOEM arbitrarily omits greenhouse gas (GHG) emissions from the environmental and social costs analysis; omits the impacts of non-GHG pollution from consumption of oil and gas from the Program; omits catastrophic oil spills from the cost calculation; use of the Offshore Environmental Cost Model improperly understates the costs of drilling in the Arctic; BOEM overstates the economic value of including the Arctic in the Program; BOEM's consideration of the section 18 factors is flawed; and the assessment of fair market value is flawed.

Arctic Energy Center**Document ID: BOEM-2016-0003-2364**

The commenter supports the Proposed Program and the retention of two Arctic leasing areas when the Program is finalized. The commenter states that as the Arctic becomes more navigable due to changing physical and geographic environments, the U.S. should maintain a presence in the Arctic in order to stay competitive with foreign nations and to positively influence all developments in the region.

Center for Biological Diversity for 49 organizations**Document ID: BOEM-2016-0003-0173**

The commenters request that BOEM withdraw all unleased lands of the OCS, at least until atmospheric carbon dioxide (CO₂) levels are stable enough to limit the average global temperature rise above that of pre-industrial times in accordance with the Paris Agreement.

Center for Biological Diversity**Document ID: BOEM-2016-003-2471**

The commenter urges BOEM to halt all lease sales in the GOM, Arctic, and Cook Inlet, as they will deepen the climate crisis and contradict President Obama's commitment to combat climate change. Though the commenter admits that removing the Atlantic from the Proposed Program was a step in the right direction, it is not enough. The commenter argues BOEM omitted vital information from the Proposed Program, such as balancing environmental sensitivity and other factors in planning areas, as well as outlining precise leasing areas. States that BOEM also failed to properly analyze national energy needs and GHG emission impacts.

Clean Ocean Action**Document ID: BOEM-2016-0003-2467**

The commenter approves and commends BOEM's decision to remove the Atlantic from the Proposed Program. However, it is strongly opposes permitting G&G activities related to oil and gas production in the Atlantic Ocean. The commenter argues BOEM should halt the processing of all environmental permitting documents for these activities. The commenter also urges BOEM to remove all new lease sales in the GOM, Arctic Ocean, and Cook Inlet from the Proposed Program.

Consumer Energy Alliance A**Document ID: BOEM-2016-0003-2177**

The commenter submitted a resolution from the Louisiana House of Representatives that argues it is in the best interest of the State of Louisiana to maintain all leases in the GOM. The commenter also argues energy development in Louisiana contributes to state and federal revenue, and is therefore vital to the economic well-being of not only the Gulf Coast region, but the entire nation. Further, the commenter states that the nation's energy policy relies on oil and gas development in the GOM.

Consumer Energy Alliance B**Document ID: BOEM-2016-0003-2176**

The commenter submitted a resolution from the Louisiana State Senate that urges BOEM to include region-wide leasing in the GOM in the Proposed Program without any further exclusions or restrictions. The Louisiana oil and gas industry supports offshore drilling practices as the state is ranked number two in natural gas production and number five in oil production.

Consumer Energy Alliance - Texas**Document ID: BOEM 2016-0003-0070**

The commenter supports BOEM's Proposed Program but urges the Department to take an "all of the above" approach to energy policy by including valuable offshore opportunities in the GOM as well as Alaska without any further restrictions. The commenter argues it is the Country's duty to provide affordable electricity to all Americans while protecting the environment.

Environment North Carolina for 48 organizations**Document ID: BOEM-2016-0003-0134**

The commenters support BOEM's decision to remove the Mid- and South Atlantic regions from the Proposed Program as it environmentally benefits the Southeast United States coast in multiple ways.

Florida Coastal and Ocean Coalition**Document ID: BOEM-2016-0003-0423**

The commenter supports BOEM's decision to remove the Atlantic from leasing agreements in the Proposed Program, but requests that BOEM retract the Record of Decisions for the environmental review of proposed G&G for the Atlantic Continental Shelf. States that seismic airgun testing has widespread impacts on marine fish and mammal populations and that offshore oil and gas development are also incompatible with Florida's coastline. The commenter advises BOEM to prepare a new environmental review of proposed G&G activities in the Mid- and South Atlantic.

Greenpeace USA**Document ID: BOEM-2016-0003-2294**

The commenter requests BOEM remove the Arctic Ocean and GOM leasing from the Proposed Program. The commenter advises President Obama to include climate change costs in BOEM's assessment of environmental impacts of its Proposed Program.

Gulf Economic Survival Team**Document ID: BOEM-2016-0003-2451**

The commenter requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM. The commenter cites the offshore oil and gas industry's positive economic impact for the region and nation, as well as the ability of the region to balance energy development while maintaining a robust hunting, fishing, and wildlife industry.

Industrial Energy Consumers of America**Document ID: BOEM-2016-0003-1553**

The commenter urges BOEM not to exclude the Atlantic lease (Sale 260) from the Leasing Program. The commenter states that the reason for exclusion, conflicts with military and NASA operations, is not rational given the decades of leasing in the region that have not resulted in conflict. Further, the

commenter states that projected volume of recoverable oil and gas in the OCS will be vital to the nation's energy future.

Institute for Energy Research

Document ID: BOEM-2016-0003-2490

The commenter states that the Proposed Plan is inadequate to meet the Nation's needs and fails to meet the intent of OCS Lands Act, that the OCS be made available for expeditious and orderly development. The commenter states that exclusion of the Atlantic sale leaves the concentration of the Leasing Program on the Arctic and the GOM, the most hurricane-prone region of the country. Further, the commenter references projected economic benefits of opening federal lands to the Leasing Program.

Institute for Policy Integrity, NYU School of Law

Document ID: BOEM-2016-0003-2473

The commenter commends BOEM's progress in addressing environmental, economic, and social uncertainty in the Proposed Program, but recommends that BOEM strengthen its analysis with OCS Lands Act's mandate to balance economic, environmental, and social values in Section 18(a). Recommendations consist of including the cost of the downstream GHG emissions in its net benefits calculations, further analyzing a "no action" option with proper modeling, and continuing to analyze option values.

Institute of the North

Document ID: BOEM-2016-0002-0078

The commenter supports the Proposed Program and submitted a case study reflecting the economic and resource gains that offshore development can offer a remote community in the Arctic region, such as Hammerfest, Norway. The commenter states that this is a time when the U.S. must remain competitive in offshore development while also protecting the environment.

Mississippi Energy Institute

Document ID: BOEM-2016-0003-0105

The commenter urges BOEM to finalize a 2017–2022 leasing program and Programmatic EIS that includes the GOM without any further exclusions or restrictions, stating that the experience in the GOM demonstrates the significance of offshore energy development to the Gulf Coast states and coastal communities. The commenter states that a sensible energy policy must include the Gulf's offshore resources to ensure access to affordable, reliable domestic energy for years to come.

National Audubon Society, Oceana, Ocean Conservancy, The Pew Charitable Trusts, and World Wildlife Fund

Document ID: BOEM-2016-0003-0174

The commenters support BOEM's withdrawal of 10 million acres in the Chukchi and Beaufort seas, but requests that BOEM remove all Arctic regions from the Proposed Program, as well as all Environmentally Important Areas. Further, the commenter recommends consultation with local communities.

Natural Resources Defense Council

Document ID: BOEM-2016-0003-2447

The commenter argues the Proposed Program does not meet the requirements of the OCS Lands Act, specifically Section 18(a). According to the commenter, the Proposed Program does not comply with

Section 18(a) because it fails to consider relevant climate and energy policy information. The commenter approves of BOEM's decision to remove the Atlantic Ocean from the Proposed Program but urges BOEM to withdraw oil and gas development completely from the Atlantic and Arctic Oceans, include no new OCS leasing in the GOM, and draft scenarios that comply with national and international climate policy.

The Nature Conservancy**Document ID: BOEM-2016-0002-0239**

The commenter supports the Department of the Interior's (USDOJ) decision to exclude the Mid- and South Atlantic regions from the Proposed Program and implement a landscape-based approach for mitigation. The commentator states that despite these positives, BOEM should lay out in greater detail plans to implement a landscape-scale strategy to its oil and gas activities on the OCS so as to minimize environmental impact and eliminate gaps in data.

New Progressive Alliance**Document ID: BOEM-2016-0003-2305**

The commenter asserts BOEM should stop all seismic blasting, place a moratorium on offshore drilling in the Atlantic Ocean, phase out leasing in the GOM, and eventually cease all drilling in the Arctic and the GOM and stated that these steps will comply with the Paris Agreement as well as minimize global warming.

Oceana A**Document ID: BOEM-2016-0003-2538**

The commenter listed eight municipalities and business interests from New Jersey that formally oppose offshore drilling and/or exploration. The commenter supports BOEM's decision to remove the Atlantic Ocean Planning Area from the Proposed Program. However, the commenter opposes oil and gas exploration in the Atlantic Ocean, such as seismic airgun blasting,

Oceana B**Document ID: BOEM-2016-0003-2541**

The commenter presented multiple municipalities, civic leagues, conservation groups, fishing and business interests in Virginia that formally oppose offshore drilling and/or express concern regarding G&G activities.

Oceana C**Document ID: BOEM-2016-0003-2542**

The commenter listed four municipalities, businesses, and fishing interests in Maryland that formally oppose offshore drilling and/or exploration. The commenter supports BOEM's decision to remove the Atlantic Ocean region from the Proposed Program. However, the commenter opposes oil and gas exploration in the Atlantic Ocean, such as seismic airgun blasting.

Oceana D**Document ID: BOEM-2016-0003-2543**

The commenter listed 7 municipalities, businesses, and 36 commercial and recreational fishing interests in Delaware, representing 100 percent of Delaware's coastal communities, which formally oppose offshore drilling and/or exploration. The commenter supports BOEM's decision to remove the Atlantic

Region from the Proposed Program. However, the commenter opposes oil and gas exploration in the Atlantic Ocean, such as seismic airgun blasting.

Oceana E**Document ID: BOEM-2016-0003-2448**

The commenter listed 30 municipalities in Florida that support of BOEM's decision to remove the Atlantic Ocean Program Area from the Proposed Program but urges BOEM to prevent oil and gas exploration including seismic airgun blasting along the Atlantic Coast.

Oceana F**Document ID: BOEM-2016-0003-0156**

The commenter supports BOEM's decision to remove the Mid- and South Atlantic regions from the Proposed Program as it will spur clean energy development and protect the ocean's wildlife. The commenter mentions that a potential disaster such as the Deepwater Horizon oil spill of 2010 would devastate the tourism and fishing industries and thus the economies of the east coast.

Oceana G**Document ID: BOEM-2016-0003-2387**

The commenter requests that BOEM remove the Beaufort and Chukchi seas from the Proposed Program. The commenter points to past sales in the Arctic Ocean resulting in relinquished leases and no production. The commenter argues that, like these past sales, production is overwhelmingly unlikely in the Beaufort and Chukchi seas, and suggests BOEM move away from past failed policies.

Oceana H**Document ID: BOEM-2016-0003-2537**

The commenter provided 32 resolutions from municipalities in North Carolina opposing offshore drilling and/or exploration. The commenter supports BOEM's decision to remove the Atlantic Ocean Planning Area from the Proposed Program.

Oceana I**Document ID: BOEM-2016-0003-2539**

The commenter listed five municipalities and fishing interests in Georgia that formally oppose offshore drilling and/or exploration. The commenter supports BOEM's decision to remove the Atlantic Ocean Planning Area from the Proposed Program. However, the commenter opposes oil and gas exploration in the Atlantic such as seismic airgun blasting.

Oceana J**Document ID: BOEM-2016-0003-2540**

The commenter listed 23 municipalities in South Carolina, representing 100 percent of South Carolina's coastal communities, which formally oppose offshore drilling and/or exploration. The commenter supports BOEM's decision to remove the Atlantic Ocean Planning Area from the Proposed Program. However, the commenter opposes oil and gas exploration in the Atlantic such as seismic airgun blasting.

OffshoreAlabama.com**Document ID: BOEM-2016-0003-0218**

The commenter urges BOEM to finalize the Proposed Program without any further exclusions and restrictions to the GOM. Commenter argues that Alabama will directly benefit economically from offshore development in the Gulf, as will the rest of the U.S.

Oil Change International**Document ID: BOEM-2016-0003-2459**

The commenter urges BOEM to reassess its GHG emissions impact analysis as it does not take into account the potential decreases in demand for oil and gas with new national and international climate policy. According to the commenter, BOEM uses a Reference Case with outcomes that run counter to the government's goals for climate policy. The commenter also argues the full and true cost of oil and gas development in the OCS, including subsidies, should be considered in the economic value of the draft.

One Hundred Miles**Document ID: BOEM-2016-0003-2367**

The commenter supports BOEM's decisions to remove the Atlantic Ocean Planning Area from the Proposed Program, especially Georgia and the South Atlantic, but encourages the Bureau to reevaluate its decision to process permits for G&G oil and gas surveys in the Atlantic. Subsequently, new and relevant information has been published since the Programmatic EIS and the commenter urges BOEM to cease permitting until this information can be incorporated into the process. Considerations include military operations, wildlife, and ecologically and historically significant areas.

Our Children's Trust, TRUST Campaign, Earth Guardians, Youth Climate Action Now, WITNESS, 350 Eugene, and Plant for the Planet**Document ID: BOEM-2016-0003-2547**

The commenter argues BOEM should not approve the Proposed Program as it poses significant threats to human health, safety and welfare and contributes to catastrophic and irreversible environmental impacts.

