2017—2022 Outer Continental Shelf Oil and Gas Leasing Draft Proposed Program

January 2015

U.S. DEPARTMENT OF THE INTERIOR
MARCH 3, 1849

BOEM
Bureau of Ocean Energy Management

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Abbreviations and Acronyms

Area ID	Area Identification
bbl	barrels of oil
BBO	billion barrels of oil
BBOE	billion barrels of oil equivalent
BOE	barrel of oil equivalent
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
California I	*California v. Watt*, 688 F.2d 1290 (D.C. Cir. 1981)
California II	*California v. Watt*, 712 F.2d 584 (D.C. Cir. 1983)
CBD	Center for Biological Diversity
CDE	catastrophic discharge event
CZM	Coastal Zone Management
DMME	Virginia Department of Mines, Minerals, and Energy
DOD	Department of Defense
DOE	Department of Energy
DPP	Draft Proposed Program
DPS	Distinct Population Segment
EA	environmental assessment
EEZ	Exclusive Economic Zone
EIA	Energy Information Administration
EIS	environmental impact statement
ENSO	El Niño-Southern Oscillation
ESA	Endangered Species Act of 1973
ESI	environmental sensitivity index
ESPIS	Environmental Studies Program Information System
FMV	fair market value
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FY	fiscal year
G&G	geological and geophysical
GDP	gross domestic product
GHG	greenhouse gas
GIS	geographic information system
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
mcf	thousand cubic feet
MHK	marine hydrokinetic
MMS	Minerals Management Service
NAAQS	National Ambient Air Quality Standards
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

NMS	National Marine Sanctuaries
NNMREC-OSU	Northwest National Marine Renewable Energy Center at Oregon State University
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NP	National Park
NPP	net primary productivity
NS	National Seashore
NSV	net social value
NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
2012–2017 Program PEIS	*Outer Continental Shelf Oil and Gas Leasing Program: 2012–2017 Programmatic Environmental Impact Statement*
OECM	Offshore Environmental Cost Model
OPAREA	Operational Area
OPEC	Organization of Petroleum Exporting Countries
PADD	Petroleum Administration for Defense District
PEIS	programmatic environmental impact statement
PFP	Proposed Final Program
PP	Proposed Program
RFI	Request for Information and Comments
ROD	Record of Decision
SCB	Southern California Bight
Seismic EIS	*Atlantic OCS Geological and Geophysical (G&G) Activities, Mid-Atlantic and South Atlantic Planning Areas, Final Programmatic Environmental Impact Statement*
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.C.	United States Code
USDOI	United States Department of the Interior
USGS	U.S. Geological Survey
UTRR	undiscovered technically recoverable resources
VGPM	Vertically Generalized Production Model
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, and 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 (USDOI) 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 replace 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 Draft Proposed Program (DPP) for OCS oil and gas leasing is the first in a series of three decision documents developed, pursuant to the OCS Lands Act, before the Secretary of the Interior (Secretary) may take final action to approve a 2017–2022 Program (43 U.S.C. 1331 et seq.).

The DPP phase provides a basis for conducting further analysis and a mechanism for gathering additional information for the Secretary to consider in making future decisions. See Chapter 1, OCS Oil and Gas Leasing Program Development Process, for further information regarding the OCS oil and gas leasing program development process. This DPP consists of the following parts:

Summary of the Draft Proposed Program describes the rationale behind the Secretary's DPP 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 to be taken into account in deciding where and when to propose lease sales. Also included is a summary of the judicial guidance obtained from the court decisions regarding the Program.

Part II: Analysis of All 26 OCS Planning Areas presents the Section 18 analyses of all 26 OCS Planning Areas that BOEM prepared and used to develop the options presented to the Secretary.

Part III: Lease Sale Options presents the options that BOEM prepared based on its analysis of the OCS Lands Act Section 18 criteria. This part also presents the Secretarial DPP decision. Options determined to be viable for detailed examination through the DPP decision-making process will next be analyzed in the PP and the Draft PEIS. See Figure 1-3 for a diagram of BOEM's leasing process.

Appendix A: Summaries of Public Comments by Commenter Category is a summary of the comments BOEM received in response to its June 16, 2014, *Federal Register* (FR) Notice (79 FR 34349) requesting information and comments from all interested parties.

Appendix B: Economic Analysis Methodology provides a further explanation of the analytic approach used for the analyses presented in Part II, including an explanation of the calculations and assumptions in the net social value analysis described in Section 6.2 and the fair market value analysis discussed in Chapter 8.

Summary of the Draft Proposed Program

S.1 Decision-Making Strategy

The Bureau of Ocean Energy Management (BOEM) is responsible for managing 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..." Section 18 of the OCS Lands Act (43 U.S.C. 1344). This first stage of lease sale schedule development involves analyzing all 26 OCS planning areas to provide a basis to conduct further analysis, and acts as a mechanism to gather additional information for the Secretary of the Interior (Secretary) to consider in making future decisions within this five-year planning process and successive processes (e.g., future lease sales and oil and gas Program development processes). The analysis of all 26 OCS planning areas is contained in this 2017–2022 DPP document. The Secretary, in accordance with Section 18 of the OCS Lands Act, uses balancing factors and guiding principles (described in Chapter 2) to develop reasonable options for a schedule of proposed lease sales.

The next stage of developing the 2017–2022 Program is the Proposed Program (PP) analysis and decision. During the PP stage, the lease sale options identified in the DPP and chosen by the Secretary as feasible for potential inclusion in the 2017–2022 Program will be further analyzed. Only those areas and options that the Secretary decides are appropriate to include in the DPP decision will be further analyzed in the PP and the associated Draft Programmatic Environmental Impact Statement (PEIS). Subsequently, only the OCS areas and options that the Secretary decides to include in the PP decision will be analyzed in the Proposed Final Program (PFP) and in the Final PEIS. The PEIS will consider potential geographic exclusions and restrictions on leasing activities for the 2017–2022 Program, and the final decision on the Program may adopt any exclusions or restrictions that BOEM considers necessary for environmental protection and that are sufficiently identifiable at that stage. Those exclusions or restrictions not chosen at the Program stage may, as appropriate, be considered at later, more focused stages in the leasing process, including the pre-lease sale and plans processes (see Chapter 2).

It is important to emphasize that this DPP is the first of three phases required to develop the 2017–2022 Program. Because the Program development process starts with the broadest consideration of areas available for leasing (i.e., all 26 OCS planning areas) and is narrowed through a winnowing process, the DPP contains the broadest possible decision under consideration. As additional comments are received, a National Environmental Policy Act (NEPA) analysis is conducted, and Section 18 criteria are further analyzed and balanced, a PP will be composed and the analysis refined. Inclusion of an area at the DPP phase is not a final indication that it will be included in the approved Program or offered in a lease sale, because many decision points still remain for reducing or completely deleting an area or sale. Conversely, if an area or sale is not included at the DPP stage, it cannot be added back in without analyzing the option and rebalancing the DPP decision.

The 2017–2022 DPP is designed to promote the diligent and responsible development of the Nation's offshore oil and gas resources. The offshore oil and gas leasing Program is an important component of the President's all-of-the-above energy strategy to expand safe and responsible domestic oil and natural gas production as a means to support economic growth and job creation and enhance energy security. The DPP reflects three primary goals: (1) providing access to oil and gas resources in OCS areas that are well-understood, mature, and robust, (2) laying the groundwork for future data collection to inform future decisions about access to frontier areas, and (3) balancing potential environmental impacts and competing ocean uses. The DPP provides the platform to foster the flexibility necessary for long-term planning.

This DPP continues the regionally-tailored leasing strategy set forth in the current 2012–2017 Program. The proposed schedule reflects that a one-size-fits-all approach to offshore leasing is not appropriate, but instead should be tailored to achieve the dual goals of promoting prompt development of the Nation's oil and gas resources while protecting the marine, coastal, and human environments within each specific OCS region.

This region-specific strategy is the basis of the DPP's approach to assessing offshore areas around the country individually, including evaluation of current information about resource potential, accommodation of regional interests and concerns, and the need for a balanced approach to development of our natural resources. The options in the DPP involve sales in offshore areas that have the highest oil and gas resource values, highest industry interest, or are off the coasts of states that expressed interest in further consideration of potential effects of energy exploration, while recognizing potential environmental impacts, concerns, and competing uses of ocean and coastal areas.

Grounded in these principles, the DPP contains a proposed lease sale schedule for eight OCS planning areas where there are currently active leases, exploration, support from adjacent states, and/or known or anticipated hydrocarbon potential. In certain regions such as the Western and Central Gulf of Mexico that are known to contain significant oil and gas resources and that already have well-developed infrastructure, including established spill response capacity, the proposed schedule is designed to make substantial areas available for exploration and development. In other regions, such as the Arctic and the Mid- and South Atlantic, the proposed schedule takes a more cautious approach, allowing time for additional research and data collection about the resource values in those areas and reflecting that necessary infrastructure needs to be developed. In total, this strategy makes available for leasing areas containing nearly 80 percent of the estimated undiscovered technically recoverable oil and gas resources estimated on the OCS.

While offshore oil and gas exploration and development will never be risk-free, the United States Department of the Interior (USDOI) has made, and is continuing to make, substantial reforms to improve the safety and environmental protection of the OCS activity since the 2010 *Deepwater Horizon* blowout and oil spill. Working with a host of stakeholders, USDOI 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.

On June 16, 2014, BOEM published a Request for Information and Comments (RFI) in the *Federal Register* regarding the preparation of a 2017–2022 Program. BOEM received more than half a million comments in response to the June 2014 RFI (see Appendix A, Summary of Public Comments on the Request for Information and Comments, for additional information). Comments were received from Governors; Federal, state, and local government agencies; energy and non-energy industry; tribal governments; non-governmental organizations including environmental advocacy groups; and the general public. Of the 22 coastal states, Governors from 6 states requested exclusion from the 2017–2022 Program (Washington, Oregon, California, Maryland, Delaware and Massachusetts), and 9 states requested inclusion in the DPP (Alaska, Texas, Louisiana, Mississippi, Alabama, Georgia, South Carolina, North Carolina, and Virginia). The remaining seven states either did not provide a response to the RFI or did not state a position regarding the Program in their comment response. See Chapter 3 for more detail and a map of state government input.

S.2 2017–2022 Draft Proposed Program

The schedule below reflects the lease sale options selected to create the 2017–2022 DPP. Those selections result in a schedule of 14 potential lease sales in 8 OCS planning areas: Ten sales in the three Gulf of Mexico (GOM) planning areas; one sale each in the Chukchi Sea, Beaufort Sea, and Cook Inlet Planning Areas, offshore Alaska; and one sale in a portion of the combined Mid-Atlantic and South Atlantic Planning Areas (see Table S-1). No lease sales are proposed for the Pacific. A more detailed description of these lease sale options, including more detailed maps, is presented in Chapter 9.

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

	Year	Planning Area	Sale Number
1.	2017	Gulf of Mexico Region	249
2.	2018	Gulf of Mexico Region	250
3.	2018	Gulf of Mexico Region	251
4.	2019	Gulf of Mexico Region	252
5.	2019	Gulf of Mexico Region	253
6.	2020	Gulf of Mexico Region	254
7.	2020	Beaufort Sea	255
8.	2020	Gulf of Mexico Region	256
9.	2021	Gulf of Mexico Region	257
10.	2021	Cook Inlet	258
11.	2021	Gulf of Mexico Region	259
12.	2021	Mid-Atlantic and South Atlantic	260
13.	2022	Gulf of Mexico Region	261
14.	2022	Chukchi Sea	262

S.2.1 Gulf of Mexico Region

Gulf of Mexico options identified for further detailed analysis in the PP and PEIS include region-wide sales: one sale each in 2017 and 2022, and two sales each in 2018, 2019, 2020, and 2021 (see Figure S-1). In addition to balancing Section 18 factors, the DPP is also tailored to support development that is commensurate with the presence and maturity, or lack thereof, of the infrastructure necessary to support offshore oil and gas activity. Of the 14 lease sales included in

the DPP, 10 are in the GOM, where infrastructure is best-established and there is strong adjacent state support and significant resource potential.

In the past, 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. This DPP schedules region-wide sales comprised of the Western, Central, and Eastern GOM unleased acreage not subject to moratoria. BOEM is proposing this change to balance Agency workload and 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 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 (see Section 3.1.4 for more information).

While sales in the GOM have historically been separate annual sales in the Central and Western GOM and periodic sales in the Eastern GOM as appropriate, significant recent energy reforms in Mexico have the potential to meaningfully change how exploration and development decisions are made in the GOM. By scheduling sales 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.