Resource Development Council**Document ID: BOEM-2016-0003-0096**

The commenter urges BOEM to finalize the Proposed Program without any further exclusions or restrictions to the Alaska region, especially in the Chukchi and Beaufort seas as well as Cook Inlet. The commenter argues close cooperation, communication, and new technologies can restrict impacts on subsistence activity, resources, and the environment.

Restore Mississippi Sound**Document ID: BOEM-2016-0003-2462**

The commenter is against oil and gas leasing in the GOM for two reasons. First, soliciting public comments along the Gulf Coast does not conform to federal guidance, specifically Executive Order 12579. Second, there is no need for more oil production in the U.S.

Sabin Center for Climate Change Law**Document ID: BOEM-2016-0002-0227**

The commenter supports the Administration's effort to expand and diversify energy resources, but notes that expanded oil and gas lease sales run counter to national and international efforts to combat climate

change, and that USDOJ failed to accurately account for potential GHG emissions and impacts, both direct and indirect. The commenter suggests USDOJ carefully revise its environmental impact analysis of expanded oil and gas leasing.

Sierra Club**Document ID: BOEM-2016-0003-2465**

The commenter approves BOEM's decision to remove the Atlantic Region from the Proposed Program, but does not support any new leases in the OCS. The commenter argues offshore oil and gas development is not compatible with the Administration's climate goals and will complicate the country's ability to meet goals decided in the Paris Agreement. The commenter urges BOEM to draft a "no action" alternative, especially considering gas and oil market projections demonstrate new sources are unnecessary.

Sierra Club, Gulf Restoration Network, and Earthjustice**Document ID: BOEM-2016-0003-2484**

The commenters support the exclusion of the Atlantic Ocean Program Area from the Proposed Program. However, the commenters urge BOEM to exclude ten additional lease areas in the GOM from the Program. The commenters argue that including these areas undermines the administration's progress in combatting climate change. Furthermore, the commenters argue BOEM's cost benefit analysis of the program is flawed. For example, BOEM omits catastrophic oil spill costs from its analysis.

Southern Alliance for Clean Energy A**Document ID: BOEM-2016-0003-1552**

The commenter supports BOEM's decision to remove the Atlantic Ocean Program Area from the Proposed Program. The Atlantic Coast has developed industries, character, and livelihoods incompatible with offshore drilling. The commenter advises the administration to focus on clean, renewable energy developments instead.

Southern Alliance for Clean Energy B**Document ID: BOEM-2016-0003-1554**

The commenter supports BOEM's decision to remove the Atlantic lease sale from the OCS Leasing Program. The commenter thanks the administration and the USDOJ for taking input from residents and businesses of the Mid- and South Atlantic coasts, who are largely dependent on a tourism-driven economy, into consideration.

Southern Environmental Law Center**Document ID: BOEM-2016-0003-2454**

The commenter supports BOEM's removal of the Atlantic Ocean Program Area from the Proposed Program based on strong coastal opposition, potential conflicts with military operations and commercial uses of the ocean, and current market conditions.

Steps Coalition**Document ID: BOEM-2016-0003-2404**

The commenter urges BOEM to remove all oil and gas lease sales in the GOM from the Proposed Program. The commenter states hidden economic impacts, environmental justice impacts, and climate

change as reasons to cease all lease sales. The commenter argues the proposed plan also denies inhabitants of the Gulf the opportunity to benefit from growing the renewable energy economy.

Surfrider Foundation

Document ID: BOEM-2016-0003-0203

The commenter supports BOEM’s decision to remove Atlantic lease sales from the Proposed Program, but rejects BOEM’s conclusions that Atlantic lease sales can commence in 2022 when issues are resolved. Offshore drilling does not belong in the Atlantic Ocean. The commenter also opposes additional lease sales in Alaska. The commenter advises BOEM to focus on alternative energy sources that can meet the energy needs of the U.S. without requiring offshore drilling.

Surfrider Foundation, Outer Banks Chapter

Document ID: BOEM-2016-0003-2374

The commenter urges BOEM to cease all seismic testing in the Atlantic Region. The commenter argues seismic testing is unnecessary because east coast inhabitants oppose offshore developments. Furthermore, seismic testing causes unnecessary ecological and economic risks.

The Wilderness Society

Document ID: BOEM-2016-0003-2474

The commenter argues there should be no Arctic lease sales in the Proposed Program. The commenter cited issues with the Proposed Program including inadequate analysis of oil spill risks in the Arctic region; disregard for protecting important offshore resources; implausible results of the Environmental and Social Cost Analysis in the Arctic Ocean; and failure to incorporate the impact of climate change on likely energy use.

Wildlife Conservation Society

Document ID: BOEM-2016-0003-2441

The commenter supports BOEM’s decision to remove the Mid- and South Atlantic Program Area from the Proposed Program. The commenter stated concern about proposed permitting for seismic surveys in the Atlantic despite its exclusion from leasing, stating that seismic testing endangers marine wildlife. The commenter also suggests that BOEM revisit its decision to include the Beaufort and Chukchi seas in its Proposed Program. The commenter expresses concern that BOEM did not rely on the best available science when determining the environmental impacts of its Proposed Program.

World Wildlife Fund

Document ID: BOEM-2016-0003-2482

The commenter identified multiple reasons why Arctic OCS Planning Areas should be excluded from the 2017–2022 Leasing Program. The reasons provided include the high risk of major oil spills; protection of special and unique areas of the Arctic OCS by the USDOJ; inconsistency of oil and gas activities in the Arctic with the Paris Agreement as well as the U.S.-Canada Joint Statement on Climate, Energy and Climate Leadership; and finally, waning interest from industry in the Arctic.

A.2.4 Federal Agencies

Department of Defense

Document ID: BOEM-2016-0003-2048

The Department of Defense (DOD) fully supports the development of energy resources in a manner compatible with military operations, readiness, and the safety of military personnel and the public. The commenter states that DOD supports further analysis of the established uses of the OCS prior to proposing a lease sale in the Mid- and South Atlantic Program Area and will continue to work collaboratively with USDOJ, BOEM, and other stakeholders. The commenter states that DOD is prepared to provide additional information and continue its close cooperation on offshore energy development.

Department of Energy

Document ID: BOEM-2016-0003-2493

The Department of Energy (DOE) supports the Proposed Program, including the decision to update the lease sale structure in the GOM to offer region-wide sales. The commenter states that DOE supports leasing of selected high-potential resource areas in the Beaufort Sea, Cook Inlet, and Chukchi Sea Program Areas, subject to the adoption of appropriate safety and environmental protections. The commenter states that DOE also supports the proposal to hold the Alaska lease sales later in the Program, and encourages BOEM to acknowledge analyses involving the energy security, economic impact, and energy systems strategic value of TAPS to ensure continued operations in the coming decades.

Department of Homeland Security—United States Coast Guard

Document ID: BOEM-2016-0003-2553

The Department of Homeland Security's United States Coast Guard stated that they have no specific comments on the Proposed Program at this time.

Department of Justice

Document ID: BOEM-2016-0003-0206

The Department of Justice, in consultation with the Federal Trade Commission, determined that the Proposed Program is unlikely to have an adverse impact on competition.

Department of Transportation

Document ID: BOEM-2016-0003-2501

The Department of Transportation (DOT) did not provide specific comments on the Proposed Program, but did state that USDOJ and DOT's mutual interest in the adequacy and availability of transportation infrastructure in regions where exploration and production are taking place is fundamental to meeting our national energy needs.

Environmental Protection Agency

Document ID: BOEM-2016-0003-0236

The Environmental Protection Agency comments focused on the draft Programmatic EIS; there were no comments on Proposed Program.

Marine Mammal Commission**Document ID: BOEM-2016-0003-2166**

The Marine Mammal Commission (MMC) recommends excluding lease sales in Cook Inlet due to potential impacts on the Cook Inlet beluga whale and northern sea otters, or exclusion of areas that overlap with these species' critical habitat. The commenter states that MMC recommends excluding lease sales in the Arctic, or excluding the Environmentally Important Areas from leasing. The commenter states that MMC recommends exclusions of an expanded 35 nautical mile coastal buffer zone off Kasegaluk Lagoon and Point Hope.

National Aeronautics and Space Administration**Document ID: Not posted on regulations.gov**

The National Aeronautics and Space Administration (NASA) provided a "no comments" letter upon review of the Proposed Program document and draft Programmatic EIS and removal of the Atlantic Program Area lease sale. However, BOEM did receive information from NASA on potential impacts to the Poker Flat Research Range (PFRR) from oil and gas activities in the Beaufort Sea via its role as a cooperating agency on the Programmatic EIS. NASA notes that several key factors render the potential for conflict low because the vast majority of sounding rocket launches from PFRR occur during the winter months, a time at which most oil and gas exploration and construction activities would not occur; and it would be highly unlikely that any air- or land-based recovery operations would occur for items jettisoned into the OCS. Therefore, NASA recovery operations, regardless of season, would not likely have spatial overlap with oil and gas activities. Finally, given the relatively low density of oil and gas structures envisioned under the Proposed Program, the near shore location (i.e., on the continental shelf) of the oil and gas activities, and the typical distances from the coast at which jettisoned sounding rocket items land in the Beaufort Sea (planned impact points are generally 300 km offshore), there would only be a very small overlap between the potential leasing areas and rocket dispersions, resulting in a very low probability for interaction. NASA concluded that it will continue to monitor oil and gas activity in the Beaufort Sea, and will coordinate with BOEM to assess (and mitigate, as necessary) the potential space-use conflicts at more action-specific stages of planning (e.g., the leasing stage).

National Oceanic and Atmospheric Administration**Document ID: BOEM-2016-0003-2548**

The National Oceanic and Atmospheric Administration (NOAA) recommends reducing or eliminating oil and gas activities within the range of the Cook Inlet Beluga whale, an expanded shoreline buffer to 60 miles in the Chukchi Sea, and seasonal closures in the Beaufort Sea. The commenter states that NOAA recommends specific exclusions for sensitive areas, or, at a minimum, potential interagency consultation pursuant to the National Marine Sanctuaries Act section 304(d).

National Park Service**Document ID: Not posted on regulations.gov**

The National Park Service (NPS) submitted a comment letter to BOEM via its role as a cooperating agency on the Programmatic EIS. NPS states that Gulf Islands National Seashore is a national treasure that warrants stronger protective measures under BOEM's planning process, and expresses concern that oil and gas leasing could occur as close as 3 miles offshore. NPS requests that a 15-mile no-leasing buffer be included as a Program option.

A.2.5 Energy Industry and Associations

API, NOIA, IPAA, USO&GA, IAGC, AOGA

Document ID: BOEM-22016-0003-0186

The American Petroleum Institute (API), National Ocean Industries Association (NOIA), Independent Petroleum Association of America (IPAA), U.S. Oil and Gas Association (USOGA), International Association of Geophysical Contractors (IAGC), Alaska Oil and Gas Association (AOGA) submitted comments primarily on the Draft Programmatic EIS, but stated their support of continued sales in the GOM and Alaska and suggested that removal of the Atlantic be reconsidered. While recognizing that doing a Programmatic EIS is discretionary and some of the information is used for section 18 factor analysis, the commenters do not think that the National Environmental Policy Act (NEPA) analysis supports the decisions, particularly as the Proposed Program decision was made prior to the Draft Programmatic EIS comment period. They question the lack of a range of alternatives in the Draft Programmatic EIS as a framework for accomplishing the OCS Lands Act goals, particularly “expeditious development of OCS resources.” They support continued sales in the GOM and in Alaska without further restrictions. They disagree that the Alaska sales need to be held in later years in order to gather more information as that disregards the sheer volume of scientific research that has been undertaken in the region. They also state that local uses (such as subsistence) can coexist with oil and gas activities using the stipulations and mitigations already in place. They disagree with the removal of the Atlantic area as such is not supported by the NEPA analysis, particularly before the Draft Programmatic EIS comment period. They believe BOEM should reconsider the Proposed Program decision after the draft Programmatic EIS comment period.

API, NOIA, IPAA, USO&GA, AXPC, IADC, IAGC, PESA, AOGA

Document ID: BOEM-2016-0003-2045

API, NOIA, IPAA, USOGA, American Exploration & Production Council (AXPC), International Association of Drilling Contractors (IADC), IAGC, Petroleum Equipment and Services Association (PESA), and AOGA fully support keeping the Proposed Program as-is with no additional areas being removed from future leasing consideration. Considerable acreage has already been excluded in previous stages of the planning process, especially in the Atlantic, Eastern GOM, and Alaska OCS. The decisions made regarding what areas are available for leasing will have long term implication for our Nation’s energy security, prospects for job creation, and government revenue generation.

The commenters stated that they do not understand the decision to remove the Atlantic given the hundreds of thousands of public comments in support, the bipartisan support in the coastal states, and the DOD report indicating that only 5 percent of the area should be off limits to oil and gas. They also state that the decision is in conflict with the statutory requirement to weigh risks and benefits. They also say that inclusion in a revenue sharing program does not guarantee revenue, it merely provides pathways to revenue should a successful leasing and exploration/production program ensue in the given area. To use the current lack of revenue sharing as a reason for not holding an Atlantic lease sale is disingenuous and preempts the legislative process. If the revenue sharing decision is outside the control of the Secretary’s authority, then it should not be used as a reason to remove a lease sale. If the same logic were applied throughout the history of five-year program development, there would have been no offshore leasing outside of 8(g) areas until after 2006 when GOM revenue sharing was signed into law. Also citing current market prices as a reason to not schedule a sale is contradicted by the Proposed Program analysis

including use of hurdle pricing to determine whether to hold a sale. The Proposed Program decision document itself says that there is no reason to exclude any of the proposed program areas in the Proposed Program Options based purely on the price of oil and gas. The commenters also question fact that there are possible conflicts with other ocean users when multiple uses have evolved in the GOM and Alaska.

Arena Offshore, LP**Document ID: BOEM-2016-0003-2108**

Arena Offshore, an independent operator in the GOM, strongly urges BOEM to maintain all GOM lease sales without further restriction. Energy development, conservation efforts and other industries, be it tourism, fishing or military operations, have coexisted and thrived for decades so there is no justification for reducing the number of sales or sale areas in the GOM. Arena also urges that Alaska sales be maintained with further restrictions and is disappointed in the removal of the Atlantic and the potential it represents.

ASRC Exploration, LLC**Document ID: BOEM-2016-0003-2480**

ASRC Exploration (AEX), a subsidiary of the Arctic Slope Regional Corporation (ASRC), believes that energy development onshore and offshore can proceed safely while protecting the arctic environment and subsistence culture. AEX supports the Arctic sales and is concerned about the impact of the area and its economy if any are delayed or cancelled as with the sales in the 2007–2012 and 2012–2017 (current) programs. BOEM must provide a predictable and reasonable program that supports safe and responsible development. AEX supports moving the Beaufort Sale to 2019 and holding the Chukchi sale without further exclusions.

Atwood Oceanics, Inc**Document ID: BOEM-2016-0003-0229**

Atwood Oceanics, Inc, a drilling contractor currently operating two deepwater rigs in the GOM, requests that GOM and Alaska sales be maintained without further restrictions and is disappointed in the exclusion of the Atlantic lease sale. The commenter states that the offshore industry has been active in the GOM since the 1950s and has coexisted with many activities including tourism, fishing, and military training. The DOD and USDOJ have operated under a successful Memorandum of Agreement in the GOM for over 30 years. Delaying and/or further restricting the Alaska sales could cause the country to miss out on a valuable resource as other Arctic nations move forward. The commenter disagrees with the reasons given for excluding the Atlantic—DOD activities have and can coexist; citing low prices denies the cyclicity and volatility of prices and the long lead times needed to explore and produce; and allegations of strong local opposition and lack of adequate infrastructure can be refuted by the facts.

Calypso Exploration LLC**Document ID: BOEM-2016-0003-2527**

Calypso Exploration LLC, owner of over 80 leases in the GOM, supports the Proposed Program's 13 sales tailored to each OCS region without any further reductions, but is disappointed in the removal of the Atlantic. Calypso supports the 10 region-wide sales in the GOM but is concerned about the expansion of the Flower Garden area. Instead of removing these areas from leasing consideration, the commenter prefers leasing with surface limitations. Calypso supports the three sales in Alaska. In general the commenter requests that OCS areas not be eliminated because of perceived use conflicts. Certain

portions of the OCS are actively being used by multiple entities, including commercial fishing, state oil and gas activities, military activities, tourism, commercial shipping and transport, coastal recreation (including recreational fishing and diving), subsistence use, renewable energy leasing and non-energy marine minerals activities.

Chevron U.S.A. Inc

Document ID: BOEM-2016-0003-0419

Chevron believes that a comprehensive offshore oil and gas program is a critical component to the Administration's domestic energy strategy and that oil and gas will continue to remain the largest component of the U.S. energy mix for years to come. Chevron was disappointed in the decision to remove the Mid-Atlantic sale. This would have been the first new area included in a 5-Year Program in over 30 years where no new data exist. Chevron recommends that the Administration reconsider and reinstate the Atlantic in the Proposed Program. Otherwise, Chevron does support the Proposed Program, is supportive of the region-wide lease sales in the GOM, and requests that all three Alaska sales remain on the schedule. Chevron also urges that no areas be excluded due to perceived conflicts that might arise with new oil and gas development. Certain portions of the OCS are actively being used by multiple entities, including fishing, state oil and gas activities, military, tourism, shipping, renewable energy and non-energy minerals.

Cobalt International Energy, Inc.

Document ID: BOEM-2016-0003-2189

Cobalt International Energy submitted four letters that urge BOEM to maintain all of the ten GOM and three Alaska sales in the schedule. Cobalt is disappointed and surprised at the decision to exclude the Atlantic given the coastal state support and that other Atlantic nations have robust programs to lease and support exploration and development.

ConocoPhillips

Document ID: BOEM-2016-0003-2366

ConocoPhillips has a strong, direct interest in the process of preparing a national OCS oil and gas leasing program. It is a significant producer of natural gas in the United States and the largest producer of oil in Alaska. It is a major lease holder in the GOM and Alaska. The commenter is greatly disappointed with the removal of the Atlantic and is concerned about the potential for lease sale deferrals and additional exclusion areas as considerable acreage has already been removed in the Eastern GOM, Atlantic, Pacific and Alaska.

ConocoPhillips advocates for Option 1 in the GOM [10 region-wide sales], supports Option 2 [separate yearly sales in Central/Eastern and Western GOM] and does not support Options 3 or 4 [15-mile no leasing off Baldwin County, Alabama, and no sale]. The commenter strongly urges BOEM to conduct NEPA analysis in the Eastern GOM in anticipation of the expiration of the congressional moratorium in 2022.

ConocoPhillips supports the Alaska sales with the Beaufort moved to 2019, but is disappointed that there is only one sale per area. It does not support targeted leasing but supports areawide leasing. It also is concerned about the potential for additional exclusions and supports a process based on collaboration with stakeholders rather than outright exclusion by time and area restrictions. The commenter also states that

with seasonal drilling windows that the actual operational period is much less than the 10-year term so recommends that BOEM extend lease terms to provide sufficient time to explore and appraise leases. If extended terms are not possible, BOEM should utilize its authority to grant directed suspensions for the time leases are inaccessible for operations.

ConocoPhillips is disappointed in the premature removal of the Atlantic given the inherent flexibility of the leasing process that would allow BOEM to adapt to changing market conditions, best available science, public opinion and new information during the program as being in a final program is not a commitment to hold a sale. The commenter disagrees with the use of current market conditions in a frontier area that will take longer to develop. It also is concerned that in the absence of a sale, industry support and monetary commitment for updated G&G acquisition will be greatly reduced. The commenter also notes that removal of the Atlantic is not supported by the draft Programmatic EIS.

ExxonMobil**Document ID: BOEM-2016-0003-2363**

ExxonMobil supports a reliable, stable and predictable schedule of lease sales. The OCS program is an important driver of the nation's economy and its energy security. However, sale cancellations and removal actions, existing moratoria and increasingly restrictive and prescriptive policies have weakened the Program's ability to deliver that value. ExxonMobil is disappointed in the decision to exclude the Atlantic and cites that decision as further reason to maintain the Proposed Program schedule without further restrictions and to provide expanded access to the Eastern GOM.

Fieldwood Energy LLC**Document ID: BOEM-2016-0003-2320**

Fieldwood Energy strongly urges that the final program maintain all GOM and Alaska lease sales without further restriction and is disappointed in the decision to eliminate the Atlantic lease sale. Continued access to offshore resources is fundamental to the nation's economy and energy security.

Louisiana Mid-Continent Oil and Gas Association**Document ID: BOEM-2016-0003-2428**

Louisiana Mid-Continent Oil and Gas Association, Louisiana's longest standing trade association, exclusively representing all aspects of the oil and gas industry onshore and offshore, including exploration, production, mid-stream activities, pipeline, refining and marketing, supports the Proposed Program as-is with no additional areas being removed from future leasing consideration. The number and timing of GOM sales should be maintained without further restrictions.

Noble Drilling (U.S.) LLC**Document ID: BOEM-2016-0003-2307**

Noble Drilling states that long term energy security requires an expanding commitment to offshore development in new areas and Nobel is disappointed that a significant portion of acreage in the Atlantic, GOM and Alaska has already been excluded. Noble points to the GOM as illustrative of the value of a sustained and expansive energy policy. Energy and other interests, including tourism, fishing and military operations, have coexisted and thrived. Noble requests that the number and timing of GOM be maintained without further exclusions. Access to the Alaska OCS under balanced and science-based regulations is essential to the Nation's long term economy and energy security. The manner of leasing

must be predictable and certain for industry to engage in long term strategies in the Arctic. Nobel requests that exclusion of the Atlantic be reconsidered.

Noble Energy, Inc.

Document ID: BOEM-2016-0003-2455

Noble Energy is concerned that the Proposed Program is limiting the energy development and leadership opportunities for the nation as a whole. Close to 85 percent of the OCS remains closed to energy development. Noble requests that BOEM maintain all GOM sales and reconsider removal of the Atlantic lease sale.

Oceaneering

Document ID: BOEM-2016-0003-0418

Oceaneering states that BOEM should reconsider eliminating the Atlantic lease sale scheduled for 2021. Additionally, the commenter believes BOEM should maintain all Arctic and GOM lease sales in the Program without further restriction.

Oceaneering International

Document ID: BOEM-2016-0003-0466

Oceaneering International states that BOEM should reconsider eliminating the Atlantic lease sale scheduled for 2021. Additionally, the commenter believes BOEM should maintain all Arctic and GOM lease sales in the Program without further restriction.

Offshore Operators Committee

Document ID: BOEM-2016-0003-2378

The Offshore Operators Committee fully supports a continued robust OCS leasing program in the GOM, and requests that leasing opportunities expand into other OCS areas, including the Eastern GOM. Louisiana has demonstrated first-hand how to balance the development of our nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry.

Ridgewood Energy Corporation

Document ID: BOEM-2016-0003-2464

Ridgewood Energy urges BOEM to maintain all the GOM and Alaska lease sales without further restriction and is disappointed that the Atlantic lease sale has been excluded. The commenter believes that the justification for eliminating Atlantic leasing is based upon questionable claims. Ridgewood opines that industry needs continued access to responsibly develop our offshore oil and natural resources for American energy security and economic prosperity.

Shell Exploration and Production Company

Document ID: BOEM-2016-0003-2416

Shell Exploration and Production Company disagrees with the Secretary's decision to deny access to the Atlantic and urges BOEM to take steps to initiate a new program while completing work on this program, retaining all proposed areas in the GOM and Alaska. Shell believes that the analysis in the decision record enumerating the section 18 criteria not only fails to support the Proposed Program decision but creates a rationale squarely against the criteria. Shell states that the decision is contrary to the purposes of OCS Lands Act in that it fails to: (1) "make resources available to meet the nation's energy needs", (2)

“ensure the extent of OCS resources is assessed at the earliest practicable time”, (3) “balance orderly energy resource development with protection of the human, marine, and coastal environments.” Shell also states that the decision is harmful to the Nation and national energy policy. Shell refutes each factor of the rationale provided for the Secretary’s decision to exclude the Atlantic:

(1) presence of conflicts with other uses such as Department of Defense (DOD) and commercial interests—Shell cites the successful coordination efforts under the 1983 Memorandum of Agreement with DOD and questions why potential coexistence with military operations is different from siting of alternative energy [wind].

(2) market dynamics—Reliance on recent market trends such as import reductions and onshore production increases is in opposition to Proposed Program Chapter 6 analysis that OCS projects generally provide a steady and more predictable source of oil and gas for long periods once production begins. In general, long term offshore projects are less susceptible to fluctuations in prices and price expectations.

(3) limited infrastructure—Shell again cites Chapter 6 analysis that shows the presence of some existing infrastructure and growing demand by consumers for petroleum products in an area of greatest demand, heavily reliant on imports from Canada and Europe. While new infrastructure may be needed, requiring all or most to be in place would effectively preclude ever offering frontier areas.

(4) opposition from local communities—While there was local opposition expressed, more expressions of support were received. More importantly, affected coastal state Governors—directly accountable to their states’ voters—voiced strong support for including the Atlantic planning areas for leasing consideration. Pursuant to the section 18 criteria regarding local concerns, it is the input from Governors that the Secretary is required to give foremost consideration in the balancing analysis.

(5) potential for environmental damage—Neither Chapter 7 of the decision document nor the analysis in the draft Programmatic EIS supports any concern that there would be significant environmental damage from leasing activities, especially in the GOM and Atlantic, as many categories assessed resulted in impact findings of mostly negligible to minor. The analyses support the conclusions to keep the GOM and Alaska regions in the PFP. Further, the impact findings and summary conclusions do not support the removal of the Atlantic region.

(6) insufficient resource potential—The BOEM estimate of resource potential for the Atlantic reveals significant potential for economically valuable oil and gas, which could be worth over \$37 billion in incremental net benefits. The Proposed Program analysis also notes that BOEM’s estimates of Atlantic resources are highly uncertain due to lack of recent seismic data and little exploratory effort. In light of USDOJ’s responsibility to “ensure the extent of OCS resources is assessed at the earliest practicable time”, using undetermined resource potential as a basis to deny exploratory access is indefensible and also self-perpetuating. It is impossible to offer counter-evidence to the contention that low resource potential exists without allowing for any exploration activities.

(7) adverse impacts to the coastal zone—Not only are adverse environmental impacts unsubstantiated by the draft Programmatic EIS, the Proposed Program decision document actually reveals substantial environmental benefits related to the substitution for riskier and more damaging alternatives.