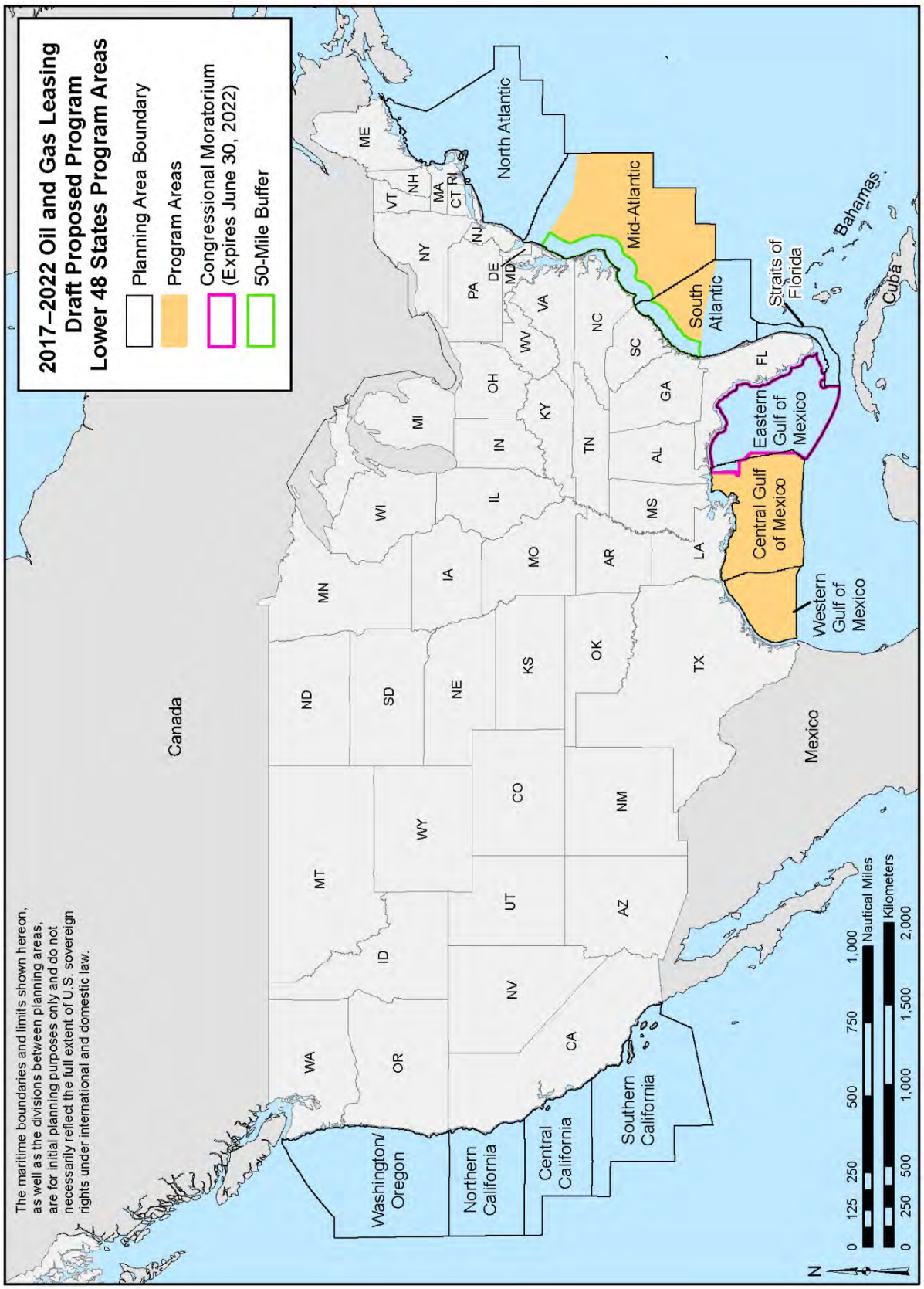


Figure S-1: 2017–2022 Draft Proposed Program Gulf of Mexico Region and Atlantic Region Program Areas

S.2.2 Alaska Region

In Alaska, the DPP continues to take a balanced approach to development, utilizing the targeted leasing strategy set forth in the current Program by identifying one potential sale each in the Beaufort Sea (2020), Cook Inlet (2021), and Chukchi Sea (2022) Planning Areas (see Figure S-2). These potential sales in the three Alaska program areas are scheduled late in the five-year period to provide additional opportunity to evaluate and obtain information regarding environmental issues, subsistence use needs, infrastructure capabilities, and results from any exploration activity associated with existing leases (see Chapter 3 for information on each planning area's history and current status).

The pre-lease sale process has begun for the three Alaska sales in the current 2012–2017 Program in the Beaufort Sea, Cook Inlet, and Chukchi Sea. Information gathered, analyses conducted, and decisions made for these sales 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 sales in the three Alaska program areas.

As developed for the 2012–2017 Program, BOEM will continue to use developing scientific information and stakeholder feedback to proactively determine, in advance of any potential sale, which specific areas offer the greatest resource potential while minimizing potential conflicts with environmental, subsistence, and multiple use considerations. This approach is guided by internal best practices, and incorporates recommendations from the U.S. Geological Survey (USGS) and the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling that BOEM consider alternatives to area-wide leasing, particularly for frontier areas like the Arctic. Therefore, sales will be tailored to offer areas that have significant resource potential while appropriately weighing environmental protection, subsistence use needs, and other considerations.

The DPP includes a potential Beaufort Sea sale in 2020 in a program area that excludes the Barrow and Kaktovik whaling deferral areas, which were also excluded in the current Program as well as the 2007–2012 Program (see Figure S-2). Deferrals have long existed around Barrow and Kaktovik at the request of stakeholders, including the North Slope Borough and the Native Village of Kaktovik, respectively.[1] BOEM will continue to identify and assess additional potential deferral areas, such as Cross Island, Barrow Canyon, Camden Bay, and other important subsistence use or environmentally sensitive areas, during the subsequent Section 18 and NEPA processes.

The DPP schedules a potential Chukchi Sea sale in 2022 that excludes the 25-mile coastal buffer and subsistence deferral areas that were also excluded in the current Program (see Figure S-2). Since the onset of leasing consideration in the area, the Chukchi Sea coastal area has been

[1] The present Barrow whaling deferral area in the Beaufort Sea appeared in the Beaufort Sea Lease Sale 186 (held September 2003), and was incorporated in subsequent lease sales and into the PFPs for 2007–2012 and 2012–2017. Deferral areas around Point Barrow were first mentioned in the Proposed Five-Year Program OCS Oil and Gas Leasing Program mid-1987 to mid-1992 Final EIS (released January 1987). A deferral area around Point Barrow was first proposed by the State of Alaska, U.S. Environmental Protection Agency, Natural Resources Defense Council, and the North Slope Borough.

recognized as an important bowhead whale migration corridor, coastal habitat for many bird species, and a protective buffer to offshore subsistence areas and resources for communities along the coast. As such, specific blocks have been deferred through past Programs and lease sales. Based on BOEM's analyses conducted for the 2007–2012 Program, the current Program, recent sales, and analysis of comments received during the pre-lease process for Arctic lease sales, other potential deferrals will be considered for this Program, such as Hanna Shoal, Herald Shoal, Ledyard Bay Critical Habitat Unit, and others that may be raised during the Section 18 and/or NEPA analyses for this Program preparation. The deferral and buffer areas in both the Beaufort and Chukchi Seas adopted for the DPP protect important subsistence and environmentally sensitive areas while leaving significant oil and gas resources available for continued consideration.

A potential Cook Inlet sale is scheduled for 2021 in a program area that includes only the northern portion of the Cook Inlet OCS Planning Area (see Figure S-2). This option balances the protection of endangered species, as identified in 2013 in the Cook Inlet Lease Sale 244 Area Identification (Area ID), with the availability for leasing of the areas with significant resource potential and industry interest. The Lease Sale 244 Area ID resulted in the removal of certain blocks of concern due to beluga whale and sea otter critical habitat. The areas identified in the Lease Sale 244 Area ID and potentially other deferrals and environmental concerns will be considered in subsequent steps.

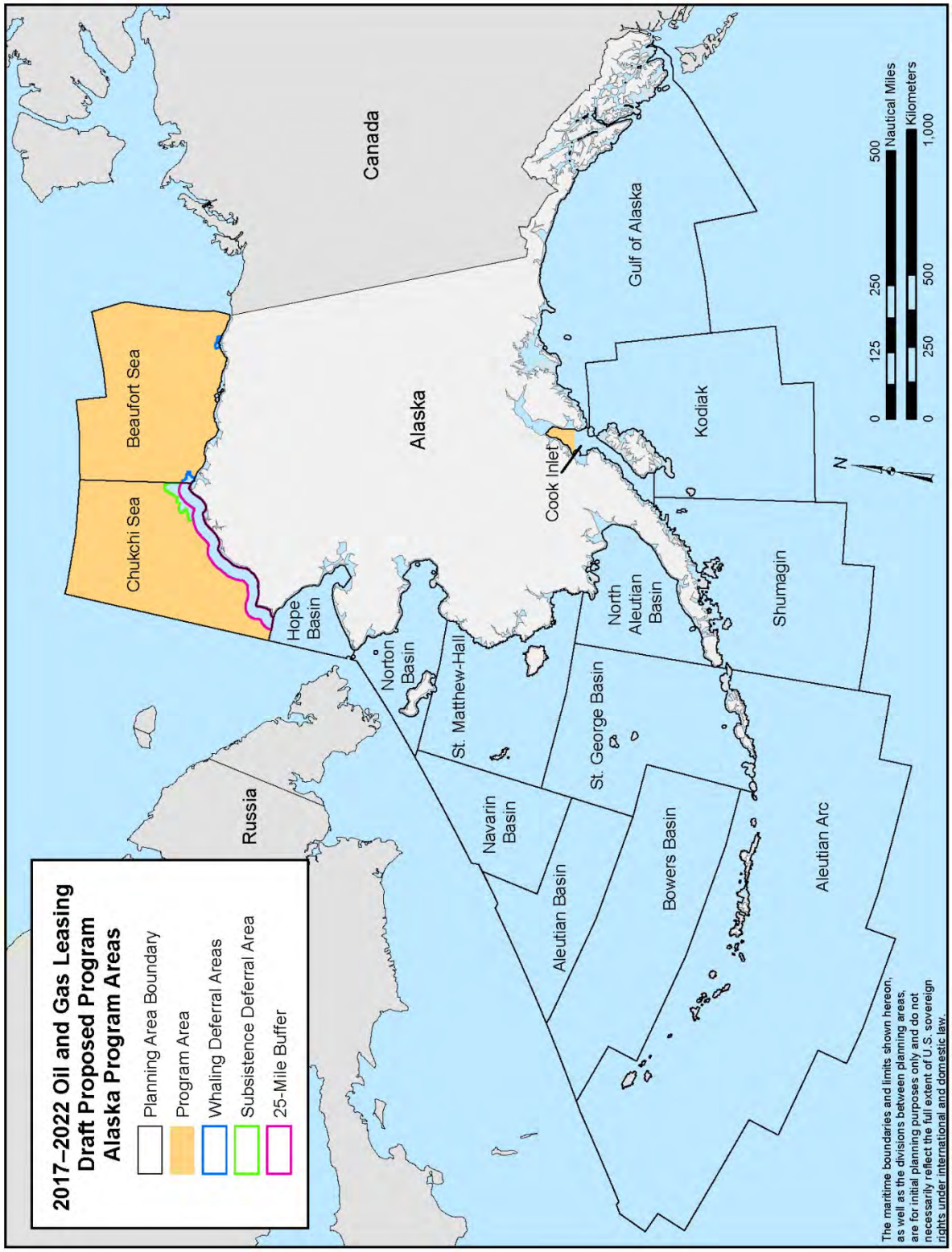


Figure S-2: 2017–2022 Draft Proposed Program Alaska Region Program Areas

S.2.3 Atlantic Region

One option, a lease sale in a portion of the Mid-Atlantic and South Atlantic Planning Areas in 2021, has been identified for additional analysis in this DPP (see Figure S-1). Consistent with the targeted and balanced leasing approach adopted in the current Program and this DPP for the Arctic, there is one potential sale scheduled late in the Program, which would be located at least 50 miles offshore the coasts of Virginia, North Carolina, South Carolina, and Georgia in the Mid-Atlantic and South Atlantic Planning Areas. Presenting this option in the DPP allows for consideration of a targeted area with resource potential, while limiting potential impacts to the environment and other ocean uses.

Some data suggest that portions of the Mid-Atlantic and South Atlantic Planning Areas may contain significant oil and gas resource potential; however, current geological and geophysical (G&G) information regarding that potential is based on older data collected in the 1970s and 1980s. Tremendous advances in instrumentation and technology for the acquisition and analysis of G&G data have been made in the intervening decades.

In recognition of these advances in G&G data acquisition technology and of the need to better understand the scope of existing resources and potential conflicts, BOEM's July 2014 Record of Decision (ROD) for the PEIS for Atlantic G&G activities established a path forward for appropriate G&G survey activities off the Mid-Atlantic and South Atlantic coast. That decision establishes safeguards governing potential research activities to update the region's offshore oil and gas resources data.

The ROD for Atlantic G&G activities established the highest practicable level of mitigation measures and safeguards consistent with allowing survey activity, to reduce or eliminate environmental impacts, including impacts on marine life. This work builds upon the groundwork laid in the 2012–2017 Program, and is consistent with BOEM's frontier area strategy to increase BOEM's understanding of resource potential and develop a suite of environmental studies for the purpose of establishing a baseline. Several permits are currently under consideration for conducting geophysical seismic surveys and, if approved, will provide critical new information to inform potential future leasing decisions.

Additionally, the Governors of Virginia, North Carolina, and South Carolina requested that the Mid-Atlantic and South Atlantic Planning Areas be included in the DPP and indicated a desire to better understand the oil and gas potential offshore their states. Georgia's Department of Natural Resources, on behalf of the governor, expressed its interest in increasing access to domestic oil and gas resources while detailing its issues and concerns with potential environmental impacts and conflicts with other important ocean activities.

The Mid-Atlantic and South Atlantic Planning Areas have also been previously identified by the Department of Defense (DOD) as areas important to DOD mission activities, such as training and testing. The USDOI respects the military's mission in protecting the United States and will continue to work closely with DOD to understand and identify potential measures to deconflict the military's needs in these areas.

The 50-mile coastal buffer, for example, was included for the potential Atlantic sale to minimize potential conflicts with DOD activities as well as respond to the Governor of Virginia's comments regarding minimizing other multiple-use conflicts, such as renewable energy activities, commercial and recreational fishing, critical habitat needs for marine mammals and sea turtles, hard bottom environments, and other environmental concerns. During the subsequent Section 18 and NEPA processes, BOEM will be collecting and analyzing additional information regarding the extent to which any existing conflicts can be minimized and what mitigation measures should be required.

Finally, the DPP proposes a sale in this area late in the Program, reflecting the need for additional analysis and planning to identify the infrastructure and resources necessary to prepare for development activity, particularly spill response capabilities. During the next stages of the Section 18 and NEPA processes, BOEM will be seeking additional information regarding the extent to which necessary infrastructure can be made available to ensure protection of the environment and public safety.

S.2.4 Pacific Region

No lease sales have been identified in the Pacific for additional analysis. The four planning areas off the Pacific coast were not included for potential oil and natural gas leasing. The exclusion of the Pacific Region is consistent with the long-standing interests of Pacific coast states, as framed in the 2006 West Coast Governors' Agreement on Ocean Health. This agreement expressed the Governors' opposition to oil and gas development off their coasts, and these states have continued to voice concerns, including in formal comments on the RFI.

Part I: Regulatory Framework

Chapter 1 OCS Oil and Gas Leasing Program Development Process

1.1 INTRODUCTION

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." The proposed oil and gas leasing program must be prepared and maintained in a manner consistent with the principles 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 DPP, are summarized in Chapter 2.