Shell also states that the record does not support with decision to delay Alaska sales. Shell supports the Governor's recommendation to advance the Beaufort sale to 2019. In consideration of the Environmentally Important Areas, Shell believes it is inappropriate to use NEPA analysis to identify such areas without going through the iterative analytic review process and allow a "balancing" calculation as provided in Sections 18 and 19 of the OCS Lands Act. Shell also disagrees with going away from areawide leasing to targeted leasing in Alaska. The necessarily uncertain and sequential nature of geologic exploration requires access to the fullest range of target zones in frontier areas to allow for the conduct of necessary seismic testing and other related geologic analysis. Premature and arbitrary narrowing of areas may eliminate prospective acreage that cannot be opened for exploration without restarting the leasing process.

Shell supports the region-wide leasing in the GOM and recommends that BOEM look at alternative policies to streamline permitting to expedite exploration and development.

Statoil (B. Moore at Houston Public Hearing)

Document ID: BOEM-2016-0003-0175

Statoil is generally supportive as hydrocarbons will be a chief source of energy for decades to come. The commenter is concerned that the frequency of the proposed GOM-wide sales is inefficient. Not enough "first available" acreage will become available in the 6 months following the first sale in a year for the second sale. BOEM will waste manpower on the second sale and industry will not have adequate time to prepare for the larger area. Human resources will shift from prospect generation and well drilling to prospect evaluation and assessing so exploration will diminish. Statoil does not recommend going back to the alternating Central and Western GOM sales. The commenter states that eliminating the Atlantic is a missed opportunity to compete with other countries, such as Mexico, who are opening new acreage. They request that the Atlantic be reinstated. It also states that when the area is made available, there needs to be adequate time for shooting of new seismic.

Statoil (VP, Exploration USA)

Document ID: BOEM-2016-0003-2368

Statoil supports no additional areas being excluded. Considerable acreage has already been excluded. Long term energy security can only be ensured by expanding offshore development to new areas. Statoil is disappointed with the decision to exclude the Atlantic and believes it's a missed opportunity to compete with other countries that are opening new acreage. Statoil disagrees with the twice yearly region-wide sales in the GOM. There will not be enough acreage available for the second sale, industry will not have adequate time to prepare for the second sale, and will shift human resources to prospect generation from maturation and drilling. Statoil does not want BOEM to go back to separate Central and Western sales each year but recommends once yearly sales for a total of five in the program. Statoil recommends that the three Alaska sales be maintained with further exclusions.

Stone Energy Corporation

Document ID: BOEM-2016-0003-0421

Stone Energy strongly urges that the final program maintain all GOM and Alaska sales with further restrictions and is disappointed in the exclusion of the Atlantic lease sale. It supports the 10 sales in the GOM and the three sales in Alaska but is disappointed in the reduction of the available area and the limited number of sales in Alaska.

W&T Offshore, Inc.**Document ID: BOEM-2016-0003-2450**

W&T Offshore supports the Proposed Program as it is with no new areas being excluded and states that the number and timing of GOM sales be maintained.

A.2.6 Non-Energy Industry and Associations**Air Liquide America LP****Document ID: BOEM-2016-0003-2481**

The commenter urges BOEM to finalize the Proposed Program including Alaskan waters, without any further restrictions. The commenter stated that the development and growth of the state will stagnate and energy security will be compromised nationwide if the leasing areas off of Alaska's coast are removed from the Program.

Alaska Coalition for 15 organizations**Document ID: BOEM-2016-0003-2390**

The commenter submitted a letter on behalf of 15 organizations urging BOEM to retain the Arctic leasing areas in the Proposed Program. The commenter emphasized the economic benefits that the Leasing Program could bring to Alaska and the historic dependence that state employment levels have had on resource development.

Alaska Process Industry Careers Consortium**Document ID: BOEM-2016-0003-0083**

The commenter states support for lease sales in the Beaufort and Chukchi seas, as well as Cook Inlet. The commenter states that oil and gas development of the Arctic OCS is in the public interest and urges BOEM to consider the economic and employment benefits associated with oil and gas development. The commenter describes the potential economic and employment impacts of the Proposed Program for Alaska and the country as a whole, including an additional 55,000 jobs in Alaska alone.

Alaska Support Industry Alliance**Document ID: BOEM-2016-0003-2308**

The commenter urges BOEM to finalize the 2017–2022 leasing program and PEIS that includes Alaska's OCS without any further exclusions or restrictions. The commenter states that lease sales will contribute to the nation's energy security and stabilize Alaska's economy during a time of fiscal crisis. The commenter argues that advancements in technology ensure that development and environmental protection can co-exist.

Alaska Trucking Association**Document ID: BOEM-2016-0003-0085**

The commenter supports the Proposed Program without any further exclusions or restrictions to the Alaskan OCS. In addition to boosting economic growth, the commenter asserts that Alaskan offshore development will help extend the longevity of TAPS. The commenter remarked that the forced reliance on alternative sources of energy could cause other environmental impacts. The commenter concludes that advances in drilling technology allow for safe drilling with minimal environmental impact. Finally, the commenter expressed support for the expansion of revenue-sharing to states beyond the GOM.

Alyeska Pipeline Service Company**Document ID: BOEM-2016-0003-1551**

The commenter urges BOEM to reconsider limiting the Proposed Program and increasing the number of sales in the Chukchi and Beaufort seas. The commenter stated that the development of these resources is vital to maintaining TAPS, and therefore vital to the energy security and job prosperity of the Nation. Further, the commenter remarked that technology exists to develop these areas in an environmentally responsible manner and can be delivered to the southern 48 states through the existing infrastructure of TAPS.

American Chemistry Council**Document ID: BOEM-2016-0003-2377**

The commenter urges BOEM to finalize the 2017–2022 Program and Programmatic EIS that includes the Alaska OCS as well as the GOM without any further exclusions or restrictions while also stating opposition to the removal of the Atlantic leasing areas. The commenter states that the key to growth in the American chemical manufacturing industry is access to abundant and affordable natural gas.

American Iron and Steel Institute**Document ID: BOEM-2016-0003-2426**

The commenter strongly supports the inclusion of the GOM and Alaskan OCS regions in the Proposed Program and opposes the removal of the Atlantic OCS. The commenter states that the large, untapped reserves found in these areas are key to ensuring a secure energy future for the U.S. and explains that the steel industry relies on low-cost fuel to remain competitive and viable in the global markets.

American Real Estate**Document ID: BOEM-2016-0003-0090**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Aries Marine Corporation**Document ID: BOEM-2016-0003-2090**

The commenter urges BOEM to finalize the 2017–2022 leasing program and Programmatic EIS that includes the GOM and the Arctic without any further exclusions or restrictions. The commenter opposes BOEM's decision to exclude Atlantic lease sales from the Proposed Program. The commenter states that economic prosperity follows strong domestic American energy production, and no justification exists to limit oil and gas activity.

Associated General Contractors of Alaska**Document ID: BOEM-2016-0003-2311**

The commenter urges BOEM to finalize the 2017–2022 leasing program and PEIS that includes the Alaska OCS without any further exclusions or restrictions. The commenter states that Alaskans have proven that resource development can proceed in a way that protects the environment. The commenter

also explains that offshore development is critical in supporting TAPS and protecting U.S. energy security.

Baker Professional Services

Document ID: BOEM-2016-0003-2190

The commenter urges BOEM to permit oil and gas development in the Arctic's OCS without further exclusions or restrictions, explaining as drilling and production of oil decreases, so do state revenues and employment. The commenter states offshore drilling will allow Alaska to diversify and secure its economy.

Bayou Industrial Group

Document ID: BOEM-2016-0003-2297

The commenter urges BOEM to continue the existing OCS lease sales in the GOM and expand leasing opportunities to the Eastern Gulf. The commenter remarked that the Gulf offshore oil and gas industry has provided long-lasting economic and energy security to the region and the nation, and more communities in the Eastern Gulf should be given an opportunity to capitalize on these benefits.

Bayou Region Real Estate

Document ID: BOEM-2016-0003-2175

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Benoit Premium Threading, LLC

Document ID: BOEM-2016-0003-2303

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Business Council of Alabama

Document ID: BOEM-2016-0003-0120

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Cartridge World-Houma, LA

Document ID: BOEM-2016-0003-0209

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil

supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Cherami+Bruce Architects

Document ID: BOEM-2016-0003-2270

The commenter states that it supports a robust OCS leasing program in the GOM because the offshore oil and gas industry is an integral part of Louisiana's economy, our society and our coastal restoration efforts. States that Louisiana has demonstrated firsthand how to balance the development of our Nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry. The commenter requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

Chet Morrison Contractors, LLC

Document ID: BOEM-2016-0003-0422

The commenter expresses disappointment in the exclusion of the Atlantic lease sale, recommends a new Program that includes the Atlantic Program Area, approval of pending seismic survey applications, revenue sharing in all states with offshore energy activity, and recommends maintaining all GOM and Alaska lease sales without further restriction, citing job creation, federal revenue, and U.S. energy security.

Committee of 100 for Economic Development, Inc.

Document ID: BOEM-2016-0003-0422

The commenter urges BOEM to finalize the 2017–2022 leasing program and Programmatic EIS that includes the GOM without any further exclusions or restrictions. The commenter describes the economic, employment, and energy benefits that have come of past leasing in the Gulf. The commenter states the inclusion of the Gulf leasing area contributes to a sensible national energy policy as well as ensures affordable, reliable domestic energy.

Crosby Tugs, LLC

Document ID: BOEM-2016-0003-2439

The commenter urges BOEM to proceed with the Proposed Program without further restrictions to the GOM or Alaska OCS regions. The commenter also expressed disappointment over the decision to remove the Atlantic leasing area. The commenter described the potential benefits that would be produced by allowing oil and gas drilling in the Gulf, Alaska, and the Atlantic, including \$550 billion generated for the U.S. economy and more than 3.5 million barrels of domestic oil production. The commenter also noted the industry has never been safer given the enhanced regulations.

Davis Block & Concrete Company

Document ID: BOEM-2016-0003-2446

The commenter supports the inclusion of the Beaufort and Chukchi seas in the Proposed Program, citing the multiple employment and economic benefits of oil and gas development for Alaska's economy. The commenter also argued that offshore drilling would help maintain the integrity of TAPS and provide energy security to meet the country's future demands.

E3 Environmental, LLC**Document ID: BOEM-2016-0003-2417**

The commenter expresses support for the inclusion of all three leasing areas of the Arctic OCS in the Proposed Program. The commenter noted the economic and employment benefits and energy security for the Nation that is generated by offshore drilling and that the exclusion of leasing in Alaska would result in long term impacts on the financial well-being of the state. The commenter also explained that leasing in Alaska would provide continued support for TAPS.

Era Helicopters, LLC**Document ID: BOEM-2016-0003-2369**

The commenter states that it supports a robust OCS leasing program in the GOM because the offshore oil and gas industry is an integral part of Louisiana's economy, our society and our coastal restoration efforts. States that Louisiana has demonstrated firsthand how to balance the development of our Nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry. The Commission respectfully requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

Fairbanks Chamber of Commerce**Document ID: BOEM-2016-0003-0108**

The commenter encourages BOEM to maintain the Beaufort and Chukchi seas planning areas for leasing in the PFP. The commenter states that a healthy and vibrant oil and gas industry is essential in keeping the Alaska economy strong and maintaining the viability of TAPS. The commenter argues that the offshore drilling industry has proven that oil and gas activity can co-exist with the inhabitants of the Arctic and support essential services.

Frank's International**Document ID: BOEM-2016-0003-2191**

The commenter opposes BOEM's decision to exclude lease sales in the Atlantic Ocean from the Proposed Program, and requests that the GOM and Arctic be included in the PFP without any further exclusions or restrictions. The commenter states it is imperative that the U.S. develop oil and gas in the Atlantic and Arctic in order to remain a competitor in the global energy market. The commenter states that while environmental issues should be considered, economic contributions are equally important.

GATE, Inc.**Document ID: BOEM-2016-0003-2072**

GATE, Inc. submitted four letters that urge BOEM to finalize the 2017–2022 leasing program and Programmatic EIS that includes the GOM and the Arctic without any further exclusions or restrictions. The commenter expressed disappointment with BOEM's decision to exclude Atlantic leases from the Proposed Program. The commenter described the oil and gas industry as a large and important driver of the economy that is vital for long term energy security.

Graystar Pacific Seafood**Document ID: BOEM-2016-0003-0101**

The commenter states support for development of oil and gas resources in the Alaska region. The commenter explained that development of the Alaskan OCS would provide 35,000 indirect and direct

jobs and contribute \$200 billion in revenue for the federal, state, and local governments, as well as bring much needed infrastructure to the region.

Greater Port Arthur Chamber of Commerce

Document ID: BOEM-2016-0003-0088

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation’s crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country’s energy future.

Greater Tomball Area Chamber of Commerce

Document ID: BOEM-2016-0003-2397

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation’s crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country’s energy future.

Grow Louisiana Coalition

Document ID: BOEM-2016-0003-2272

The commenter urges BOEM to finalize the 2017–2022 leasing program and Programmatic EIS that includes the GOM without any further exclusions or restrictions. The commenter explains that advancements in well containment, spill prevention and response demonstrate a commitment to increased environmental standards. The commenter also states that a sensible energy policy must include the Gulf’s offshore resources to ensure access to reliable and affordable domestic energy.

Hassell Wealth

Document ID: BOEM-2016-0003-0212

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation’s crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country’s energy future.

Houma-Terrebonne Chamber of Commerce

Document ID: BOEM-2016-0003-0093

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation’s crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country’s energy future.

Kiewit Offshore Services, LTD.**Document ID: BOEM-2016-0003-2514**

The commenter strongly supports the inclusion of the Alaskan and GOM OCS region in the Proposed Program and expressed disappointment in the removal of the Atlantic OCS leasing area. The commenter argues that the Proposed Program curtails the country's ability to meet current energy demands and notes there is little justification for reducing the number of available sales. The commenter also describes the potential benefits that would be generated by approving the Proposed Program, including a \$550 billion increase in gross domestic product and as many as 840,000 jobs. Finally, the commenter describes reasons the Atlantic should not be removed from the program, including potential conflict resolution with the DOD.

LA 1 Coalition**Document ID: BOEM-2016-0003-2159**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Laborers' Local 341**Document ID: BOEM-2016-0003-2487**

The commenter expressed strong support for OCS leasing in the Beaufort Sea, Chukchi Sea, and Cook Inlet. The commenter provided examples of the positive benefits that could arise from the implementation of the Proposed Program, including the creation of a stable tax base for local governments and thousands of jobs for Alaskans. The commenter also notes that the oil and gas industry has successfully operated in the region in a manner respectful of safety and subsistence concerns. Finally, the commenter states the importance of offshore oil and gas drilling to a secure energy future for the country.

Lafourche Chamber of Commerce**Document ID: BOEM-2016-0003-2288**

The commenter states that it supports a robust OCS leasing program in the GOM because the offshore oil and gas industry is an integral part of Louisiana's economy, our society and our coastal restoration efforts. States that Louisiana has demonstrated firsthand how to balance the development of our Nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry. The Commission respectfully requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

Louisiana Association of Business and Industry**Document ID: BOEM-2016-0003-2163**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future

Louisiana Oil Marketers and Convenience Store Association**Document ID: BOEM-2016-0003-0086**

The commenter submitted 26 comment letters that request that BOEM finalize the 2017–2022 leasing program and Programmatic EIS that includes the GOM without any more exclusions or restrictions and recommends adopting Alternative A. The commenter remarks that Gulf Coast states and communities strongly support GOM oil and gas development for the economic and employment benefits associated with the industry. The commenter concludes that excluding the Gulf from the leasing program would result in incremental economic and environmental costs due to a reliance on other energy sources.

Lynden, Inc.**Document ID: BOEM-2016-0003-2511**

The commenter expressed strong support for oil and gas leasing in the Alaska OCS region, citing the economic and employment benefits for the state, the maintenance of TAPS, and greater energy independence for the country as reasons for support. The commenter stressed that environmental concerns could be considered down the road and previous experience in the area has shown that the industry is able to successfully coexist alongside marine life.

Magnum Mud Equipment Company**Document ID: BOEM-2016-0003-2554**

The commenter expressed strong support for continued leasing program in the GOM and requested that BOEM expand leasing opportunities to the Eastern GOM, stating the magnitude and importance of the oil and gas industry to the Louisiana economy and the country as a whole. The commenter asserted that Louisiana currently supports a robust oil and gas industry while also maintaining a booming hunting, fishing, and wildlife industry.

Manufacture Alabama**Document ID: BOEM-2016-0003-0180**

The commenter urges BOEM to finalize the 2017–2022 leasing program and Programmatic EIS that includes the GOM without any further exclusions or restrictions. The commenter states development of the Gulf OCS generates sizable benefits for coastal communities and ensures that the U.S. is provided with reliable crude oil, petroleum products, and natural gas. The commenter asserts the further restriction of the GOM in the leasing program would result in incremental economic and environmental costs due to a greater reliance on alternative energy sources.

Mississippi Manufacturers Association**Document ID: BOEM-2016-0003-1546**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Mobile Area Chamber of Commerce**Document ID: BOEM-2016-0003-1547**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

National Association of Charterboat Operators**Document ID: BOEM-2016-0003-0089**

The commenter urges BOEM to finalize a leasing program that includes the GOM OCS without further restrictions. The commenter explains that the development of the Gulf OCS benefits coastal communities and ensures that the U.S. is provided with reliable crude oil, petroleum products, and natural gas. The commenter describes the other benefits of oil and gas development in the Gulf for boating operators including artificial reef structures, increases in fish species biomass, and low costs of fuel. The commenter concludes that excluding the Gulf from the leasing program would result in incremental economic and environmental costs if alternative energy sources were utilized more heavily.

National Association of Manufacturers**Document ID: BOEM-2016-0003-2458**

The commenter expressed strong opposition to the reduced leasing areas available in the 2017–2022 Proposed Program. The commenter explained that energy security and global market competitiveness demands being able to secure energy from a diversity of sources, of which offshore resources are a critical piece. The commenter urged BOEM to continue approving seismic surveys on offshore leasing areas to ensure decisions about leasing is based on accurate and up to date information. Finally, the commenter stressed the importance of oil and gas for the competitiveness of the manufacturing industry as well as employment, economy, and energy security of the United States.

Palmetto AgriBusiness Council**Document ID: BOEM-2016-0003-0094**

The commenter expressed strong opposition to BOEM's decision to exclude the Atlantic Planning Area from the Proposed Program. The commenter urges BOEM to draft an alternative plan that includes the Atlantic region and approves pending Atlantic seismic survey applications. The commenter stressed that obtaining an updated oil and gas resource estimate is critical in ensuring informed decisions. The commenter recommends expanding revenue-sharing to all coastal states with adjacent offshore oil and gas activity.

Palmetto Promise Institute**Document ID: BOEM-2016-0003-0107**

The commenter states opposition for BOEM's decision to exclude the Atlantic OCS from the Proposed Program and urges BOEM to initiate a new five-year leasing program that provides for early and annual Atlantic lease sales. The commenter also stated support for the approval of pending Atlantic seismic survey applications. The commenter argues the removal of the Atlantic planning area would threaten U.S.

energy security, and would cause escalated environmental and social costs. The commenter also recommends expanding revenue-sharing to all coastal states with adjacent offshore oil and gas activity.

Ports Association of Louisiana**Document ID: BOEM-2016-0003-0087**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Pride Welding Services**Document ID: BOEM-2016-0003-2373**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Princess Anne Garden Club**Document ID: BOEM-2016-0003-2504**

The commenter expressed support for the removal of the Atlantic OCS leasing area but opposes the potential seismic testing that is under review by BOEM. The commenter stated that seismic testing would eventually lead to offshore drilling in the region and could potentially negatively impact the marine life and tourism industry along the eastern coast.

Reliable Renewables**Document ID: BOEM-2016-0003-2309**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Resources Energy, Inc.**Document ID: BOEM-2016-0003-2206**

The commenter urges BOEM to include Arctic leasing areas, including the Beaufort, Chukchi, and Cook Inlet, in the finalized Leasing Program. The commenter states that the technology exists to safely recover resources in this region, and the long-term energy security of the nation is dependent on it. The commenter emphasizes that the majority of Alaskans support this request.

Saltchuck Resources, Inc.**Document ID: BOEM-2016-003-2194**

The commenter urges BOEM to finalize the 2017–2022 leasing program and Programmatic EIS that includes the Arctic Planning Areas without any further exclusions or restrictions. The commenter states

that the oil and gas industry is the backbone of Alaska's economy, and limiting lease sales would create crippling effects for years to come.

SolstenXP, Inc.

Document ID: BOEM-2016-0003-2500

The commenter supports the Proposed Program's inclusion of Beaufort and Chukchi seas and Cook Inlet but expressed concern that these lands could still be excluded before the program is made final. The commenter states that BOEM should consider the existing infrastructure, vast available resources, and strong governmental oversight of environmental and safety concerns when finalizing the leasing program for 2017–2022. The commenter also stressed the importance of a stable regulatory environment in attracting potential investors to the Alaskan region.

South Louisiana Economic Council

Document ID: BOEM-2016-0003-2304

The commenter states that it supports a robust OCS leasing program in the GOM because the offshore oil and gas industry is an integral part of Louisiana's economy, our society and our coastal restoration efforts. States that Louisiana has demonstrated firsthand how to balance the development of our Nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry. The Commission respectfully requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

Synergy Bank

Document ID: BOEM-2016-0003-2203

The commenter states that it supports a robust OCS leasing program in the GOM because the offshore oil and gas industry is an integral part of Louisiana's economy, our society and our coastal restoration efforts. States that Louisiana has demonstrated firsthand how to balance the development of our Nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry. The commenter requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

Texas Association of Business

Document ID: BOEM-2016-0003-0092

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Texas Association of Manufacturers

Document ID: BOEM-2016-0003-0424

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Texas Trucking Association (two letters)**Document ID: BOEM-2016-0003-0104, 0221**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Thoma-Sea Marine Constructors, LLC (three letters)**Document ID: BOEM-2016-0003-2050, 2056, 2065**

The commenter states that it supports a robust OCS leasing program in the GOM because the offshore oil and gas industry is an integral part of Louisiana's economy, our society and our coastal restoration efforts. States that Louisiana has demonstrated firsthand how to balance the development of our Nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry. The Commission respectfully requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

U.S. Chamber of Commerce Institute for 21st Century Energy**Document ID: BOEM-2016-0003-2432**

The commenter expresses support for leasing sales in the GOM and Alaska OCS regions. The commenter explains the vital importance of the oil and gas industry to America's economy and stresses the availability of resources in these regions would help secure the country's energy future. The commenter also states the U.S.'s exports of oil aid the world in navigating the changing global markets and geopolitical risks that exist in other exporting countries. Lastly, the commenter noted the advances in technology and policy that have made the oil and gas industry much safer.

Virginia Manufacturers Association**Document ID: BOEM-2016-0003-0167**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Virginia Trucking Association**Document ID: BOEM-2016-0003-2174**

The commenter strongly opposes BOEM's decision to exclude the Atlantic Planning Area from the Proposed Program and urges BOEM to initiate a new five-year leasing program that provides for early and annual Atlantic lease sales. The commenter states that the decision conflicts with broad, bipartisan support for offshore oil and gas development and threatens energy security. The commenter also recommends expanding revenue-sharing to all coastal states with adjacent offshore oil and gas activity.

W.D. Scott Group, Inc**Document ID: BOEM-2016-0003-0113**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

Workforce Logistics, LLC**Document ID: BOEM-2016-0003-0176**

The commenter urges BOEM to finalize the Proposed Program without further exclusions or restrictions to the GOM leasing areas. The commenter states the Gulf provides 20 percent of the Nation's crude oil supply and describes the economic and employment benefits that offshore drilling provides the region and the country as a whole. The commenter also argues that a robust offshore leasing program will aid in securing the country's energy future.

WorkSaver Employee Testing Systems & ISR Physical Therapy**Document ID: BOEM-2016-0003-2273**

The commenter states that it supports a robust OCS leasing program in the GOM because the offshore oil and gas industry is an integral part of Louisiana's economy, our society and our coastal restoration efforts. States that Louisiana has demonstrated firsthand how to balance the development of our Nation's oil and gas resources off its coast and still maintain a robust hunting, fishing, and wildlife industry. The Commission respectfully requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM, for the benefit of the Nation.

A.2.7 State-level Elected Officials**A.2.7.1 Alaska Region****Alaska State Senator John Coghill****Document ID: BOEM-2016-0003-0082**

The State Senator opposes the removal of planning areas in the Beaufort and Chukchi seas, including the Hanna Shoal area. The State Senator requests that these areas be made available for oil and gas lease sales. The State Senator notes that there are 15 planning areas on the OCS, 8 of which have held lease sales. The State Senator argues in the Alaska State's resolution that these areas hold immense amounts of potential oil and gas reserves, and removal of these areas will cost billions in potential lost revenue.

Alaska State Senator Cathy Giessel**Document ID: BOEM-2016-0003-2296**

The State Senator opposes the removal of the Beaufort and Chukchi seas, as well as the Cook Inlet, from the current Proposed Program. The State Senator argued the Alaska North Slope has extracted 12 billion barrels of oil in a safe and environmentally conscious manner, demonstrating that oil and gas development has been occurring without incident. The State Senator maintained that the development of hydrocarbons is critical to the economic future of the State of Alaska.

Alaska State Senators Kevin Meyer, John Coghill, Mike Chenault, and Charisse Millett**Document ID: BOEM-2016-0003-0240**

Four members of the Alaska State Senate responded to a letter submitted by Washington State Governor Jay Inslee, arguing, contrary to Governor Inslee, that oil and gas development in the Arctic can be done responsibly. The Senators note that exploration wells are currently being safely drilled in Alaska's Arctic. The Senators argue that oil and gas development is critical to the economy of Alaska, and that Alaska's State Legislature welcomes additional lease sales in Alaska.

Alaska State Senator Lesil McGuire**Document ID: BOEM-2016-0003-2314**

The State Senator urges BOEM maintain all leases in the Beaufort and Chukchi seas, as well as the Cook Inlet. The State Senator asserts that if the removal of these lease sales in the Arctic was done to address climate change, it is putting undue burden on Alaska by preventing oil and gas lease sales. The State Senator argues that drilling in the Arctic is safe and vital to the economy of both Alaska and the United States. Further, the commenter suggests that Arctic development can occur alongside climate change adaptation practices.

A.2.7.2 Gulf of Mexico Region**Louisiana State Senator Glenn Koepp****Document ID: BOEM-2016-0003-2070**

The State Senator provided State Senate Resolution No. 116 that urges BOEM to maintain region-wide oil and gas leasing in the GOM. The State Senator argues that oil and gas leasing in the GOM is critical to the economy of the entire Gulf Coast and that many community members have expressed strong support to continue leases in the region.