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. The seaward extent of most states' jurisdiction is 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 3 marine leagues (9 nm) seaward, and Louisiana's jurisdiction extends 3 imperial nm (6,080.2 feet) seaward. In 1983, President Reagan proclaimed the sovereign rights and jurisdiction of the United States over submerged lands and seas adjacent to the United States extending a distance of 200 nm, commensurate with the reach of the Exclusive Economic Zone (EEZ) as recognized by international law. However, the EEZ 200 nm limit does not define the outer limit of the OCS under the OCS 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, BOEM has established four OCS regions comprised of 26 total planning areas, as shown in Figure 1-1 and Figure 1-2. The four OCS regions are the Alaska Region, Atlantic Region, Gulf of Mexico Region, and Pacific Region.

1.2 PROGRAM DEVELOPMENT PROCESS

The development of a DPP is one of several Section 18 steps in the process to prepare a new Program. This document contains the first of three proposals for OCS lease sales for the 2017–2022 timeframe, including the DPP, PP, and PFP.

Figure 1-1: OCS Lower 48 States Planning Areas

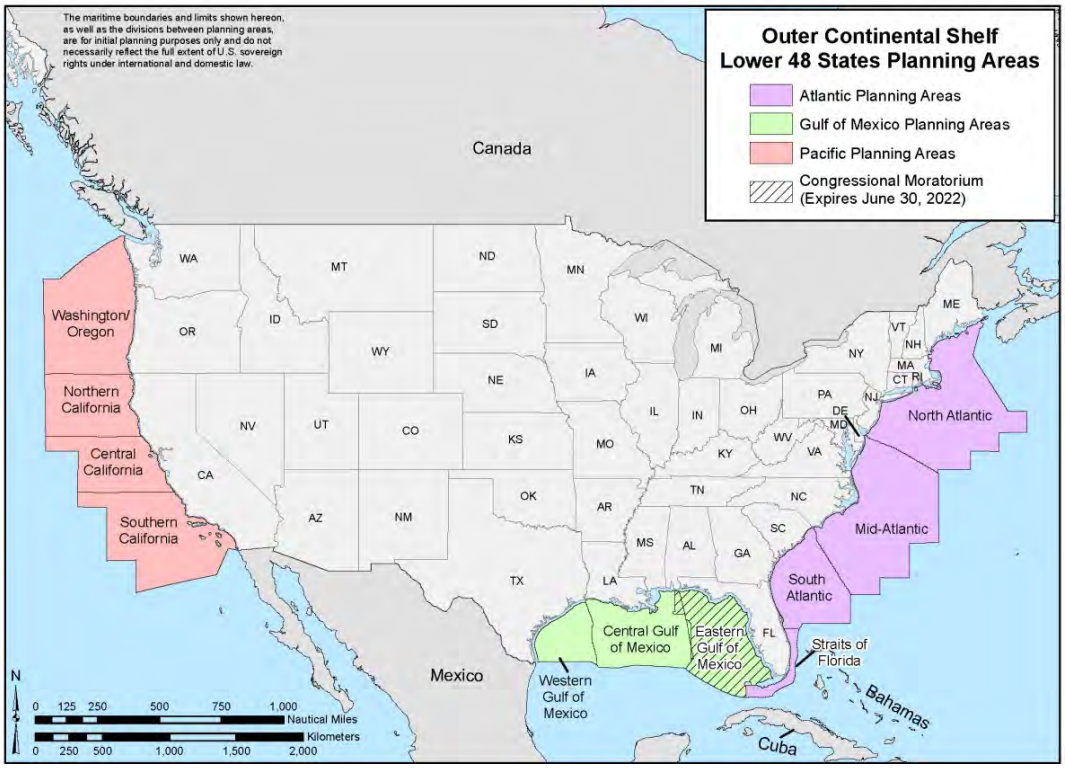
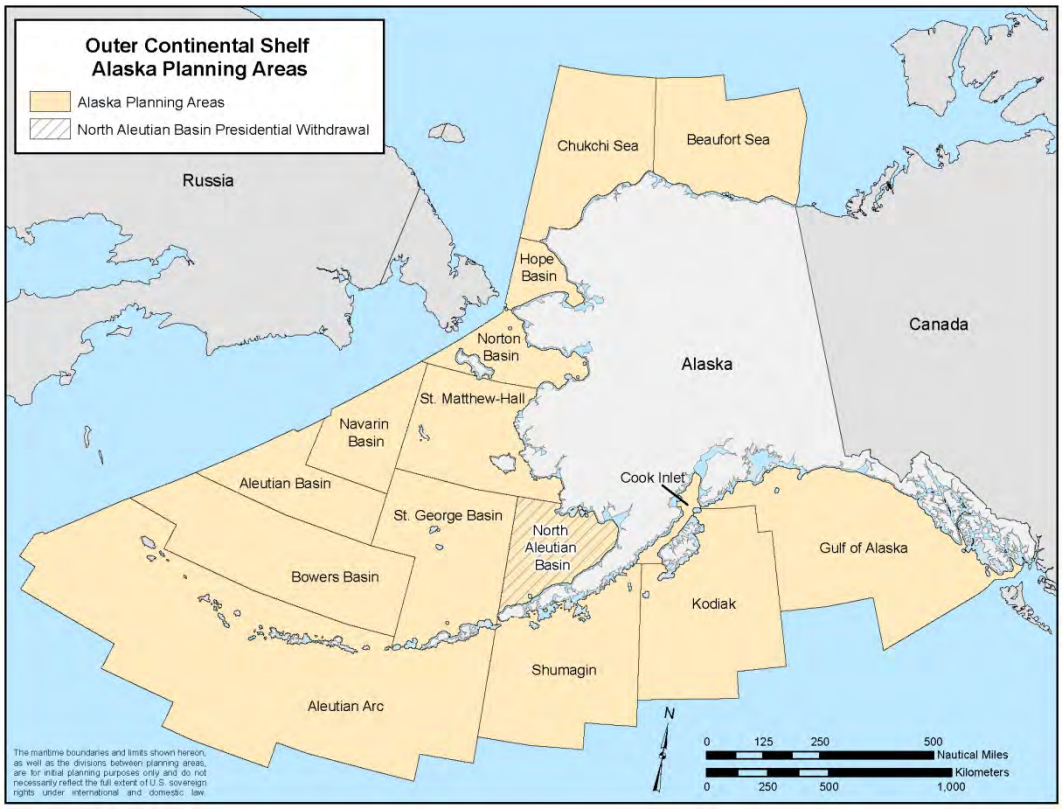


Figure 1-2: OCS Alaska Planning Areas



In addition, BOEM is preparing a PEIS to evaluate the potential environmental and socioeconomic impacts associated with the Program (see Section 1.2.2). The key steps in preparing a new Program under Section 18 of the OCS Lands Act and the PEIS under Section 102(2)(C) of NEPA are shown in Figure 1-3; the star identifies where BOEM currently is in the process of developing the 2017–2022 Program and associated NEPA document.

This DPP analysis examines and compares all 26 of the planning areas in accordance with the Section 18 factors for consideration and balancing. Only those areas and options that the Secretary decides are appropriate to include in the DPP decision will be further analyzed in the PP and the Draft PEIS. Only the OCS areas and options that the Secretary decides to include in the PP decision will be analyzed in the PFP and in the Final PEIS. The PEIS will consider potential geographic exclusions and restrictions on leasing activities for the 2017–2022 Program, and the final decision on the Program may adopt any exclusions or restrictions that BOEM considers necessary for environmental protection and that are sufficiently identifiable at that stage.

1.2.1 Request for Information and Comments

In developing the 2017–2022 Program, BOEM considers, among others, regional and national energy needs; leasing interests as expressed by possible oil and gas producers; applicable laws, goals, and policies mentioned in the comments of affected states; comments and concerns of local governments and tribes; public input; competing uses of the OCS; relative environmental sensitivity and marine productivity among OCS regions; and the equitable sharing of benefits and risks among OCS regions.

On June 16, 2014, BOEM published in the *Federal Register* an RFI regarding the preparation of a 2017–2022 Program, to commence in July 2017, just prior to expiration of the 2012–2017 Program on August 26, 2017. BOEM also sent letters all Governors and the heads of interested Federal agencies requesting their input. The initial comment deadline of July 31, 2014, was extended to August 15, 2014, after receiving requests from several states for additional time to respond. [2] Summaries of the public comments received on the RFI are included in Appendix A of this document.

1.2.2 Draft Proposed Program and Notice of Intent to Prepare a PEIS

After considering all the analyses associated with the Section 18 factors and principles (see Part II), the Secretary selects options as part of the DPP, which represent the initial proposal for the 2017–2022 Program. BOEM announces the availability of the DPP in the *Federal Register* and distributes it to interested and affected parties for a 60-day comment period. BOEM also transmits the DPP to state Governors and Federal Agency leaders. The Secretary's proposal and details of the options are explained in the Summary of the Draft Proposed Program section at the beginning of this document.

[2] 79 FR 44861, August 1, 2014.

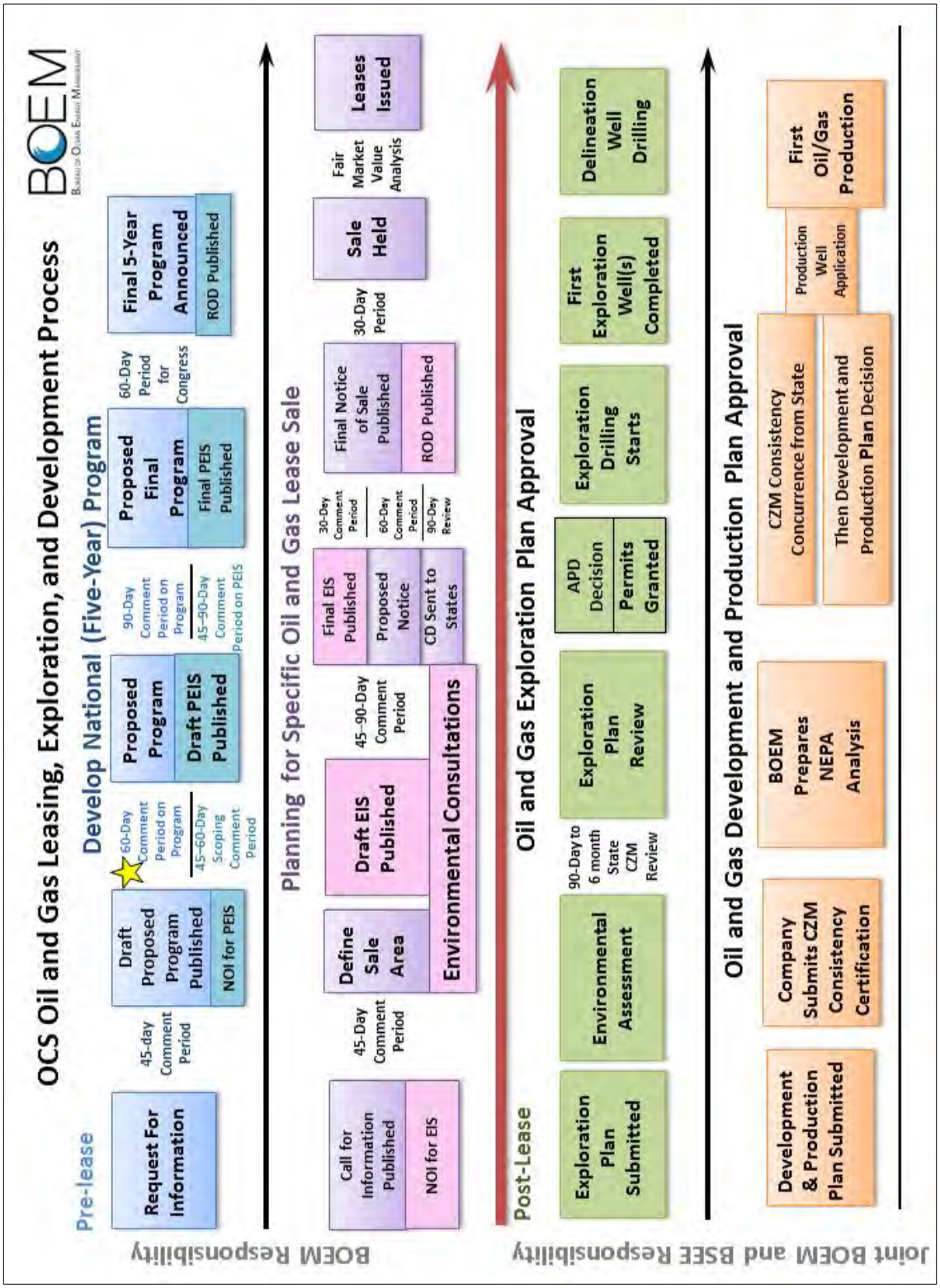


Figure 1-3: Oil and Gas Leasing Program Development Process

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

BOEM prepares a PEIS so that a broad Agency action (i.e., possible exploration and development of oil and gas resources for all, or a subset, of the 26 planning areas) can be evaluated. The PEIS examines the potential impacts from oil and gas exploration and development on planning areas of the OCS identified for potential leasing by the Secretary for consideration in the Program. Only the OCS areas identified for leasing at the DPP stage will be analyzed in the Draft PEIS. Similarly, only the OCS areas identified for leasing in the PP will be analyzed in the Final PEIS. The PEIS also considers a reasonable range of alternatives to those proposals. The analyses in the PEIS adopt a broad regional perspective; more detailed and geographically focused analyses are conducted after the Program is approved and progresses from the planning, to the leasing, exploration, and development stages. Consequently, the PEIS is the first of several NEPA analyses that will be conducted for the oil and gas exploration and development activities that are subsequently considered, and may ultimately occur as a result of implementing the Program. However, the ROD for the PEIS may adopt any geographic exclusions or restrictions on leasing activities that BOEM considers necessary for environmental protection and are sufficiently identifiable at that stage. The NEPA assessments, including EISs and Environmental Assessments (EAs) associated with various stages of OCS oil and gas development, are shown in Table 1-1.

The first step in the PEIS process is to publish a Notice of Intent (NOI) to prepare a PEIS in the *Federal Register*, which signals the initiation of the NEPA process. After the NOI is published, the Draft PEIS is developed, followed by the Final PEIS. While the minimum required duration of NEPA comment periods is less than those required for the Program; where possible, BOEM will extend the NEPA comment period to align with the Program comment period.