Louisiana State Representative Beryl Amedee**Document ID: BOEM-2016-0003-2558**

The State Representative argues oil and gas leasing is an integral part of the Louisiana economy and supports a continued robust OCS leasing program in the GOM. The Representative argues that Louisiana has demonstrated how oil and gas development can co-exist with hunting, fishing, and wildlife industries. The Representative further argues that portions of revenue from the Gulf of Mexico Energy Security Act of 2006 (GOMESA) also contribute to coastal restoration and conservation. The commenter requests that BOEM continue to provide leasing opportunities in the GOM as well as expand to other OCS areas, including the Eastern GOM.

Louisiana State Representative Alfred Speer**Document ID: BOEM-2016-0003-2069**

The State Representative provided State House Resolution No. 139 that urges BOEM to maintain region-wide leasing in the GOM. The State Representative notes that the GOM provides 20 percent of the Nation's crude oil. The State Representative argues leasing in the GOM is vital to the economy of the Gulf Coast states and the entire Nation.

A.2.7.3 Atlantic Region

Georgia State Senator Rick Jeffares

Document ID: BOEM-2016-0003-0145

The State Senator opposes the removal of the Atlantic Lease sales from the current proposed plan. The State Senator argues the State of Georgia could greatly benefit from oil and gas development off the Atlantic coast. The State Senator also urges BOEM to conclude reviews of applications of seismic exploration permits so that there is a better estimate of the amount of resources available should these lease sales be made available. The State Senator suggests that should offshore development occur, Georgia would benefit from similar revenue-sharing programs to those that exist in the GOM.

Georgia State Representative Don Parsons

Document ID: BOEM-2016-0003-0091

The State Representative opposes the removal of the Atlantic lease sale, arguing that broad, bipartisan support from stakeholders, lawmakers, and citizens alike for offshore oil and gas development exists. The Representative asserts this lease sale could reduce the United States' dependence on foreign oil and generate billions of dollars in net benefits, as well as create hundreds of thousands of jobs. The Representative suggests that should offshore development occur, states along the coast would benefit from similar revenue sharing programs to those that exist in the GOM. The Representative urges BOEM to initiate a new five-year leasing program that provides for early and annual Atlantic lease sales. The commenter also supports expansion of revenue-sharing to all states with adjacent offshore oil and gas activity.

North Carolina Representatives Bob Steinburg

Document ID: BOEM-2016-0003-0163

The State Representative opposes the removal of the Atlantic Lease sales from the current proposed plan. The Representative argues the State of North Carolina could economically benefit from oil and gas development off the Atlantic coast. The Representative also urges BOEM to conclude reviews of applications of seismic exploration permits so that environmentally efficient extraction of resources can occur, should these lease sales be made available. The Representative suggests that should offshore development occur, North Carolina would benefit from similar revenue-sharing programs to those that exist in the GOM.

South Carolina Senator Paul Campbell

Document ID: BOEM-2016-0003-0184

The State Senator strongly opposes the exclusion of the proposed Atlantic lease sale and urges BOEM to initiate a new five-year plan which includes the Atlantic and allows for continued seismic exploration of the region. The Senator argues that approximately five percent of the potential leasing area would be incompatible with leasing and military activities, currently cited as the primary reason for removing the Atlantic lease. Further, the State Senator argues that the region would benefit of the potential jobs and shared revenue oil and gas development would bring and it would further increase energy independence in the United States.

South Carolina Senator Danny Verdin**Document ID: BOEM-2016-0003-0222**

The State Senator strongly opposes the exclusion of the Atlantic lease sales and urges BOEM to initiate a new five-year lease program that includes Atlantic lease sales, as well allowing for more seismic exploration of the Atlantic Coast. The State Senator argues that removal of this area threatens America's energy security, as oil and gas development on the Atlantic coast would mean a decreased dependence of foreign oil. The State Senator also suggests that should leasing be allowed in the Atlantic, there should be a similar revenue sharing program to that which is currently established on the Gulf Coast. The State Senator also urges BOEM to approve pending Atlantic seismic survey applications.

South Carolina Representative Davey Hoitt**Document ID: BOEM-2016-0003-0142**

The State Representative opposes the exclusion of Atlantic Region lease sales in the 2017–2022 proposed OCS development plan. The Representative argues oil and gas exploration in the region could bring jobs, additional local spending, and potential shared revenue among states along the Atlantic coast. The commenter urges that BOEM reconsider including the Atlantic region in the proposed plan and add additional early lease sales in the Atlantic.

South Carolina State Representative Bill Sandifer (House Labor, Commerce and Industry Committee)**Document ID: BOEM-2016-0003-0098**

The State Representative opposes the removal of the Atlantic lease sale, arguing that broad, bipartisan support from stakeholders, lawmakers, and citizens alike for offshore oil and gas development exists. The Representative asserts that this lease sale could reduce the United States' dependence on foreign oil and generate billions of dollars in net benefits, as well as create hundreds of thousands of jobs. The Representative suggests that should offshore development occur, states along the coast would benefit from similar revenue sharing programs to those that exist in the GOM. The Representative urges BOEM to initiate a new five-year leasing program that provides for early and annual Atlantic lease sales. The Representative also supports expansion of revenue-sharing to all states with adjacent offshore oil and gas activity. The Representative maintains the removal of this lease sale threatens our energy security by doing nothing to reduce our dependence on foreign oil and urges BOEM reconsider the removal of this leasing area.

Virginia State Senator Richard Black**Document ID: BOEM-2016-0003-0126**

The State Senator is disappointed in BOEM's removal of the Atlantic lease sale as offshore drilling has widespread support in Virginia. Including the lease sale would have at least given the option for future exploration and development.

Virginia State Senator Frank Wagner**Document ID: BOEM-2016-0003-0168**

The State Senator has advocated for Atlantic offshore drilling for over a decade and support for diversifying Virginia's economy and enhancing energy security has not diminished. The State Senator is

disappointed in BOEM’s removal of the Atlantic lease sale as offshore drilling has widespread support in Virginia.

Virginia House Delegate Ben Cline

Document ID: BOEM-2016-0003-0130

The Delegate is disappointed in the removal of the Atlantic lease sale as offshore drilling has widespread public support in Virginia and bipartisan support of the Governor and most of the congressional delegation and state legislature.

Virginia House Delegate William Howell + 20

Document ID: BOEM-2016-0003-0213

The 21 members of the Virginia House of Delegates oppose the removal of the Atlantic from the 2017–2022 five-year plan for offshore lease sales. The Delegates state that nearly two-thirds of Virginia citizens favor the possibility of offshore drilling. The Delegates note their sensitivity to the military’s use of the Atlantic coast, but note that very little (5 percent) would be off-limits, therefore offshore activity would minimally impact military activity.

A.2.8 Members of Congress

Alaska Senators Murkowski and Sullivan and Congressman Young

Document ID: BOEM-2016-0003-2550

The Senators strongly support maintaining and accelerating the timing of all Alaskan Federal water lease sales in the Proposed Program. The Senators stated that a majority of Alaskans also support this request. The Senators emphasized the volume of the estimated recoverable oil and natural gas in this region and outlined widespread economic and national security benefits of bringing these resources to market.

Eleven Senators

Document ID: BOEM-2016-0003-2551

Eleven Senators support the removal of the Atlantic Ocean from the Proposed Program, but express concern over leases in the Arctic Ocean, particularly in the Beaufort and Chukchi seas. The Senators state that pursuing expensive and environmentally damaging fuel sources does not reflect the content of the Paris agreement, nor the March 10, 2016, agreement between the United States and Canada, and is not necessary to meet U.S. short- and mid-term energy needs. The Senators urge BOEM to permanently protect these citizen-owned waters from further leasing.

Eighty-Eight Members of Congress

Document ID: BOEM-2016-0003-2291

Eighty-eight Members of Congress support the removal of the Atlantic Ocean from the Proposed Program and urge BOEM to not only remove Arctic Ocean sales, but to permanently protect the Arctic Ocean from any future oil and gas development. The Congressmen stated that continued inclusion of the Arctic Ocean would move the nation backwards in its commitment to address climate change and facilitate the transition to a clean energy economy. The Congressmen stated that, based on scientific consensus, drilling in the Arctic would worsen climate change and put the marine ecosystems and ocean-reliant communities at risk of oil spill, referencing BOEM’s findings that development of new leases in the Chukchi Sea would come with a 75 percent chance of at least one significant oil spill.

Fifty-One Members of Congress**Document ID: BOEM-2016-0003-0185**

Fifty-one Members of Congress fully support the removal of the Atlantic Ocean lease area from the Proposed Program. The Congressmen stated their appreciation to BOEM for protecting the fragile ocean ecosystems and surrounding industry that supplies more than one million jobs and \$95 billion in gross domestic products. The Congressmen emphasized the risks in offshore drilling, and the oils spills that have devastated local communities and economies.

Twenty-three Members of Congress**Document ID: BOEM-2016-0003-2552**

Twenty-three Members of Congress express disappointment in the decision to remove the Atlantic Ocean lease area from the Proposed Program and urge BOEM to maintain all proposed lease sales in the GOM and the Arctic Ocean without further reduction or restriction. The Congressmen refuted four specific points of the decision and emphasized that the decision runs counter to public opinion, historic record, and market realities. Further, the Congressmen referenced several widespread economic benefits of opening the Atlantic to lease sales.

A.2.9 Tribes and Tribal Organizations**Arctic Inupiat Offshore, LLC****Document ID: BOEM-2016-0003-2477**

The commenter supports the inclusion of the Beaufort and Chukchi seas program areas in their entirety in the Five-Year Proposed Program and states that oil and gas development in the Arctic will provide local, state, and national economic benefits. The commenter is discouraged by BOEM's decision to schedule the Arctic lease sales at the end of the Program. The commenter acknowledges that while the Arctic cannot be compared to the GOM in terms of oil and gas infrastructure, the North Slope has significant infrastructure in place to aid any exploration and development and encourages BOEM to consider management techniques used by North Slope people and industry. In addition, the commenter does not support BOEM's designation of Environmentally Important Areas.

Arctic Slope Regional Corporation**Document ID: BOEM-2016-0003-2423**

The commenter supports BOEM's decision to include lease sales in the Beaufort and Chukchi seas. The commenter believes development of the Arctic OCS is critical to the Program as well as establishing economic security in the North Slope communities. Specifically, the commenter supports Option 2 for the Beaufort Sea and Option 1 for Chukchi Sea. However, the commenter rejects exclusions or deferrals to either lease sales, stating that it is premature at the programmatic level.

Inuit Arctic Business Alliance**Document ID: BOEM-2016-0003-2316**

The commenter supports Alternative A of BOEM's draft Programmatic EIS and BOEM's Proposed Program, as well as exploration, development, and production of the Arctic OCS if done in a responsible manner. The commenter urges BOEM to maintain the Beaufort and Chukchi seas lease sales in the Proposed Program and opposes excluding Environmentally Important Areas from leasing as well as temporal closures. The commenter states that oil and gas development in the Arctic can provide hundreds

of jobs and long-term careers in regions with high unemployment rates. The commenter believes Alternative A can be achieved by mitigation efforts and communication with traditional knowledge holders.

Kuukpik Corporation

Document ID: BOEM-2016-0003-2312

The commenter asks that BOEM continue to consult with Kuukpik as the process for developing the Final Programmatic EIS continues. The commenter requests that BOEM include a protective zone in the Proposed Program modeled on the provisions of the Alaska Eskimo Whaling Commission's CAA. The commenter prefers this type of protection zone to a deferral or Environmentally Important Area and hopes BOEM honors previous discussions and requests regarding the zone.

Native Village of Nuiqsut

Document ID: BOEM-21016-0003-0204

The commenter submitted a resolution calling for the USDOJ to refrain from holding lease sales in the Arctic Ocean. The resolution states that oil and gas development in the Arctic Ocean will affect food security, wildlife, and the traditions of indigenous people.

A.2.10 General Public

A.2.10.1 General Comments from Individuals Not Specific to OCS Program Areas

Approximately 460 submissions were received from individuals, many of which provide general comments with regard to the 2017–2022 Program and potential impacts to the environment.

Individuals express general environmental concerns that new offshore drilling could lead to oil spills, leaks, air and water pollution, and coastal erosion resulting in negative effects on public health, marine resources, and the recreation and tourism industries. Some commenters expressed concern for the effects that noise from seismic testing may have on marine wildlife. Many commenters are concerned that drilling fluid discharge will contaminate seafood, negatively impacting the fishing industry. Several individuals state that continued government approval of offshore drilling favors dirty, environmentally harmful energy sources over clean, renewable energy sources. One individual argues that new regulations adopted after the Deepwater Horizon spill do not adequately mitigate the environmental risks of drilling. Several individuals express concern about the risk from oil spills on human health. Many individuals express concern about the consequences to the tourist industry from an oil spill. Some commenters state that an oil spill would pollute beaches, devastate tourism and recreation, and could result in a loss of tourist industry jobs in coastal communities. Many commenters argue that pollution from drilling, leasing, and spills will have a harmful effect on marine wildlife and damage sensitive marine habitats. However, one individual asserts that decommissioned oil and gas production platforms could benefit local ecosystems by serving as foundations for artificial reefs. This individual argues that because commercial fishing has historically coexisted with oil and gas development, the development process does not harm marine life. Some commenters argue that environmental concerns are overstated, with many citing a lack of evidence that seismic waves harm marine life or stating that the oil and gas industries have an overall positive track record when it comes to managing environmental risk. A few individuals commented that domestic production of oil and gas is more environmentally conscious than similar production in other

countries. Some individuals argue that oil and gas development is better for the environment than ethanol production, making it a more environmentally friendly option.

Many individuals express concern about the consequences leasing will have on climate change due to the resulting carbon and GHG emissions from increasing fossil fuel usage and production. Several commenters express concern that offshore drilling is a deviation from national climate change goals and a short-term solution to long-term energy needs. Specifically, many of the same commenters argue that further OCS development undermines commitments the United States made as a signatory to the 2016 Paris Agreement under the United Nations Framework Convention on Climate Change. Several individuals cite studies indicating that 30 percent of known oil reserves and 50 percent of known gas reserves must remain untouched in order to stay within the agreed upon 2 degrees Celsius limit to avoid catastrophic climate change. Many individuals note the risks of continuing to expand oil and gas development, citing the negative implications from ocean acidification, temperature increases, and sea level rise on low-lying coastal regions. Some of the same individuals state that the domestic effects of climate change disproportionately impact people of color. Numerous commenters expressed concern that carbon emissions from fossil fuel production contribute to climate change causing extreme weather (e.g., more frequent and damaging storms; severe drought and floods; and more intense tornados, hurricanes, and variations in temperature). Some individuals argue that BOEM has underestimated GHG emissions from oil and gas development because they did not account for emissions from other sources related to production such as transportation and electricity generation. A few individuals state that the draft Programmatic EIS did not devote enough attention to climate change and that its analysis was inadequate.

Many individuals express concern about the increasing risk of oil spills with further offshore drilling. Some individuals address concerns about oil spills including potential damage to ecosystems, marine life, tourist economies, fishing industries, and human health. Several individuals assert that the risk of another catastrophic event like the Deepwater Horizon spill is too great to permit further drilling. A few commenters argue that even if large spills are infrequent, small spills are commonplace and also merit consideration. In contrast, some commenters assert that the risk of spills is overstated and that the oil and gas industries have adequate spill prevention and response measures in place.

Some commenters address the importance of weighing the risks versus the benefits in terms of the economy, the environment, and society when making a decision about expansion of OCS oil and gas development. Several commenters expressed concern for health and safety risks associated with development of offshore oil and gas, particularly in areas that are geographically remote or experience severe weather. A few commenters, addressing prospective benefits such as new jobs or lower gas prices, argue that jobs could be created in other fields (e.g., marine ecosystem restoration, maintenance of aging or abandoned drilling infrastructure, and renewable energy development) with less to no risk of environmental harm or assert that offshore development will not appreciably reduce gas prices because consumption outpaces production. Some individuals suggest that BOEM should review the risk management plans of existing leaseholders to ensure that appropriate safeguards are in place before contemplating new leases. A few individuals state that other forms of energy production, such as terrestrial drilling or solar capture, are safer than offshore drilling. However, some individuals express support for the development of offshore oil and gas resources, stating that offshore oil rigs and associated resources support marine wildlife and improve ocean safety and rescue. Many commenters state that the monetary and economic benefits from oil and gas development, such as government revenue and job

creation, outweigh the environmental risks. Numerous individuals cite benefits in other areas, such as energy security, national security (via energy independence), and the development of new technologies with applications in other fields. Some individuals assert that the safety risks of offshore development are overstated and that avoiding risk to both humans and the natural environment is a leading priority for the oil and gas industries. One commenter argues that even if the resource potential of the proposed leasing areas is less than estimated, drilling in those areas would still create jobs and generate revenue.

Some commenters argue that offshore oil reserves will only provide a short-term supply of oil considering the current rate of consumption and would not help meet long-term energy needs. Several commenters suggest that cleaner renewable energy alternatives (e.g., biofuels, wind, and geothermal) should be considered for the nation's future energy needs. Some of the same commenters expressed concern that continued offshore oil and gas development undermines government efforts to support the transition to renewable energy sources. Several individuals suggest that the government should do more to promote existing and emerging alternative energy technologies rather than support entrenched technologies like offshore drilling. In contrast, many commenters support expanding exploration and development opportunities in new planning areas in an effort to secure domestic energy needs. Several individuals state that the nation's mix of energy sources should be determined on the open market rather than through government intervention. Some commenters argue that OCS development could be an important factor in reducing economic risks for the proposed Alaska liquid natural gas project. One individual disagrees with the argument that the impact of OCS drilling on production will take too long to be felt in energy markets.

Regarding regulations and safety, several commenters state that current safety reviews, regulations, inspections, and enforcement are inadequate. In contrast, many commenters point out that there have been significant technological, operational, regulatory, and legal advances in the past 30 years (including those adopted following the Deepwater Horizon spill), which have made OCS oil and gas production very safe. Several commenters expressed confidence that the industry is using the best safety practices, standards, and regulations to develop offshore oil and natural gas resources and deal with spill prevention, containment, and response.

The commenters that discussed revenue sharing generally support the sharing of Federal revenue with states and local communities, which will provide for coastal protection, infrastructure investments, and added incentives to pursue responsible offshore oil and gas development. One individual suggests that all coastal states should be included in OCS revenue sharing and that offshore deposits should be treated the same as terrestrial deposits for purposes of revenue sharing. Another commenter argues that if OCS resources and resulting revenues belong to the federal government rather than to individual states, then the states should not effectively have veto power over offshore development. The same commenter instead suggests that states should continue to have the right to review proposed OCS development off of their coastlines (starting either at the coastline itself or 20 miles beyond the shore), with revenue sharing modeled after existing terrestrial or offshore revenue sharing arrangements.

Other general comments not specific to program areas include an assertion from some individuals that politics (not science) has guided decision-making and a suggestion from one commenter that leasing decisions should be made with input from both the scientific community and industry representatives.

A.2.10.2 Comments from Individuals Specific to Program Areas

Many individuals provide comments on environmental concerns specific to the Alaska, Atlantic, and GOM program areas. Many individuals express concern that the impacts of seismic testing and offshore drilling in the Atlantic Ocean are not yet fully understood by scientists, the oil and gas industry, BOEM, or the Federal Government. Individuals express concern that airgun blasts in the Atlantic could cause injury or death to marine wildlife, including threatened and endangered species; disturbance to vital behaviors of marine mammals; displacement of whales; and disruption of both sea turtle and fish migration and spawning. However, other individuals state that there have been no known cases of injury or mortality to marine life from seismic survey activities and note that seismic surveys make offshore energy production safer and more efficient by drilling areas with known reserves.

Individuals express concern that oil spills and resource development activities in the Arctic, Atlantic, and GOM would impact wildlife refuges, marine protected areas, endangered and protected species, critical habitat, and other marine wildlife and fish populations, many of which have not recovered from past oil spill events or are under stress from other activities. Other individuals express concern about effects on marine life and disruption of food webs in the Arctic, Atlantic, and GOM planning areas due to the toxicity of oil. In contrast, some individuals are confident that oil and gas resources can be developed in the Arctic and the GOM while protecting the environment.

In statements regarding the Arctic and GOM planning areas, some individuals suggest the environmental analysis does not adequately address climate change concerns. Specifically, one individual states that the environmental analysis should include a climate change ecological resilience and resistance plan assessing the impacts of climate change on biological and ecological elements in the GOM. Another individual, also commenting with respect to the GOM Program Area, states that BOEM did not correctly follow the NEPA process mandated by law in preparing its environmental analysis. Another individual, commenting with respect to the Atlantic planning area, argues that analysis of the effects of seismic testing on the right whale, which is critically endangered, should be incorporated into NEPA documents.

Many individuals expressed concerns about the harsh conditions and extreme weather of the Arctic contributing to accidents or hindering spill responses. One commenter states that companies drilling in the Arctic have failed safety inspections, dumped waste illegally, and otherwise demonstrated a lack of concern for the environment. Another individual argues that the number of existing active spills in Alaskan waters underscores the harm that further exploration would cause. In contrast, several individuals state that new regulations and technologies will allow for development and environmental protection to coexist in the Arctic; that operators have taken great strides to implement lessons learned and enhance prevention and response capabilities in the Arctic; that drilling has occurred in the Arctic since 1971 without incident; and with regard to the Atlantic and GOM planning areas, that improved drilling practices and robust regulatory requirements have made drilling safer. One commenter states that proper platform engineering design accounts for environmental factors such as ice conditions, wind speeds, and wave heights.

Several individuals note that the consequences to fragile ecosystems and wildlife from the Deepwater Horizon event are not fully understood and will be felt for decades to come. Some individuals assert that an accident similar to this incident could have a major effect on mid-Atlantic coastal communities and natural resources. Other individuals state that the GOM has still not recovered from the Deepwater

Horizon spill, commercial fisheries and marine populations have not rebounded, and exploration and development safety recommendations and improvements in the wake of the event are not sufficient. Another individual states that the thousands of unplugged orphaned wells in the GOM already pose an environmental hazard and that it is important to ensure that more are not created. Other commenters state that the environmental impacts of the Exxon Valdez oil spill are still affecting the Arctic and that further exploration would again expose the area to the threat of a major spill. Specifically, several individuals cite BOEM's estimate that the Chukchi Sea Planning Area in the Arctic faces a 75 percent chance of a large spill during the course of exploration.

With regards to deferrals, exclusions, and mitigations in the Alaska program areas, one individual commented that approximately 42 million acres have already been removed from consideration and that further removal could foreclose future development, while several commenters expressed their concern that the proposed withdrawals are inadequate and will not effectively protect the offshore ecosystem. Numerous individuals support complete exclusion of the Atlantic, with some of those individuals arguing that the Arctic and GOM should also be excluded given concerns about the environment and climate change, whereas many individuals suggest that BOEM should maintain Atlantic lease sales in their entirety with no further access restrictions. Several individuals state that the removal of the Atlantic will lead to economic loss and harm both energy security and energy independence. Many individuals state that all of the proposed leasing areas in the Beaufort and Chukchi seas should be kept open to development and additional restrictions should be denied, while some individuals note that only a fraction of the approximately 3 million acres with active leases are producing and suggest that there is no need to open up additional acreage for exploration. Some individuals expressed concern that the deferral of additional leasing areas in the Arctic could set precedent for additional restrictions and limit opportunities for future generations. Several individuals state that predictable, frequent sales are necessary for companies to make the long-term decisions required for offshore exploration and development in Alaska. One commenter states that GOM lease sales should exclude blocks containing or adjacent to topographic high marine ecosystems and provides several examples of such ecosystems. Several commenters oppose the moratorium in the Eastern GOM, which many of those individuals argue has had a crippling effect on the oil and gas industries, while one commenter asserts that the moratorium is necessary to maintain the sensitive coastline for tourism and other activities.

Regarding cultural and subsistence concerns in Alaska, a few individuals expressed concern that BOEM failed to properly consider or balance social and cultural consequences of their actions and that the proposed program is at odds with traditional values. One commenter asserts that climate change has already negatively impacted conditions for subsistence hunting and that further Arctic exploration will exacerbate those effects. Other individuals state that the industry has a proven track record of conducting operations in cooperation with Alaska's indigenous people and that impacts on subsistence activities can be avoided and mitigated. One commenter argues that development in Alaska undermines previous government commitments to prioritize Arctic conservation for the benefit of indigenous peoples. Another individual states that the Aboriginal claim to the Arctic OCS has previously been upheld by courts.

Oral testimonies from 19 concerned Alaskans were recorded at the April 5, 2016, public meeting in Anchorage, Alaska. Each commenter requests that BOEM consider halting lease sales in Alaska as well as other regions on the OCS. These Alaskans are concerned that oil and gas development in the Arctic regions poses serious threats to ecosystems, marine wildlife, and their traditions.

A.2.11 Petitions

Note that only one Document ID number is listed for each petition below, which is a representative copy of that petition.

350.org

Document ID: BOEM-2016-0003-2562

The letter, signed by 42,215 petitioners, argued that the five-year plan should reject all new offshore oil and gas drilling. The commenters asserted that for the U.S to meet its climate targets and continue to be a leader in climate change policy, the government needs to stop new fossil fuel extraction.

Alaska Wilderness League

Document ID: BOEM-2016-0003-2586

The letter, signed by 30,610 petitioners, requests BOEM remove the Arctic from the PFP. The commenter argues that, in the past, all lease sales in the Arctic have been relinquished except for one in the Chukchi Sea. The commenter states that drilling poses high risks for large oil spills. The commenter requests that BOEM protect future generations and the climate by stopping all drilling in the Arctic.

American Petroleum Institute

Document ID: BOEM-2016-0003-0181

The letter, signed by 177,000 petitioners, states support for greater domestic offshore oil and gas production that creates jobs, grows the economy, and increases energy security. They stated that it is vital to offer the GOM and Alaska and open up areas in the Atlantic.

Center for Biological Diversity

Document ID: BOEM-2016-0003-2570

The letter, signed by 59 petitioners, requests the Administration end all offshore oil and gas lease sales. The commenters request keeping fossil fuels in the ground in order to protect coastal communities, fisheries, and sensitive marine habitat.

Consumer Energy Alliance

Document ID: BOEM-2016-0003-2569

The letter, signed by 21,438 petitioners, requests the Administration maintain the GOM and offshore Alaska sales, and include the Atlantic. The petitioners urge the initiation of a new Program that provides for annual, early lease sales, informs lease sales by approving pending Atlantic seismic survey applications, and support efforts to expand revenue sharing to all states with adjacent offshore oil and gas activity.