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

Program Level	Program Stage	NEPA Analysis*	Geographic Scope	Focus and Scope
Planning	Program	PEIS	Continental	Identification of program areas and number and schedule of lease sales for the Program
Lease sale	Lease sale	EIS or EA	Planning area	Identification of potential impacts and mitigation measures
Project	Exploration	CER, EA, or EIS	Lease block(s)	Application and enforcement of mitigation measures; monitoring of mitigation effectiveness
	Production	CER, EA, or EIS	Portion of lease block	
	Decommissioning	CER, EA, or EIS	Specific facility within a lease block	

* 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; PEIS = programmatic environmental impact statement.

1.2.3 Proposed Program and Draft PEIS

Preparation of the PP will be 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 PEIS. As such, the PP is the second version of the Secretary's proposal for a five-year Program.

BOEM will announce the publication of the PP and associated request for comments in the *Federal Register* and submit the PP to Congress, state Governors, and potentially interested Federal agencies. BOEM will also request input on the PP from other interested and affected parties during a 90-day comment period. BOEM will provide written responses to Governors and Federal Agency leaders on their comments on the PP.

1.2.4 Proposed Final Program and Final PEIS

At the last phase of the Program analysis, BOEM will prepare a PFP based on additional analyses of Section 18 factors and comments BOEM received on the PP. The PFP is the third and final version of the Secretary's proposal. BOEM will announce publication of the PFP in the *Federal Register* and submit it to the President and Congress, along with the Final PEIS and copies of all incoming comments received on the PP and responses to comments on the PP received from state and local governments and Federal agencies. The PFP will be sent to the President and Congress for a minimum of 60 days before a final decision to approve a Program is made by the Secretary.

1.2.5 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, as it relates to the PEIS, is described in the ROD and a signed program decision memorandum is also made publically available. After the Final PEIS is published, the ROD is the final step in the PEIS 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.

1.3 NEXT STEPS

The DPP is part of a multi-step process to prepare the 2017–2022 Program to succeed the current 2012–2017 Program, which became effective on August 27, 2012, and will expire on August 26, 2017.

1.3.1 Completion of Program Development

The program development process includes three analytical phases (see Section 1.2). In conjunction with the release of this DPP on January 29, 2015, a Request for Comments was published in the *Federal Register* with a 60-day comment period ending on March 30, 2015. An NOI to Prepare the PEIS was also published with a 60-day scoping comment period ending on March 30, 2015. Comments received during these comment periods help inform the development of, and ultimately the decision, on the size, timing, and location of lease sales in the second analytical phase of program development, the PP, and also the Draft PEIS. The proposed lease sale schedule identifies program areas for further leasing consideration, consisting of all or parts of the 26 OCS planning areas. Once an area is removed from leasing consideration at any point in the program development process, it can no longer be considered at a subsequent phase without going back to the stage of its removal. For example, if an area was deleted at the DPP stage, it could not be added to the PP without preparing a new DPP that included that area.

1.3.2 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 in which interested and affected parties can participate (see Figure 1-3). That process examines the proposed lease sale, 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 sale area can be offered that is not included in the area identified in the approved Program. The prelease 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 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 NEPA document will be prepared. An NOI is often not prepared for an EA-level NEPA document. The NOI for the EIS 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 step below.

3. **Area Identification (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. **Draft NEPA document** – BOEM will prepare an 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.

    - **Public Review and Comment** – A Draft EIS is available for public review for at least 45 days; a Draft EA is available for at least 30 days if BOEM chooses to solicit public comments.

    - **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 government-to-government (tribal) consultations and National Historic Preservation Act Section 106 consultations with State Historic Preservation offices.

    - **Consistency Determination** – Federal determination is documented on whether the proposed 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.

5. **Final NEPA document** – BOEM will incorporate responses to public comments on the Draft EIS or EA, and analyze environmental impacts as updated from the draft NEPA document.

6. **Proposed Notice of Sale –** BOEM will provide information to the states and the public on the proposed area to be offered and the proposed lease terms and conditions.

7. **Letters to the Governors –** BOEM will send Governors of the affected states copies of the Proposed Notice of Sale for their review as required under Section 19 of the OCS Lands Act.

8. **Final Notice of Sale** – BOEM will publish a Final Notice of Sale a minimum of 30 days before the sale is held. The Final Notice of Sale includes the date, time and location of the bid opening, blocks offered, and terms and conditions of the sale.

9. **Record of Decision (EIS-level) or Finding of No Significant Impact (EA-level)** – The final decision for the NEPA process regarding the selected action, alternatives, environmentally preferable alternatives, and environmental mitigation measures, adopted or not, is recorded and published a minimum of 30 days before the sale is held.

10. **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 before a lease may be issued.

11. **Lease Issuance** – BOEM will issue a lease following completion of the fair market value (FMV) analysis and review by the Department of Justice, in consultation with the Federal Trade Commission.

1.3.3 Exploration and Development Process

After BOEM issues a lease, the lessee typically begins a process of exploration for oil and gas accumulations. An Exploration Plan is submitted to BOEM for analysis and approval (see Figure 1-3). 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 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.[3] 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),

[3] A trap is an impermeable rock that prevents the migration of hydrocarbons.

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 are performed prior to plan submittal to identify natural and manmade hazards, areas of potential benthic habitat such as hard bottoms and reefs, and significant cultural resources such as historic shipwrecks. Depending on the areal extent and the complexity of the seismic survey data being acquired, the timeframe from survey design and permit request to delivery of the processed data can often exceed several years. The process of interpreting this seismic data and developing a prospective drilling target can take several additional years. 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 develop a well, a Development and Production Plan must be submitted to BOEM for analysis and approval (see Figure 1-3). Assuming that hydrocarbons are discovered and successfully delineated, a production facility may be installed at the site. The number of wells per structure 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 a more focused, site-specific environmental analysis under NEPA and the requirement for a consistency concurrence of the proposed activities under the CZM Act, as appropriate.

Chapter 2 Section 18 Factors for Consideration and Balancing

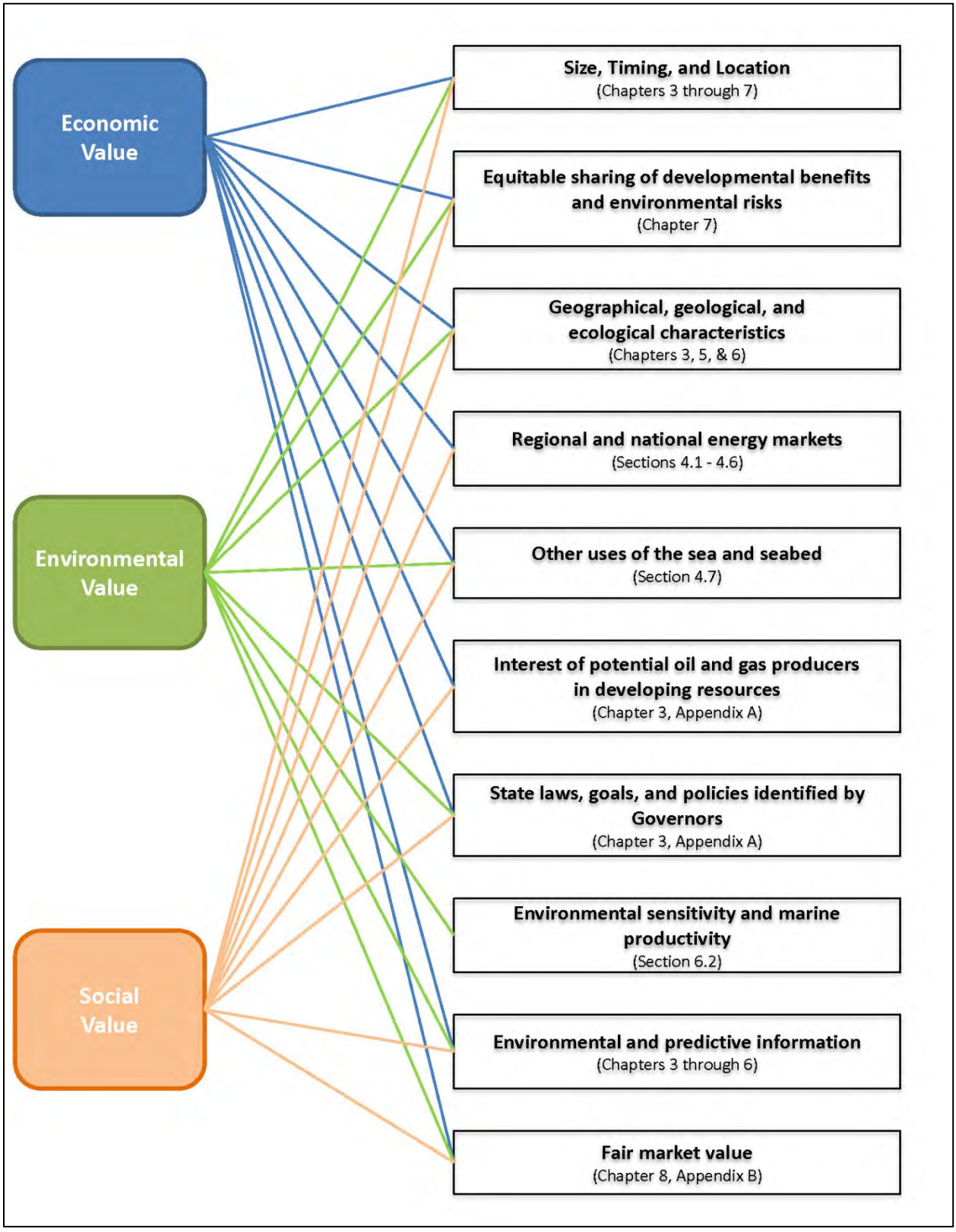
2.1 BOEM's Approach to Analyzing Planning Areas

Section 18 of the OCS Lands Act sets forth specific principles and factors that guide Program formulation by providing the foundation for BOEM analysis that is used in the development of reasonable options for a schedule of proposed lease sales. The Secretary may select from these 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). Figure 2-1 provides a basic 'road map' for where to find the various Section 18 requirements and considerations analyzed and discussed throughout this document. The Secretary's proposal, as presented in the Summary, identifies program areas for further leasing consideration, consisting of all or portions of the 26 OCS planning areas. Once the Secretary proposes areas for inclusion in the Program, those areas become "program areas." See further discussion of planning and program areas in Section 3.1. This DPP contains analyses of all 26 planning areas pursuant to the eight factors listed in Section 18(a)(2) of the OCS Lands Act (see Section 2.6). The program areas will be analyzed further in the PP and the Draft PEIS.

The analyses underlying the 2017–2022 Program utilize the best available information. In some instances, this includes information that was used to develop and approve the current 2012–2017 Program, most notably the analysis of environmental impacts. The Draft PEIS will not be published until the PP stage, which is the next step in the process, and follows the comment period on the DPP. The DPP provides the initial Proposed Action to be analyzed in the PEIS. Previous studies and analyses are augmented by the latest documents, reports, and studies available, along with pertinent information provided in comments to the RFI. Additionally, BOEM reviews and reinterprets existing oil and gas resource data as necessary.

Appendix B, Economic Analysis Methodology, provides additional information regarding the methodologies used to conduct the net social value (NSV) and FMV analyses presented in this DPP.

Figure 2-1: Crosswalk with OCS Lands Act Section 18 Factors and Considerations



2.2 FACTORS FOR DETERMINING TIMING AND LOCATION OF LEASING

Section 18(a)(2) of the OCS Lands Act lists eight factors to be considered in deciding 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 planning 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 below:

(A) Geographical, Geological, and Ecological Characteristics

The main sources of information on geographical, geological, and ecological characteristics of the OCS planning areas considered in preparing the DPP analysis are 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, scientific study results (as reported in BOEM's Environmental Studies Program Information System [ESPIS]), and information submitted or cited by commenters.

(B) Equitable Sharing of Developmental Benefits and Environmental Risks

Chapter 7 analyzes the equitable sharing of developmental benefits and environmental risks associated with oil and gas leasing. The first portion of the chapter provides a discussion of the developmental benefits that accrue in regions near OCS production and the benefits that are distributed widely throughout the United States. The equitable sharing analysis also discusses the environmental risks that exist near areas of OCS production and those that may affect the United States. By discussing the impacts that affect both regional and national interests, this chapter provides the Secretary with information on the sharing of developmental benefits and environmental risks.

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

Section 4.1 analyzes regional and national energy needs and markets. The analysis includes discussions of the contributions of domestic oil and gas to the United States and recent developments in energy markets—especially some of the intricacies of market and infrastructure adjustments to the recent boom in production of unconventional light sweet crude oil and natural gas, and the suitability of different grades of crude oil for different markets. The analysis also includes the U.S. Department of Energy's (DOE) projections of national energy needs according to the Energy Information Administration's (EIA) *Annual Energy Outlook 2014* (EIA 2014), the potential contribution of OCS oil and gas production in meeting the Nation's needs, regional energy markets and the location of OCS planning areas, and alternatives to OCS production. The analysis considers the OCS leasing program's contributions to the goals of the President's broadly focused energy strategy to increase energy independence as discussed in the 2014 *All-of-the-Above* (see Section 4.2).

Chapter 3 of the 2012–2017 Final PEIS describes the socioeconomic environment for each OCS region and nearby onshore areas, including the existing oil and natural gas infrastructure and its relationship to new leasing (BOEM 2012). Recent lease sale EISs and other NEPA documents

cited below 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 4.7 discusses competing uses of the OCS. This brief description is based primarily on information from *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (BOEM 2014). Other sources include comments provided by 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.

(E) Interest of Potential Oil and Gas Producers

Section 3.3 describes industry interest as indicated in response to the RFI. Appendix A summarizes all comments received, including those from oil and natural gas companies and associations in the energy industries.

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

Section 3.2 includes summaries of the relevant laws, goals, and policies—including federally approved CZM programs and policies—that any state government may have identified in responding to BOEM's request for comments and information. 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 all comments received, including those from state Governors and state government agencies.

(G) Relative Environmental Sensitivity and Marine Productivity

Section 6.2 contains an analysis of the environmental sensitivity and marine productivity for all 26 OCS planning areas. "Sensitivity" is not a well-defined term in ecology or environmental science. In Section 6.2, 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.

In the development of the 2007–2012 Program, BOEM examined environmental sensitivity using two different approaches. The first analysis considered only shoreline impacts from oil spills and did not consider impacts on other ecological features such as fauna and benthic and pelagic habitats. In response to the U.S. Court of Appeals for the District of Columbia Circuit's remand decision of April 17, 2009 (Center for Biological Diversity, et al. v. Department of the Interior, 563 F.3d 466 [D.C. Cir. 2009]) (see Section 2.7 on Judicial Guidance), BOEM presented an expanded relative environmental sensitivity analysis in the Revised 2007–2012 Program and the current 2012–2017 Program. This approach combined the potential impacts on vulnerable organisms into an index of sensitivity, which was incorporated into four model components: (1) coastal habitats, (2) marine habitats, (3) marine fauna, and (4) marine primary productivity.

The vulnerability approach provided a relatively straightforward and quantifiable measure of potential impacts. The method used in the 2017–2022 DPP analysis goes beyond that used in the 2012–2017 Program and accounts for 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.

The OCS planning areas were distributed into nine BOEM ecoregions using an ecosystem-based approach, which was based on distinguishing physical and ecological characteristics. These BOEM ecoregions incorporate all 26 planning areas. The vulnerability and resilience of representative species and habitats to a suite of impacts within each BOEM ecoregion were determined using best-available scientific data and a purpose-built model (Niedoroda et al. 2013). The habitats that were examined spanned the scope of BOEM's jurisdiction, ranging from the shoreline to the edge of the continental shelf. Representative bird, invertebrate, fish, mammal, and turtle species were selected on the criteria of conservation importance, ecological role, and fisheries importance. The National Oceanic and Atmospheric Administration's (NOAA) Environmental Sensitivity Index (ESI) for shorelines also was incorporated into the model (NOAA 1995, NOAA 2002). To account for impact-independent stressors, a climate change index was applied to the baseline sensitivity scores based on the expected impacts of climate change and increased carbon dioxide concentrations on the OCS. Combined scores for each OCS region were obtained and applied to the corresponding planning areas.

An updated estimate of OCS marine productivity also is included in this analysis (see Section 6.2.3). 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. Secondary (and higher) production is difficult to estimate, especially across geographically large and ecologically diverse areas, such as the OCS (Balcom et al. 2011). Furthermore, estimates of secondary production are not available for the entire OCS. Thus, in this 2017–2022 Program, BOEM focuses its productivity analysis on marine primary productivity. Primary productivity estimates for all 26 planning areas 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 planning areas of different sizes may be made.

(H) Environmental and Predictive Information

Section 6.1 provides a summary of environmental and cultural resource information for each OCS region, which includes the ecological considerations and portions of the geographic and geological considerations that are relevant to determining when and where leasing should occur. Section 6.3 includes a discussion of the most relevant environmental issues and builds on the environmental setting to discuss the predictive information relevant to potential environmental impacts. It provides a broad overview of the types of relationships between resources and impact-producing factors that may result in impacts on those resources. The nature and severity of these impacts will be fully analyzed in the PEIS for the 2017–2022 Program.

2.3 Balancing the Potential for Environmental Damage, Discovery of Oil and Gas, and Adverse Impact on the Coastal Zone

Section 18(a)(3) requires the Secretary, when making decisions on the timing and location of OCS leasing, to strike a balance among the potential for environmental damage, the potential for discovery of oil and gas, and the potential for 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 DPP presents a comparative analysis of all 26 OCS planning areas.

An element of the comparative analysis is an estimation of societal net benefits for each planning area, derived by calculating the value of undiscovered technically recoverable oil and natural gas resources (UTRR) minus the cost to industry and the net environmental and social costs of developing those resources. BOEM refers to the results of this analysis as NSV (see Section 5.3). See also the descriptions of the various types of "value" described in Section 2.6.

The comparative analysis also ranks the planning areas according to quantified information relating to environmental sensitivity and marine productivity (see Section 6.2) and relating to the interest of potential oil and natural gas producers (see Section 3.3). 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 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 to the Secretary the discretion to reach a reasonable determination under the existing circumstances.

2.4 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, meets the FMV requirement in the pre-lease sale process. Historically, this process has considered geologic and auction market factors in phase one and economic factors in phase two. Further, the DPP provides that BOEM will re-assess market and resource conditions as each sale approaches. Additional information on and analysis of FMV is contained in Chapter 8, which also considers option value, the uncertainties surrounding OCS leasing, and how these uncertainties may impact the value of OCS acreage.

2.5 Energy Needs

Section 18(a) of the OCS Lands Act states that, the purpose of the OCS oil and gas leasing program is to help meet the Nation's future energy needs. In making the programmatic decisions, the Secretary also 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)). Chapter 4 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 gross domestic product (GDP), the national balance of trade, national energy security, and as an integral component to national economic and energy policies in general.

2.6 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 nonrenewable resources contained in the outer Continental Shelf,…." The DPP analyses presented in Part II of this document are conducted to ensure that economic, social, and environmental values of the OCS 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 quantitative analyses performed for the DPP is to assist the Secretary with these requirements (including the balancing requirement described in Section 2.3, above), in consideration with the other analyses. Section 6.1 presents the environmental setting for each of the OCS regions (Alaska, Pacific, GOM, and Atlantic), which includes relevant environmental information on habitats, species types and distribution, and federally protected species. Appendix A contains summary of comments received in response to the RFI, including issues or concerns that were identified by commenters. The environmental considerations section also includes information from previous Program decision documents and references to available environmental resource information. Finally, a brief discussion of predictive information is provided to identify the potential relevant impacts and the resource areas that may be affected.

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 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; government receipts of cash bonuses, rentals, royalties, and taxes; as well as consumer surplus related to potentially lower domestic oil and natural gas prices resulting from OCS production. Economic values are discussed primarily in Section 5.3, Net Social Value; Chapter 7, Equitable Sharing Considerations; and Chapter 8, Assurance of Fair Market Value.

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 may be negatively impacted (a social welfare loss) when OCS resources are not developed in the interest

of conservation[4] 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 (which include cultural and community values) and reflect the components of all the substantive requirements analyses prepared for this DPP. They are especially relevant in Part II, Analysis of all 26 OCS Planning Areas.

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, marine productivity, predictive information, and the important effect of relevant environmental impacts on environmental value.

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, the results of which are presented in this DPP. See Section 2.2 (G) and Section 6.2 for methodological explanations. Feedback from internal and external reviews of this new approach will be incorporated into the analyses for the PP and PFP.

2.7 JUDICIAL GUIDANCE

The 2017–2022 Program will be the ninth program prepared by USDOI. 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 District of Columbia Circuit. The 1980, 1982, 1986, 2007, and 2012 Programs prepared and approved under Section 18 were challenged in court. No lawsuits were filed with respect to the approved 1992, 1997, or 2002 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 any to later stages when 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

[4] 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).

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 of 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 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) (*CBD*) — 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 as they were not ripe at the Program stage. Regarding consumption effects, the Court stated that "Interior need not consider the impacts of the *consumption* of oil and gas after it has been extracted from the OCS. OCSLA therefore concerns the local environmental impact of leasing activities in the OCS and does not authorize – much less require – Interior to consider the environmental impact of post-exploration activities such as consuming fossil fuels…."

- Litigation is ongoing in the D.C. Circuit on the current 2012–2017 Program in *Center for Sustainable Economy, v. Department of the Interior*, No. 12-1431(D.C. Circuit) (*CSE).* The plaintiff is claiming that the economic analysis used by the Secretary in the 2012–2017 Program was flawed and the 2012–2017 PEIS did not comply with the procedural requirements of NEPA.

Part II: Analysis of All 26 OCS Planning Areas

Chapter 3 Background and Leasing History of OCS Planning Areas

3.1 BACKGROUND

The OCS is divided into 26 planning areas that are grouped, for administrative purposes, into four regions:

Alaska Region. The Alaska Region is the largest OCS region, covering approximately 1,035 million acres including offshore areas such as the Chukchi Sea, Beaufort Sea, Cook Inlet, and Gulf of Alaska. Water depths in the Alaska OCS range from less than 10 feet to more than 25,000 feet. This region consists of 15 planning areas (see Figure 1-2). Sales have been held in eight of the planning areas over the years, the most recent of which was held in 2008. Four of the areas have been determined to have negligible oil and gas resource potential. There are existing Federal leases in two planning areas—the Beaufort Sea and Chukchi Sea.

Pacific Region. The Pacific Region encompasses an area of more than 248 million acres in four planning areas and includes the Pacific offshore area from the Canada border in the north to the Mexico border in the south (see Figure 1-1). [5] Water depths range from approximately 30 feet to more than 17,500 feet. Sales have been held in all four areas, with the most recent sale occurring in 1984. The Southern California Planning Area has existing leases and production from 23 platforms.

Gulf of Mexico Region. The GOM Region is on the southern margin of the United States and contains approximately 160 million acres in three planning areas. It extends from the Texas coastline to the Straits of Florida, a distance of approximately 1,200 miles (see Figure 1-1). Water depths range from less than 30 feet to greater than 11,000 feet. The Central and Western GOM Planning Areas are the most mature and active areas of the OCS, with production for more than 60 years. Annual area-wide sales have been typical for 30 years. Although much of the Eastern GOM Planning Area is unavailable for leasing through June 30, 2022, there are existing leases in all three planning areas.

Atlantic Region. The Atlantic Region encompasses an area of nearly 270 million acres in four planning areas. It extends north to Canada, east to the offshore territorial waters of the

[5] Administratively, the Pacific Region includes the State of Hawaii. However, for the national OCS oil and gas leasing program, and, in particular, DPP purposes, the Pacific Region only includes the four planning areas off of the U.S. West coast.

Commonwealth of the Bahamas, and south to Cuba (see Figure 1-1). Water depths in the Atlantic OCS range from approximately 0 feet to more than 18,000 feet. Sales have been held in all four areas, the most recent of which was held in 1983. There was exploration activity in the past, but there has been no production in this region. There are no existing leases in the Atlantic Region.

Table 3-1 contains a summary of the regions. See Section 6.1 for more information on the environmental setting of the four regions and the planning areas. The environmental setting of an area where oil and gas leasing activities may occur is defined by various geological, geographical, and ecological characteristics. Section 4.7 provides an overview of the various economic, military, and public uses of the OCS and nearby coastal regions.

Table 3-1: Summary of OCS Regions

Region	Acres (millions)	Number of Planning Areas
Alaska	1,035	15
Pacific	248	4
GOM	160	3
Atlantic	269	4

The planning areas were initially established pursuant to the OCS Lands Act Amendments of 1978. They have been reconfigured several times over the years, most recently to correspond to the administrative lines announced in the January 2006 *Federal Register* Notice (71 FR 127) and the February 2006 DPP for 2007–2012. Unless otherwise noted, references to a planning area in this document correspond to the current configuration. The portion of a planning area that is considered for leasing in the Program is referred to as a program area. A program area can be an entire planning area; a small portion of a planning area; comprised of parts or all of more than one planning area; or any size in-between. As discussed in the program development process in Chapter 1, the preparation of a new Program begins with an RFI and analysis and consideration of all 26 planning areas, as required by the OCS Lands Act. Once areas are chosen for further consideration, the subsequent analyses focus on those areas.

Restrictions on OCS activities can originate from outside the Section 18 program development process. Areas may be withdrawn by the President under Section 12(a) of the OCS lands Act, 43 U.S.C. 1341(a), and are referred to as presidential or executive withdrawals. Pursuant to such a withdrawal, the North Aleutian Basin in Alaska was withdrawn, for a time period without a specific expiration, by President Obama on December 16, 2014, from consideration of leasing for the purposes of exploration, development or production. National Marine Sanctuaries (NMS) were withdrawn, for a time period without specific expiration, first by President Clinton in 1998 and continued by President G.W. Bush in 2008. Also, restrictions may arise from congressional action, referred to as Congressional moratoria. Much of the OCS, including the Atlantic and Pacific coasts, was unavailable through Fiscal Year (FY) 2008 (September 30, 2008) for leasing consideration pursuant to annual appropriations acts, beginning as early as FY 1982.

Currently, the majority of the Eastern GOM Planning Area and a small portion of the Central GOM Planning Area are unavailable through FY 2022, pursuant to GOMESA (see Figure 1-1). GOMESA restricts leasing activities so no action can be taken towards holding a lease sale.

3.1.1 Alaska Region Planning Areas

The Alaska OCS Region is composed of 15 planning areas surrounding the state. Of those 15 areas, Federal lease sales have been held in only 8 planning areas. Existing Federal leases are present only in the Beaufort Sea and Chukchi Sea Planning Areas, with Federal production only in the Beaufort Sea Planning Area. Four of the Alaska planning areas (Aleutian Arc, Aleutian Basin, Bowers Basin, and St. Matthew-Hall Planning Areas) are currently estimated by BOEM to have negligible resource potential. Outside of the Beaufort Sea and Cook Inlet, there is little, if any, existing infrastructure and activity.

Due to the low level of Federal oil and gas production throughout the offshore Alaska region, all of the OCS planning areas in Alaska are considered to be frontier areas. See Chapter 5 for information on the oil and gas resource potential in Alaska. Figure 3-1 shows the general position stated by the governor of Alaska, as expressed in the comments received in response to the RFI.

3.1.2 Background and History for Alaska Region Planning Areas

3.1.2.1 Beaufort Sea

Ten sales have been held in this area since 1979 and one sale is scheduled in the current 2012–2017 Program for 2017. There are 147 active leases in this area. Thirty-two exploratory wells have been drilled, with the most recent in 2012. It was plugged and abandoned without being drilled to total depth. There is production from a joint Federal/state unit, with Federal production of more than 28.7 million barrels of oil since 2001. 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 Beaufort Sea is one of two OCS areas (the other being the Chukchi Sea) that has the potential to provide oil to extend the operation of the Trans-Alaska Pipeline System (TAPS), which was voiced as a priority by the State of Alaska and others voiced as a priority in public comments on the RFI. TAPS is currently operating at approximately one quarter of its capacity and requires new discoveries to continue operations. Any gas fields discovered in either area could contribute to the volumes required to make construction of a North Slope gas pipeline economically viable.