Daily Kos

Document ID: BOEM-2016-0003-2585

The letter, signed by 8,889 petitioners, requests the Administration stop new drilling in the Arctic, GOM, or elsewhere and urges President Obama to issue an executive order ending all new oil and gas leases in federally controlled oceans and lands.

EarthJustice**Document ID: BOEM-2016-0003-2571**

The letter, signed by 32,881 petitioners, supports the removal of the Atlantic from offshore oil and gas leasing. Commenters further request the President remove both the Arctic and GOM planning areas from the proposed plan. The commenters argue that if the U.S. is to follow the guidelines established in the Paris Agreement, the country should be doing everything possible to reduce GHG emissions to avoid the worst impacts of global warming.

Environment America**Document ID: BOEM-2016-0003-2572**

The letter, signed by 19,436 petitioners, requests the removal of new leasing areas in both the Arctic and GOM. The petitioners argue that opening new drilling leases in these areas puts the wildlife and ecosystems at unnecessary risk of oil spills. Petitioners also assert the U.S. needs to limit the amount of fossil fuels we are using in order to subdue the impacts of climate change.

Environmental Action**Document ID: BOEM-2016-0003-2587**

The letter, signed by 46,242 petitioners, opposes all new oil and gas leasing, especially in the GOM. Selling 92.2 million acres of the GOM for oil and gas drilling would exacerbate climate change effects and increase the chances of another oil spill. Eliminating the Atlantic leasing area from the Proposed Program and placing a moratorium on new coal mining on public lands are positive decisions in keeping with the commitment to the Paris Agreement.

Greenpeace USA**Document ID: BOEM-2016-0003-2582**

The letter, signed by 205,905 petitioners, expresses support for BOEM's removal of the Atlantic region from the Proposed Program, and requests BOEM remove all new oil and gas lease sales from the PFP. The commenters argue that drilling plans not only threaten coastal communities and wildlife, but cause negative climate effects as well.

League of Conservation Voters**Document ID: BOEM-2016-0003-2574**

The letter, signed by 82,116 petitioners, states support for BOEM's decision to remove the Atlantic Ocean Program Area from the Proposed Program but requesting that BOEM remove the Arctic Ocean Program Area from the PFP and permanently protect the Arctic and Atlantic oceans from offshore oil and gas development and work towards protecting the Gulf as well.

Ocean Conservancy**Document ID: BOEM-2016-0003-2580**

The letter, signed by 48,094 petitioners, urges BOEM to remove all new oil and gas lease sales from the Arctic Ocean and the final version of the program given the oil industry's retreat from Arctic drilling.

Oceana A**Document ID: BOEM-2016-0003-2573**

The letter, signed by 67,275 petitioners, approves BOEM's decision to remove the Atlantic Ocean Planning Area from the Proposed Program but requests that BOEM stop seismic airgun blasting in the

Atlantic, as well as remove the Arctic Ocean program areas, such as the Beaufort and Chukchi seas, from future lease sales. According to the commenters, many companies are unfit for safe development of oil and gas in the Arctic, while others have relinquished lease areas in the past.

Oceana B**Document ID: BOEM-2016-0003-2575**

The letter, signed by 22,521 petitioners, requests removal of the Beaufort and Chukchi seas from the Program; deny future requests to drill exploration wells; finalize Arctic safety and prevention regulations; and comprehensively revise and update the regulations governing planning, leasing, and exploration. The petitioners cite several risks to the Arctic, including climate change, local communities, and oil spills are reasons to remove these areas from the Program.

Oceana C**Document ID: BOEM-2016-0003-2559**

The letter, signed by 1,785 petitioners, states opposition to BOEM's decision to include lease sales in the Arctic Ocean as well as oil and gas exploration and development in the Atlantic Ocean such as seismic airgun blasting. Seismic airgun blasting is harmful to marine wildlife and fish, as well as coastal businesses. Furthermore, offering new lease sales in the Arctic Ocean would continue failed policies of the past and put new ecosystems at risk.

Oil Change International**Document ID: BOEM-2016-0003-2536**

The letter, signed by 12,025 petitioners, urges an end to offshore drilling and the removal of all leases from the Proposed Program. The commenter approves BOEM's decision to remove the Atlantic Ocean Planning Area from the leasing program, but requests that the Obama Administration halt all offshore drilling.

Pacific Environment**Document ID: BOEM-2016-0003-2577**

The letter, signed by 982 petitioners, requests BOEM remove the Beaufort and Chukchi seas from the Proposed Program. The commenter states that the risks, such as an oil spill or worse climate change effects, are too high. According to the commenter, the U.S. needs to transition to clean, renewable energy sources and not extract more fossil fuels.

Sierra Club**Document ID: BOEM-2016-0003-2590**

The letter, signed by 123,592 petitioners, argues that all new offshore leases for drilling should be removed from the current proposed plan. Commenters assert oil and gas drilling carry the risk of catastrophic spills that are damaging to the environment. The commenters further argue that instead of opening new lease sales, the U.S. should focus on investing in clean and renewable energy sources.

Sierra Club—Virginia Chapter**Document ID: BOEM-2016-0003-2563**

The letter, signed by 120 petitioners, supports the removal of the Atlantic lease sale and requests the new proposed leasing areas in the Arctic and GOM be removed as well. The commenters argue that promoting fossil fuel exploration would undermine the nation's efforts to reduce GHG emissions. The

commenters also state that while the Atlantic lease sale has been removed, Virginia is still subject to potential sea-level rise that could occur from changes in our climate, and continuing wide-spread use of fossil fuel will only increase the effects of climate change.

The Pew Charitable Trusts A**Document ID: BOEM-2016-0003-2561**

The letter, signed by 440 petitioners, states support for the removal of the Beaufort and Chukchi seas from the Proposed Program. The commenter supports further consultation with indigenous communities and tribes and with Arctic scientists to identify and permanently withdraw additional important marine areas to promote a sustainable, resilient future for this extraordinary ecosystem.

The Pew Charitable Trusts B**Document ID: BOEM-2016-0003-2589**

The letter, signed by 19,883 petitioners, states support for the removal of the Beaufort and Chukchi seas from the Proposed Program. The commenter states that much of the areas considered for leasing overlap with sensitive marine habitats that provide critically important contributions to the integrity and functionality of larger ecosystems.

Wildlife Conservation Society**Document ID: BOEM-2016-0003-2588**

The letter, signed by 23,528 petitioners, expresses strong support for BOEM's decision to remove the Mid- and South Atlantic Program Areas from the Proposed Program, citing risks to marine wildlife including additional noise, ship strikes, major oil spills, and reduced available acoustic habitat vital for communication. The commenter asks BOEM to consider the full scope of effects to marine wildlife using the most current scientific data available as the five-year plan is finalized.

World Wildlife Fund**Document ID: BOEM-2016-0003-2556**

The letter, signed by 271,893 petitioners, supports the removal of the Beaufort and Chukchi seas from the proposed oil and gas leasing plan. The commenters argue the U.S. needs to focus on alternative energy in order to help combat climate change, and opening up the Arctic, which is already experiencing the effects of climate change first hand, will only exacerbate those effects.

A.2.12 Form Letters (from Individuals)

Note that only one Document ID number is listed for each form letter below, which is a representative copy of that form letter. Form letters not submitted through an organization were assigned alphabetic identifiers (form letters A through K). Note that business entities or organizations that submitted the same comment letter were included separately in the appropriate commenter category above.

Form Letter A**Document ID: BOEM-2016-0003-2568**

The form letter, submitted by 186,065 commenters, expresses support for leasing in the GOM and Alaska and opening new areas for exploration in the Atlantic, citing job creation, economic growth, and energy security.

Form Letter B**Document ID: BOEM-2016-0003-2566**

The form letter, submitted by 100,831 commenters, expresses support for leasing in the GOM and Alaska, citing job creation, economic growth, and energy security.

Form Letter C**Document ID: BOEM-2016-0003-2564**

The form letter, submitted by 2,181 commenters, expresses support for a Program that maintains all areas currently open for oil and gas leasing and expanded access in the Eastern GOM and Arctic, citing the creation of additional jobs, economic growth, and increases in manufacturing across all sectors.

Form Letter D**Document ID: BOEM-2016-0003-2565**

The form letter, submitted by 81 commenters, expresses support for safely exploring and developing oil and natural gas on the OCS, citing its importance to employment, the economy, and a strong safety record.

Form Letter E**Document ID: BOEM-2016-0003-2097**

The form letter, submitted by 12 commenters, expresses disappointment in the exclusion of the Atlantic lease sale and recommends maintaining all GOM and Alaska lease sales without further restriction.

Form Letter F**Document ID: BOEM-2016-0003-2560**

The form letter, submitted by 14 commenters, urges the Secretary to not allow Arctic drilling, citing oil spill impacts and climate change.

Form Letter G**Document ID: BOEM-2016-0003-0038**

The form letter, submitted by 25 commenters, urges BOEM to not allow new offshore oil and gas leasing in public waters, citing climate change, oil spill impacts, and environmental justice issues.

Form Letter H**Document ID: BOEM-2016-0003-0250**

The form letter, submitted by 1,529 commenters, expresses disappointment in the exclusion of the Atlantic lease sale, recommends a new Program that includes the Atlantic Program Area, approval of pending seismic survey applications, revenue sharing in all states with offshore energy activity, and recommends maintaining all GOM and Alaska lease sales without further restriction, citing job creation, federal revenue, and U.S. energy security.

Form Letter I**Document ID: BOEM-2016-0003-0524**

The form letter, submitted by 275 commenters, supports keeping the Proposed Program as-is with no additional areas being removed from future leasing consideration, citing energy security, job creation, and government revenue generation. The commenters stated that the decision to remove the Atlantic from leasing consideration was short-sighted and that the Mid-Atlantic states would not realize the benefits of

oil and gas activities. The commenters stated concern if areas in the Alaska program areas are reduced or if mitigation measures are imposed.

Form Letter J**Document ID: BOEM-2016-0003-1930**

The form letter, submitted by 14 commenters, supports the removal of the Atlantic lease sale, citing the coastal tourism industry, oil spills, environmental resources, and support of renewable resources.

Form Letter K**Document ID: BOEM-2016-0003-2267**

The form letter, submitted by 6 commenters, supports the removal of the Atlantic lease sale, citing environmental concerns. The commenters also encouraged BOEM to reassess the justification for issuing seismic testing permits in the Atlantic.

Center for Biological Diversity**Document ID: BOEM-2016-0003-2591**

The form letter, submitted by 20,244 commenters, expresses support for BOEM's decision to remove the Atlantic from the Proposed Program but urges BOEM to end all offshore gas leasing in public waters by removing all areas of the Arctic and GOM from the proposed five-year plan. According to the commenter, offshore oil and gas development only deepens the climate crisis and sets the stage for another disastrous oil spill which devastates coastal communities and marine wildlife.

Consumer Energy Alliance**Document ID: BOEM-2016-0003-0182**

The form letter, submitted by 8,422 commenters, urges BOEM to include the Mid- and South Atlantic and Alaska Planning Areas in the Proposed Program without further exclusions or reductions. This would lead to lower energy prices, benefiting businesses and consumers across the country.

CREDO Action A**Document ID: BOEM-2016-0003-2584**

The form letter, submitted by 95,275 commenters, urges BOEM to remove all new lease sales in the Arctic and GOM from the PFP, citing climate change. According to the commenter, the Arctic and Gulf represent the 3rd and 8th largest pools of carbon in the world.

CREDO Action B**Document ID: BOEM-2016-0003-0183**

The form letter, submitted by 8,433 commenters, urges President Obama to not allow any new offshore drilling in Federal waters, citing climate change and oil spill risks.

Gulf Restoration Network**Document ID: BOEM-2016-0003-2535**

The form letter, submitted by 558 commenters, urges BOEM to halt all new oil and gas lease sales in Federal waters and adopt a "no action" alternative. The commenter argues continuing oil and gas development in the OCS is irresponsible to coastal inhabitants as it will put these residents and the environment at risk due to accidents and spills. Furthermore, it will reverse President Obama's and the

international community's commitment to combat climate change. The commenter argues the proposed program violates national policies such as NEPA, the OCS Lands Act, and the Endangered Species Act.

National Resources Defense Council

Document ID: BOEM-2016-0003-2592

The form letter, submitted by 131,331 commenters, states support for BOEM's decision to remove the Atlantic Ocean Program Area from the Proposed Program but opposition to opening Arctic waters to oil and gas drilling. New drilling will threaten wildlife with a possible oil spill as well as drive more carbon pollution. The commenter asks that BOEM permanently protect the Atlantic and Arctic from all new oil and gas exploration. This will allow America to move towards a clean energy future and protect future generations.

The Wilderness Society

Document ID: BOEM-2016-0003-2583

The form letter, submitted by more than 11,750 commenters, states approval for BOEM's decision to remove the Atlantic Ocean from the five-year plan, but urges BOEM to remove the Arctic Ocean as well before finalizing the plan.

Waterkeeper Alliance

Document ID: BOEM-2016-0003-2579

The form letter, submitted by 1,819 commenters, states support for BOEM's decision to remove the Atlantic Ocean Program Area from the Proposed Program but requesting that BOEM remove the Arctic Ocean and GOM Program Areas from the PFP as well. Comments focused on the disastrous effects of offshore oil and gas drilling and a lack of decisive action on climate change.



The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Bureau of Ocean Energy Management Mission

The Bureau of Ocean Energy Management (BOEM) manages the exploration and development of the nation's offshore resources. It seeks to appropriately balance economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development and environmental reviews and studies.