3.1.2.2 Chukchi Sea

Sale 193, the most recent sale 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. There are 460 existing leases at this time, all issued in Sale 193. However, these 460 leases have had operations suspended by the Bureau of Safety and Environmental Enforcement (BSEE) pending the outcome of a court-ordered remand concerning the Lease Sale 193 EIS. The 2012–2017 Program scheduled one sale for 2016. Prior to Sale 193, there were two sales in this area, with the most recent in 1991. There were five exploratory wells drilled prior to 1992 on leases issued in the earlier sales; all have been plugged and abandoned. Although an uneconomic gas discovery was made, there is no commercial production from the area. One exploration well was drilled on current leases in 2012. It was plugged and abandoned without

being drilled to total depth. However, the Chukchi Sea Planning Area has the greatest estimated hydrocarbon resource potential (ranked second nationally for UTRR) that could provide the hydrocarbons necessary to extend TAPS operations and contribute to the gas volumes needed to make construction of a North Slope gas pipeline economically viable.

3.1.2.3 Hope Basin

No lease sales have been held in the Hope Basin Planning Area. This area was included in the 2002–2007 Program as a special interest sale in conjunction with the Chukchi Sea Planning Area. However, no interest was expressed for the Hope Basin in response to three Calls for Information issued during the 2002–2007 Program timeframe. The area was also included in the 1997–2002 Program as a simultaneous U.S./Russia OCS lease sale, but that sale was canceled, with this area being deferred for possible consideration in later programs.

3.1.2.4 Norton Basin

One sale was held in 1983 for Norton Basin. Six exploratory wells have been drilled, with no commercial discoveries. There are no existing leases. The area was included in the 2002–2007 Program as a special interest sale. Four Calls for Information were issued with no expressions of interest.

3.1.2.5 Navarin Basin

One lease sale was held in 1983 for the Navarin Basin. Eight exploratory wells were drilled, with no commercial discoveries. There are no existing leases and the area has not been included in a lease sale schedule since the 1987–1992 Program.

3.1.2.6 St. George Basin

One sale was held in 1983 for St. George Basin. Ten exploratory wells were drilled, with no commercial discoveries. There are no existing leases in this area. One sale was scheduled in the 1992–1997 Program, but it was deferred. The area has not been included for leasing consideration since that Program.

3.1.2.7 North Aleutian Basin

There was one sale in the North Aleutian Basin in 1986 with 23 leases issued in 1988 after resolution of litigation concerning the lease sale. However, those leases were relinquished in settlement of litigation in 1995. There has been no exploratory activity and there are no existing leases in this area. One lease sale was scheduled for this area in the 2007–2012 Program. However, pursuant to Section 12(a) of the OCS Lands Act, the area was withdrawn from leasing consideration through June 30, 2017, by President Obama in a statement on March 31, 2010. The sale was not included in the December 2010 Revised 2007–2012 Program that followed the remand by the U.S. Court of Appeals (see Section 2.7 for further information). On December 16, 2014, the President withdrew the North Aleutian Basin from leasing consideration for a time period without specific expiration.

3.1.2.8 Cook Inlet

There have been five OCS lease sales in this area. The most recent OCS sale was held in 2004, with no bids received. One lease sale is scheduled in the current program. Thirteen exploratory wells have been drilled, with no commercial discoveries. There are no existing OCS leases in this area.

The upper Cook Inlet is a mature basin with extensive exploration and development in state waters over 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 2014. Annual production from non-OCS leased acreage during FY 2014 totaled approximately 5.9 million barrels of oil and 95 billion cubic feet of natural gas. Existing infrastructure in the upper portion of Cook Inlet includes 16 offshore platforms in state waters, associated oil and gas pipelines, and onshore processing and support facilities.

3.1.2.9 Gulf of Alaska

Three lease sales were held from 1976 to 1981 for the Gulf of Alaska. Twelve exploratory wells were drilled, but no commercial discoveries have been found. The sale scheduled in the 1997–2002 Program was canceled, primarily due to low prices and low industry interest. There are no existing leases.

3.1.2.10 Alaska Planning Areas with No Lease Sales

The following planning areas have had no lease sales and no wells have been drilled:

- Aleutian Arc
- Aleutian Basin
- Bowers Basin
- Hope Basin
- Kodiak
- Shumagin
- St. Matthew-Hall

3.1.3 Background and History for Pacific Region Planning Areas

The Pacific OCS planning areas encompass more than 248 million acres and include the Pacific offshore area extending north to the Canadian border and south to the Mexican border. Pacific OCS planning areas begin 3 miles offshore and extend seaward to approximately 200 nm seaward of the baseline, with water depths ranging from approximately 30 feet to more than 17,500 feet.

The Pacific Region is comprised of four planning areas: Washington/Oregon, Northern California, Central California, and Southern California. Sales have been held in all four planning areas, the most recent of which was held in 1984. There are existing active leases and production from these leases in the Southern California Planning Area. See Chapter 5 for information on the Pacific Region oil and gas resource potential. Figure 3-1 shows the general

positions stated by the Governors of the three coastal states, as expressed in their comments received in response to the RFI.

3.1.3.1 Washington/Oregon

One lease sale was held in 1964 for the Washington/Oregon Planning Area. Twelve exploratory wells were drilled, with no commercial discoveries. There are no existing leases. The area was under annual congressional restrictions from FY 1991 through FY 2008 and under presidential withdrawal from 1990 to July 2008.

3.1.3.2 Northern California

One sale was held in 1963 for Northern California. Seven exploratory wells were drilled, with no commercial discoveries. The area was under annual congressional restrictions from FY 1982 through FY 2008 and under presidential withdrawal from 1990 to July 2008.

3.1.3.3 Central California

One sale was held in 1963 for Central California. Twelve exploratory wells were drilled, with no commercial discoveries. The area was under annual congressional restrictions from FY 1991 through FY 2008 and under presidential withdrawal from 1990 to July 2008. Most of the OCS closest to the coast is designated as NMSs and therefore is under presidential withdrawal for a time period without specific expiration.

3.1.3.4 Southern California

Ten lease sales were held from 1963 through 1984 for Southern California. More than 1,455 exploratory and development wells have been drilled. There are 43 existing leases, all producing. Oil and gas production, which began in June 1968, totaled more than 1.3 billion barrels of oil (BBO) and 1.8 trillion cubic feet (Tcf) of natural gas through December 2013. Much of the area was under annual congressional restrictions for new lease sales from FY 1985 through FY 2008 and under presidential withdrawal from 1990 until July 18, 2008. There also are producing leases in state waters, although there have been no new state leases issued since 1969.

3.1.4 Background and History for Gulf of Mexico Region Planning Areas

The GOM Region is comprised of three planning areas, the Eastern, Central, and Western Gulf of Mexico Planning Areas. The latter two are the most mature and active of all 26 planning areas. The GOM's Central and Western Gulf of Mexico Planning Areas, offshore of Alabama, Mississippi, Louisiana, and Texas, remain the U.S.'s primary offshore source of oil and gas, generating about 97 percent of all OCS oil and gas production. A small portion of the Eastern Gulf of Mexico Planning Area is available for leasing consideration and contains existing leases.

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 sales since 1953 in this region and there are additional existing leases that lie outside the area currently available for leasing consideration pursuant to GOMESA. There is production from leases in the Central and Western Gulf of Mexico Planning Areas, but as of August 2014, no production has occurred from leases in the Eastern Gulf of Mexico Planning Area as currently configured. See Chapter 5 for a discussion on the GOM oil and gas resource potential by planning area. Figure 3-1 shows the general positions stated by the Governors of the coastal states, as expressed in comments received in response to the RFI.

Internationally, the U.S.-Mexico Transboundary Hydrocarbons Agreement that establishes a framework for U.S. offshore oil and gas companies and Mexico's Petroleos Mexicanos (PEMEX) to jointly develop transboundary reservoirs was signed into law in December 2013. Mexico made constitutional amendments in December 2013, followed by secondary legislation in August 2014 that opened oil and natural gas markets to foreign investments, including investments that are active in the GOM OCS. 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.

3.1.4.1 Western Gulf of Mexico

There are approximately 1,197 active leases in this area. More than 7,800 wells have been drilled and approximately 985 million barrels of oil and 34.1 Tcf of natural gas have been produced through March 2014. The most recent sale (Sale 238) was held on August 20, 2014, which resulted in 80 leases being issued with high bid bonuses totaling $109 million. Two sales remain on the current schedule, one in 2015 and one in 2016. The State of Texas administers a robust oil and gas program in state waters adjacent to this area.

3.1.4.2 Central Gulf of Mexico

There are approximately 4,103 active leases in this area. More than 43,400 wells have been drilled and approximately 17.7 BBO and 150.1 Tcf of natural gas have been produced through March 2014. The most recent sale (Sale 231) was held in March 2014 and resulted in 320 leases being awarded, with bonuses totaling $846 million. Three sales remain on the current 2012–2017 Program schedule, one each in 2015, 2016, and 2017. 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.

3.1.4.3 Eastern Gulf of Mexico

There are 106 active leases in this area. Thirteen 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 planning area as currently configured. The majority of this planning area is unavailable for leasing consideration through June 30, 2022, under GOMESA. 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 sale held in the same small area was Sale 225 in March 2014, and no bids were received. One sale remains on the current 2012–2017 Program schedule for 2016.

3.1.5 Background and History for Atlantic Region Planning Areas

The Atlantic OCS encompasses nearly 270 million acres and includes the Atlantic offshore area extending north to Canada, east to the offshore territorial waters of the Commonwealth of the Bahamas, and south to Cuba. The area begins 3 miles off the Atlantic coast and extends at least to the edge of EEZ and beyond where the continental shelf extends beyond the EEZ. Water depths in the Atlantic OCS range from approximately 0 feet to more than 18,000 feet.

The Atlantic Region is comprised of four planning areas (North Atlantic, Mid-Atlantic, South Atlantic, and the Straits of Florida) that have undergone numerous boundary changes over the years. There have been 10 Federal lease sales in all or portions of this region, the most recent of which was held in 1983. There have been no active leases since the mid-1990s and no production from the OCS. See Figure 5-5 for a map of the Atlantic geologic plays and oil and gas resource potential by planning area. Figure 3-1 shows the general positions stated by the Governors of the coastal states, as expressed in comments received in response to the RFI.

The Conference Report for the FY 2010 Interior Appropriations Act directed BOEM (then the Minerals Management Service [MMS]) to produce a PEIS to evaluate potential significant environmental effects of multiple geological and geophysical (G&G) activities in the Atlantic OCS. The Administration's March 2010 Comprehensive Strategy for Offshore Oil and Gas announced that a new PEIS would analyze eight OCS areas, including the Mid-Atlantic and South Atlantic, but not the North Atlantic. NOIs were published on April 2, 2010, for the *Outer Continental Shelf Oil and Gas Leasing Program: 2012–2017 Programmatic Environmental Impact Statement* (2012–2017 Program PEIS) and the *Atlantic OCS Proposed Geological And Geophysical Activities: Mid-Atlantic And South Atlantic Planning Areas Programmatic Environmental Impact Statement* (Seismic PEIS). The December 2010 Revised OCS Strategy document then excluded the two Atlantic planning areas from the 2012–2017 Program PEIS. The Final Seismic PEIS was published on March 7, 2014, and the ROD was signed on July 7, 2014, with a Notice of Availability of the ROD published in the *Federal Register* on July 23, 2014 (79 FR 42815). Among the mitigation measures for seismic activity included in the Preferred Alternative B is a time-area closure extending 29 nm from the coastline, from Delaware Bay to south of Cape Canaveral, Florida, generally from November through April to protect the North Atlantic right whale. Preferred Alternative B also included a time-area closure to protect nesting sea turtles offshore Brevard County, Florida. See Chapter 5 regarding resource potential and G&G activities.

Prior to the Seismic PEIS, BOEM received permit applications from nine geophysical contractors to conduct G&G activities in the North Atlantic, Mid-Atlantic, and South Atlantic Planning Areas. Following completion of the Seismic PEIS, BOEM requested that the applicants update and resubmit their permits as they had been submitted several years earlier to verify that the applicants still wanted to conduct G&G activities and to provide any new information.

As of December 2014, nine applications were deemed complete and are pending other requirements such as CZM concurrence and permits. One contractor submitted a second application for a dense grid within a portion of their initial application. All ten permit applications are publicly available on the BOEM webpage at http://www.boem.gov/Atlantic-G-

and-G-Permitting/#Permitting. BOEM is working with the associated coastal states and NMFS on the necessary actions for these permits.

3.1.5.1 North Atlantic

Forty-three exploratory wells were drilled in the currently configured planning area with no commercial discoveries. The area was under annual congressional restrictions from FY 1984 through 2008, and under presidential withdrawal from 1990 through July 18, 2008. There are no existing leases. This planning area is adjacent to the offshore waters of the Canadian province of Nova Scotia, where there are existing exploratory permits. However, those that abut the U.S.-Canada boundary are within the Georges Bank Prohibited Zone where no activity is allowed to occur through the end of 2015.

3.1.5.2 Mid-Atlantic

One exploratory well was drilled in the current planning area, with no commercial discoveries. There are no existing leases. The area was subject to presidential withdrawal from June 1998 to July 2008 and to annual congressional restrictions from FY 1999 through FY 2008. A special interest sale for an area offshore Virginia was scheduled for 2011 in the 2007–2012 Program; however, the sale was cancelled by the Secretary in May 2010, and a notice of cancellation published in the *Federal Register* on July 28, 2010 (75 FR 44276). This planning area was analyzed in the Seismic PEIS, and G&G permits for the area are under review.

3.1.5.3 South Atlantic

Seven exploratory wells were drilled in the current planning area with no commercial discoveries. There are no existing leases. The area was subject to presidential withdrawal from 1998 to July 2008 and to annual congressional restrictions from FY 1999 through FY 2008. This planning area was analyzed in the Seismic PEIS, and G&G permits for the area are under review.

3.1.5.4 Straits of Florida

Three exploratory wells were drilled, with no commercial discoveries. There are no existing leases and the area has not been included in a Program since 1987–1992. No congressional or presidential restrictions on activity have been in place. There are existing exploratory licenses offshore Cuba and the Commonwealth of the Bahamas in the waters nearby to this planning area. Wells that were drilled in the past off both countries have not had commercial discoveries. In June 2014, Cuba signed agreements with Russian companies to further explore in Cuban waters.

3.2 COMMENTS ON STATE LAWS, GOALS, AND POLICIES

OCS Lands Act Section 18(a)(2)(F) (see Section 2.6), requires BOEM to consider laws, goals, and polices of affected states that are specifically identified by their Governors. BOEM received comments through the RFI from 18 Governors or state agencies on behalf of the governor, identifying laws, goals, and/or policies the state deemed relevant for the Secretary's consideration. Comments from Governors and state agencies are summarized in Table 3-2,

which shows comments of coastal state Governors in response to the RFI. Comments per planning area are discussed in the following sections.

3.2.1 Alaska

The State of Alaska continued to express its support of oil and gas activity on the OCS offshore Alaska. The state's comment letter on the June 2014 RFI supported access to prospective OCS areas, including all OCS planning areas. The state also expressed a preference for more lease sales on an area-wide basis, not targeted leasing. The state also provided comments as part of the OCS Governors Coalition in support of increased access.

3.2.2 Pacific Region States

The states of Washington, Oregon, and California submitted a joint comment in continued opposition to new oil and gas activity in the Pacific OCS.

3.2.3 Gulf of Mexico Region States

Comments were received from all five states adjacent to this region. The State of Alabama supported responsible activity off its coast in compliance with its coastal zone management program and requested a no-leasing buffer within 15 miles of Baldwin County. A stipulation for no-surface-occupancy within 15 miles of Baldwin County has been in use for Central Gulf sales since 1998. Mississippi, Louisiana, Alabama, and Texas commented as part of the OCS Governors Coalition in support of increased access. The State of Florida expressed concern regarding long-term protection of marine and coastal environments, but did not state a position either in support of or opposition to new leasing off its Gulf coast.

3.2.4 Atlantic Region States

Comments were received from 10 of the 14 states adjacent to the Atlantic Region, including Florida, which is adjacent to both the Atlantic and GOM regions. Of the 10 state respondents, Virginia, North Carolina, South Carolina, and Georgia supported inclusion of the OCS off their coasts in the 2017–2022 Program. These states are adjacent to the Mid-Atlantic or South Atlantic Planning Areas. Virginia, North Carolina, and South Carolina also commented as part of the OCS Governors Coalition in support of increased access. The states that expressed opposition to OCS activity off their coasts were Massachusetts, adjacent the North Atlantic Planning Area; and Delaware and Maryland, adjacent the Mid-Atlantic Planning Area. The states of New York and Rhode Island, adjacent to the North Atlantic Planning Area, and the State of Florida, adjacent to the South Atlantic and Straits of Florida Planning Areas, expressed concern but did not state a position either in support or opposition (see Figure 3-1). The Florida Department of Environmental Protection, which commented on behalf of the Governor of Florida, indicated that primary consideration be given to long-term protection of marine and coastal environments and urged BOEM to proceed cautiously when determining which OCS areas to include in the DPP.

Table 3-2: Summary of Comments from Governors or State Agencies on Behalf of the Governor

	Commenter	Organization	Summary
1.	Elizabeth Podowski	New York State Department of State	Urges cautious approach in proceeding with the DPP. States that OCS oil and gas activities would have reasonably foreseeable effects on NY's offshore uses and natural resources, and should be carefully evaluated.
2.	Governor Deval Patrick	Commonwealth of Massachusetts	Opposes oil and gas development in the North Atlantic.
3.	Robert Ballou on behalf of Janet Coit	Rhode Island Department of Environmental Management	Intend to submit substantive comments in the future. Interested in impact of oil and gas activities on marine fisheries and their support industries and how Mid-Atlantic relates to waters and submerged lands important to RI fishing industries.
4.	David Small	Delaware Department of Natural Resources and Environmental Control	Express opposition to oil and gas exploration in the Mid-Atlantic and contend that "opening up the seafloor in the South and Mid-Atlantic …is in direct conflict with both the state and national energy policy agenda."
5.	Governor Martin O'Malley	State of Maryland	Opposes oil and gas development in the Mid-Atlantic.
6.	Governor Terry McAuliffe	State of Virginia	Urges BOEM to open VA portion of the Mid-Atlantic to include areas 50 miles beyond VA's coastline.
7.	Governor Pat McCrory	State of North Carolina	Stated that it is prudent to include all leasing options in the DPP.
8.	Lt. Governor Daniel Forest	Office of the Lieutenant Governor of North Carolina	Urges BOEM include all areas offshore North Carolina in the DPP.
9.	Governor Nikki R. Haley	State of South Carolina	Supports the ongoing investigations and potential future exploration of oil and gas off the coast of South Carolina. Willingness to participate in process "should not be construed as unconditional or unconcerned."
10.	Mark Williams	Georgia Department of Natural Resources	Supports sound efforts to increase the domestic oil and gas reserves of the United States. Supports DPP provided that all relevant environmental and societal issues are fully addressed.
11.	Governor Robert Bentley	State of Alabama	Supports activity, requests buffers around sensitive habitats, requests 15-mile no leasing buffer off Baldwin County.
12.	Carla Gaskin Mautz	Florida Department of Environmental Protection	States that primary consideration should be given to long-term protection of marine and coastal environments. Urges BOEM to proceed cautiously when determining which OCS areas to include in DPP.
13.	Governors Brown, Kitzhaber and Inslee	States of California, Oregon, and Washington	Express opposition to inclusion of any new lease sales in the Pacific region.
14.	Mead Treadwell	State of Alaska, Lt. Governor	Urges BOEM to include all 26 planning areas in the DPP.
15.	Eight Governors (NC, SC, AL, TX, MS, LA, VA, AK)	Outer Continental Shelf Governors Coalition	Urge BOEM to include all unleased acres of the OCS in the DPP, including all Atlantic, EGOM, CGOM, WGOM, and Beaufort and Chukchi Seas.

Key: AL=Alabama, AK=Alaska, CGOM=Central Gulf of Mexico, EGOM=Eastern Gulf of Mexico, LA=Louisiana, MS=Mississippi, NC=North Carolina, SC=South Carolina, TX=Texas, VA=Virginia, and WGOM=Western Gulf of Mexico.

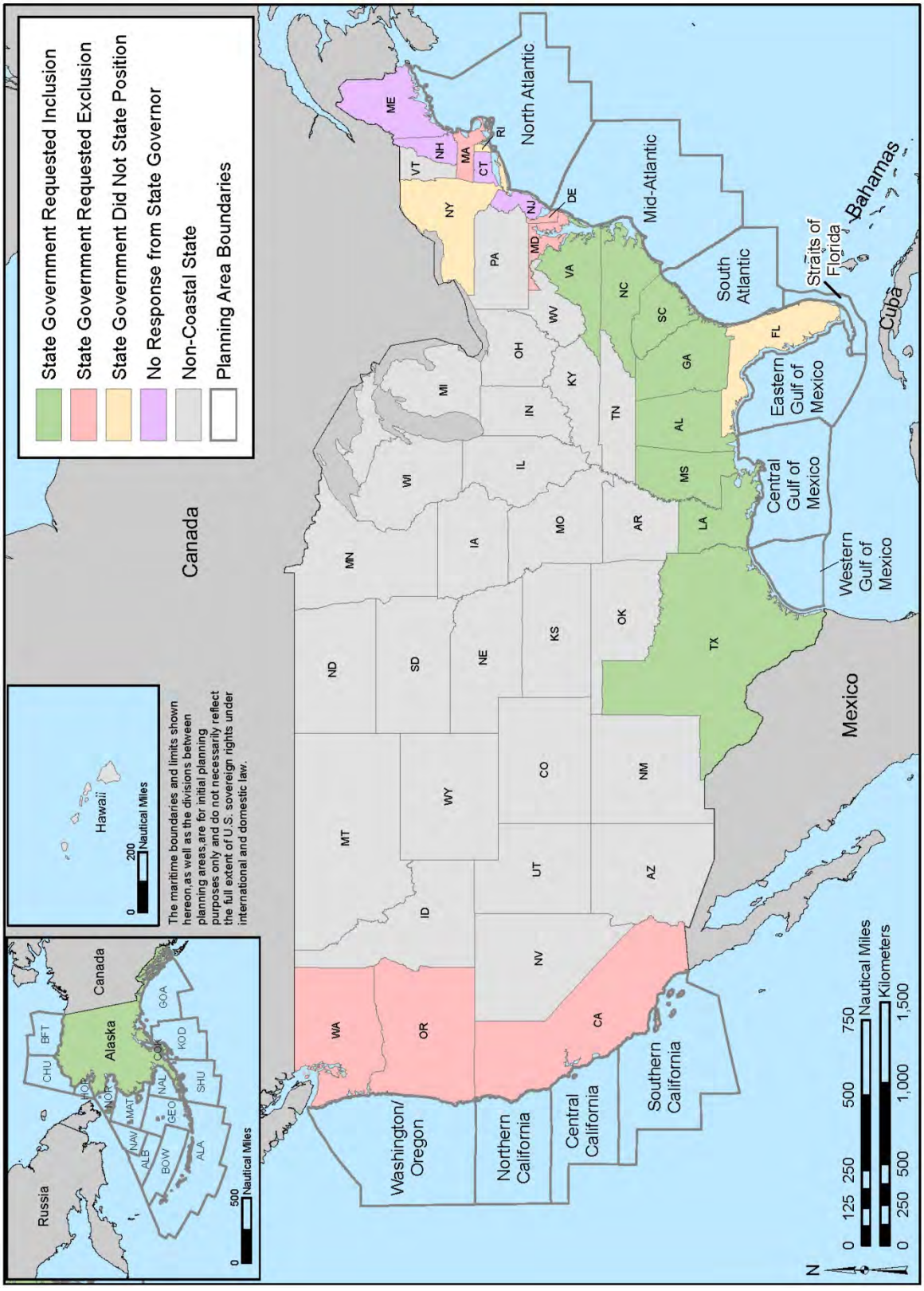


Figure 3-1: Status of Coastal State Comments on the RFI

3.3 INDUSTRY INTEREST

In response to the RFI, BOEM received 13 responses from entities in the energy industry that explore and produce oil and gas. Of those responses, many were supportive of including all 26 planning areas in the Program. Table 3-3 summarizes the comments on specific planning areas that were received by industry.

Table 3-3: Summary of Energy Industry Comments from the RFI

OCS Planning Area Preference				
	Gulf of Mexico	**Atlantic**	**Pacific**	**Alaska**
Chevron U.S.A., Inc.	1.Central 2. Western 3. Eastern	4. Mid- 5. North 6. South	7. Southern California	
ConocoPhillips	1. Eastern	2. Mid- and South 3. North	5. Pacific	4. Alaska
OCS Planning Area Mentioned in Comment Letter				
Statoil	Eastern and Deepwater	Mid- and South	X	X
Apache Corporation	Eastern	Mid- and South		
Apache Deepwater, LLC	Eastern	Mid- and South		
ExxonMobil	Eastern	Mid- and South		
Cobalt International Energy	Central and Western	Mid- and South		X
Noble Energy, Inc.	X	X	X	X
Stone Energy Corporation	Eastern	Mid- and South		
Shell Energy Resources	X	X		Chukchi and Beaufort Seas
Hercules Offshore		Mid- and South		
Gate Petroleum Company	Eastern	X		Chukchi and Beaufort Seas
Black Pearl Exploration	X			

Note: BOEM received a letter from one company marked proprietary by the submitter with an additional ranking of the OCS planning areas.

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

Chapter 4 Planning Area Location Considerations

4.1 National and Regional Energy Needs Analysis

Meeting national energy needs was a primary purpose of the OCS Lands Act Amendments of 1978 (43 U.S.C. 1802). That Act (Public Law (P.L. 95-372) amended the OCS Lands Act of 1953, establishing the criteria for the Secretary to consider when developing each new OCS Leasing Program. Section 18 of the OCS Lands Act, which was added by the Amendments, 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)). In addition to considering overall energy needs in developing the OCS Leasing Program, Section 18 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 18a(2)(c)).

In this DPP, the analysis of energy needs is split into three sections. The first section discusses the broad concept of national energy needs, emphasizing the importance of oil and natural gas to the Nation's economy. The second section focuses on national energy markets and the role that future OCS leasing may play. The third section addresses the role of future OCS leasing with respect to regional energy markets.

4.2 National Energy Needs

Energy needs, as recognized in the language of the OCS Lands Act, is a broad term that includes economic and energy policy goals, national security, reduced 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. Despite changes over the past few decades, many of the energy challenges that led to passage of the Section 18 requirements still remain today. Energy continues to play a central role in the U.S. economy.

OCS oil and gas production is a key component in meeting the Nation'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 has formulated a national strategy to meet U.S. energy needs in *The All-of-the-Above Energy Strategy as a Path to Sustainable Economic Growth* (Executive Office of the President 2014). This review describes 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. The OCS Leasing Program and resulting OCS oil and gas development is a key component for 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, affects the national well-being.

4.2.1 Contribution of Oil and Natural Gas to Nation's Economy

In recent years, American consumers have spent well over one trillion dollars a year, or more than 8 percent of the GDP, on energy. Oil and gas supply about 64 percent of the energy consumed domestically, and directly or indirectly support the supply chain for delivering nearly all goods and services in our economy. Further, oil and gas affect the balance of payments and trade, energy security, and technology and contribute to employment and public revenues.

The U.S. Geological Survey (USGS) and BOEM estimate that a significant share of the Nation's remaining oil (69 percent) and natural gas (26 percent) resources lie on Federal lands, both submerged and onshore (USGS 2013, BOEM 2011). Therefore, continued oil and natural gas production in the GOM, the primary OCS region currently available for energy production and development activities, remains vital. Many other OCS planning areas are estimated to have substantial undiscovered resources, and new production from other OCS regions can also contribute to meeting the country's energy needs.

4.2.1.1 Consumption of Energy Sources

Though U.S. energy needs expand far beyond simply consuming oil and natural gas, these fuels are fundamental to powering our economy. Section 4.3.4 provides more information on the consumption of oil and natural gas.

In addition, while oil has largely been replaced by other fuels outside the transportation sector, its dominant role as a fuel in the transportation sector is unlikely to change significantly in the foreseeable future because of a variety of technological factors (and existing infrastructure). Other sources of energy have gained only a few percentage points of transportation-fuel market share over the past 40 years. Crude oil is not only a raw input for gasoline and other transportation fuels, but also for a variety of petroleum products found in non-fuel markets. Crudes of different quality produce a different mix of petroleum products at different costs.

Natural gas—with low carbon-emitting potential relative to coal—has been increasing its share of electricity generation (EIA 2014b). The impact of additional production of natural gas has led to lower prices, which in turn have reduced manufacturing energy costs and allowed more companies to begin or to increase domestic operations (PwC 2011). Furthermore, due to low energy costs, more companies are bringing formerly overseas operations to the United States, thus benefitting American workers (Boston Consulting Group 2012). This manufacturing renaissance has benefited all regions of the country. Over the next 20 years, EIA expects the United States to rely on more oil and natural gas to meet its energy demands, even as alternative sources of energy provide an increasing share of U.S. energy needs. [6]

[6] EIA projects that consumption of liquid fuels will decrease slightly through 2040, but consumption of natural gas will increase by a greater amount over the same period (EIA 2014h).

4.2.1.2 Balance of Payments and Trade

Between 2000 and 2013, the cumulative total of United States spending on imports of goods and services exceeded U.S. exports, resulting in a trade deficit of $7.6 trillion dollars (U.S. Census Bureau 2014). During the same period, the cumulative U.S. trade deficit in crude oil and petroleum products amounted to $3.1 trillion, or 41 percent of the cumulative trade deficit in all goods and services (U.S. Census Bureau 2014). 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, and net imports of crude oil are expected to increase again over the life of the 2017–2022 Program (EIA 2014h). OCS production will remain an important contributor to domestic U.S. oil supplies, helping to improve the balance of trade.

Over the long-term, reducing the size of the trade deficit can be expected to strengthen the value of the dollar. This is the case 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 clear the international currency market in dollars, the value of the U.S. dollar would need to decline. To the extent that the trade deficit can be reduced by dampening the United States' need for imports of foreign oil, such as by producing added amounts of lower-cost oil from the OCS, the value of the U.S. dollar can be strengthened.

A stronger U.S. dollar provides macroeconomic and strategic global benefits to the nation. For example, when the value of the U.S. dollar rises in comparison to currencies of other countries, it takes fewer dollars to purchase the same amount of international products (i.e., imports become less expensive). 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 Petroleum Exporting Countries (OPEC) to undertake strategies that would result in increased prices to maintain the purchasing power of its revenues. Accordingly, increasing domestic petroleum production can reduce the nation's dependence on foreign production, in turn reducing imports, shrinking the deficit, and potentially strengthening the value of the dollar.

4.2.1.3 Energy Security

One of the key elements in the President's energy strategy is to enhance 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 and gas enhances 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 means.

The recent boom in onshore production of natural gas and oil from tight formations[7] has contributed greatly to the Nation's energy supply security. This bounty of light, sweet crude oil and gas 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 (Engel and Windrem 2013, Cummings and Gold 2013). All U.S. production contributes to the world supply of oil. Although the percentage of OCS oil and gas as a share of domestic production has declined (see Figure 4-1 and Figure 4-2), this production remains an important component for domestic energy, and economic and national security. As explained in Section 4.3.5.1, the Program 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]

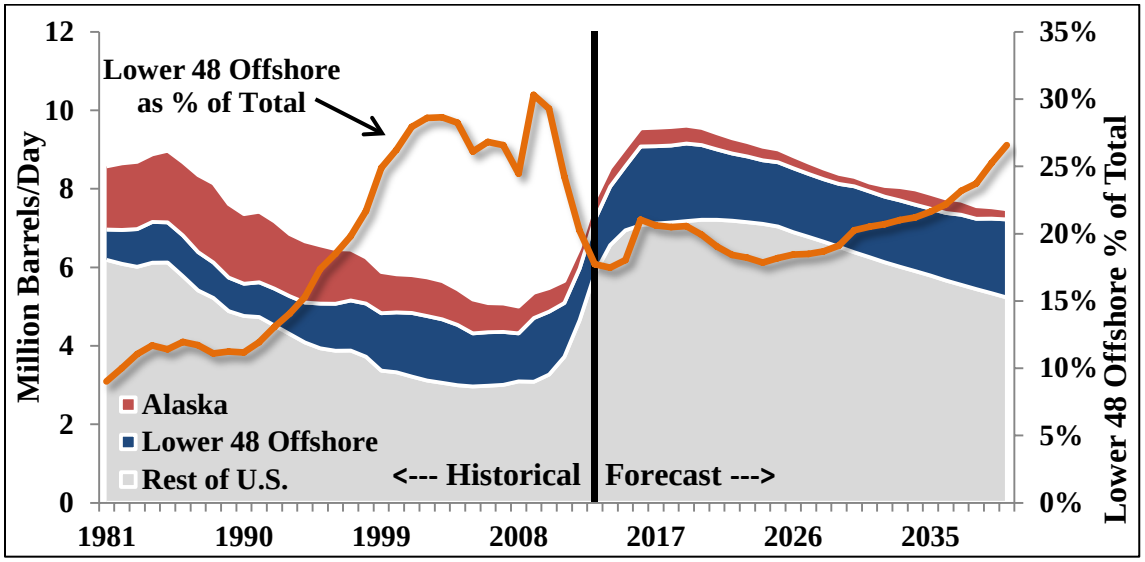
Other components of energy security are affordability of energy supplies and reduction of price volatility. In the absence of artificial rationing or an especially destructive natural disaster, higher prices are often the only publicly visible sign of supply disruptions. Oil is a fungible commodity sold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

EIA predicts costs for imported energy will increase in real terms over the coming decades. High and volatile energy prices, especially for crude oil, raise important energy policy issues about supply options and their effects on the economy and the environment.

[7] For simplicity, the light, sweet crude oil that has become abundant as the result of the widespread use of hydraulic fracturing (fracking) and horizontal drilling is referred to generically in this document as "tight oil." 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 2014h).

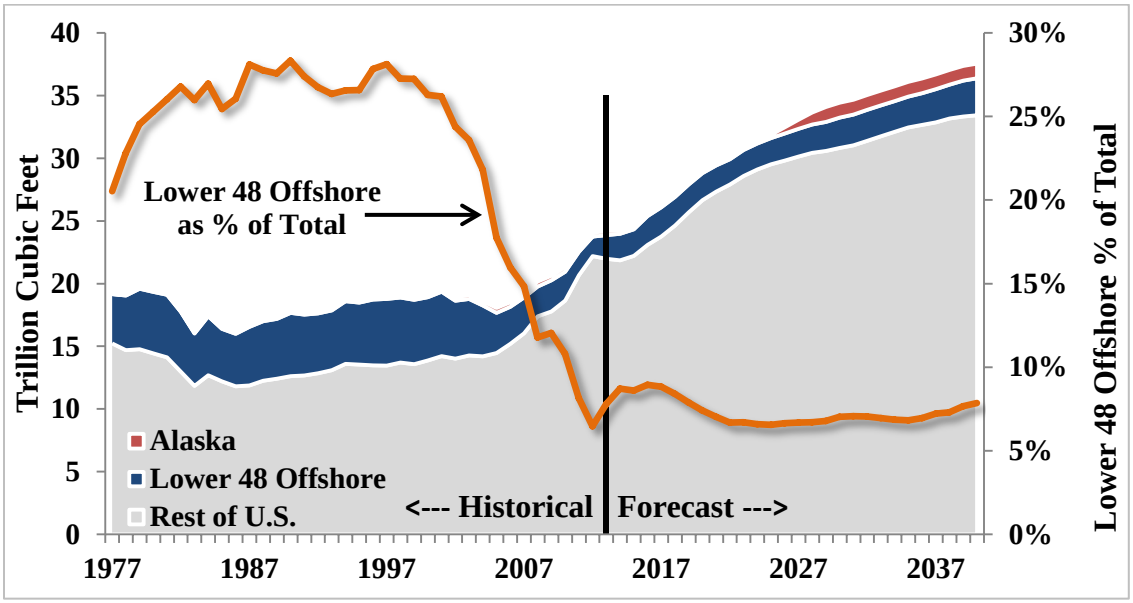
[8] In addition, while lessees can decide fairly quickly to cancel or not to initiate new OCS projects, companies cannot initiate new OCS projects without going through the long process of planning for a lease sale, bidding, applying for and obtaining approvals, obtaining the necessary resources to determine prospect viability by exploration, etc.

Figure 4-1: Historical and Forecasted U.S. Crude Oil Production by Region



Note: EIA does not publish Alaska OCS numbers separately.
Source Data: EIA *Annual Energy Outlook 2014* (EIA 2014h).

Figure 4-2: Historical and Forecasted U.S. Natural Gas Production by Region



Note: EIA does not publish Alaska OCS numbers separately.
Source Data: EIA *Annual Energy Outlook 2014* (EIA 2014h).

4.2.1.4 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 (see Section 4.3.1), have driven 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 and, along with regulatory

changes, improvements in industry practices, and enhanced 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 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 the RFI. These technological advances support the country's economic growth and help meet global energy needs.

4.2.1.5 Employment and Public Revenues

The national energy industry is an important component of the U.S. economy through its contribution to GDP, employment, and public revenues. Domestic production of 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 offshore oil and gas industry on GDP and employment is discussed in Chapter 7.

OCS leasing and production also provides billions of dollars a year in bonus bids, rentals, and royalties to the U.S. Treasury; funding for the Land and Water Conservation Fund (LWCF) and Historic Preservation Fund; OCS Lands Act Section 8(g)[9] revenues and other revenue sharing payments to states; and, indirectly, worker and industry tax payments to state and local governments. The revenues available to local, state, and Federal governments are described in Chapter 7.

4.3 NATIONAL ENERGY MARKETS

The following sections discuss national energy needs as well as the location of OCS planning areas relative to the needs of national energy markets, as required by Section 18. U.S. energy needs are considered in the presence of a persistent, though recently shrinking, gap between domestic production and consumption; continuing concerns over the United States' negative balance of payments in world trade; and increasing domestic onshore production. The Secretary must consider these national issues when deciding on the size, timing, and location of OCS lease sales.

[9] Section 8(g) of the OCS Lands Act provides for the Federal government to share with each coastal state 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."

4.3.1 Recent Developments in Oil Markets

High natural gas prices from 2005 through mid-2008 enhanced the economics of using existing technologies—hydraulic fracturing ("fracking") and horizontal drilling—to develop huge onshore formations containing natural gas. These formations had previously been too expensive to develop with conventional techniques, and this development dramatically reversed declining domestic natural gas production. The steady oil price increases from the beginning of 2007 through mid-2008 contributed to the attractiveness of applying these techniques to onshore oil production, especially as the new abundance of natural gas drove its price below the point at which natural gas production would be profitable in the long run[10].

4.3.2 Relevant Developments in Domestic Petroleum Markets

Onshore tight oil is returning 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 abundance of 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 supply and consumption is that the oil produced from tight formations is generally light, sweet crude, in contrast to the heavier sour crudes that generally come from both other domestic production and imported sources. In fact, 96 percent of the growth in production between 2011 and 2013 is in light, sweet crude, which is a higher-quality crude than the medium-to-heavy sour crude traditionally found on the OCS (EIA 2014d). This phenomenon has reduced the overall need for imported oil, but the overall numbers mask a dramatic change in the overall composition of remaining imports. Huge quantities of domestic light crude sold at discounted prices (see below) have replaced light crude imports to the extent that the limit of the short-run ability of markets to substitute domestic light (tight) crude for imported crude has largely been reached. Net imports of medium-to-heavy oil have declined only slightly since 2010 (EIA 2014c). 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 Reference Case (and Low Oil and Gas Resource Case) in EIA's *Annual Energy Outlook 2014* (EIA 2014h) projects a change toward higher imports to begin in the next decade as projected domestic production levels peak in 2019.

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. Refineries are complex facilities designed to use specific grades of crude oil as inputs and to produce specific mixes of petroleum products as outputs. The least expensive crude combinations from different sources are blended to produce the most profitable combination of refined products at the lowest price, given refinery design. The United States' refinery and transportation infrastructure was constructed and evolved over time primarily to handle the heavy, sour crude from traditional producing areas and ports, rather than the light, sweet crude from the recently developed tight oil plays. In fact, prior to the huge increase in light, better quality-crude oil, many domestic refineries spent tens of

[10] Due to low operating costs, production continued from existing projects, some (such as larger OCS projects) of which would continue production for many years. However, producers began to focus on low-cost projects and oil-prone areas, many of which provided associated gas production. While the price of natural gas is still much lower than it was a decade ago, market responses—including increased demand for this inexpensive, environmentally preferable fuel—have brought the price back up to roughly $4 per thousand cubic feet.

billions of dollars retooling their facilities to be able to process less expensive, imported heavy, sour crude oil. The U.S. pipeline network was similarly designed to transport medium-to-heavy crude from traditional production areas or ports to refineries and then to carry the refined products to markets, whether domestic or foreign. U.S refinery feedstock needs, transportation bottlenecks, and a decades-old ban on exporting crude oil[11] also combined to push the price of domestic crude, especially the lighter sweet crude, below world prices for equivalent grades of crude.

As would be expected, with the abundance of light, sweet crude from onshore tight oil, energy markets have made adjustments. It is extremely expensive to retool a facility to process different grades of crude so U.S. refineries have adopted short-term strategies of blending light crude with (often imported) heavy crude to accommodate the new supply and create an efficient mix of feedstock. This may help account for the huge increase in imports from Canada (which provides bitumen and upgraded synthetic crude from the oil sands in Alberta), despite an overall decrease in imports over the past several years (EIA 2014c). Canadian imports for the first 7 months of 2014 were more than 30 percent higher than those from the same period in 2009 (EIA 2014i).

Pipelines are the least expensive and perhaps safest means to transport crude oil, even if the grade is so heavy that special heating units and/or blending is required to make the oil flow. The U.S. pipeline network was originally designed to transport oil from traditional producing areas to the appropriate refineries. With the recent boom in tight oil production, pipeline bottlenecks have emerged. The industry is shipping oil in specially designed rail cars and even trucks, sometimes using two or three modes of transportation (e.g., truck from production site to nearest rail line) in succession to transport crude oil to its destination. Although railways and trucks offer greater short-term flexibility than pipelines, the costs of shipping by rail can be two or three times higher than pipeline shipping costs and truck transportation is even more expensive than rail.

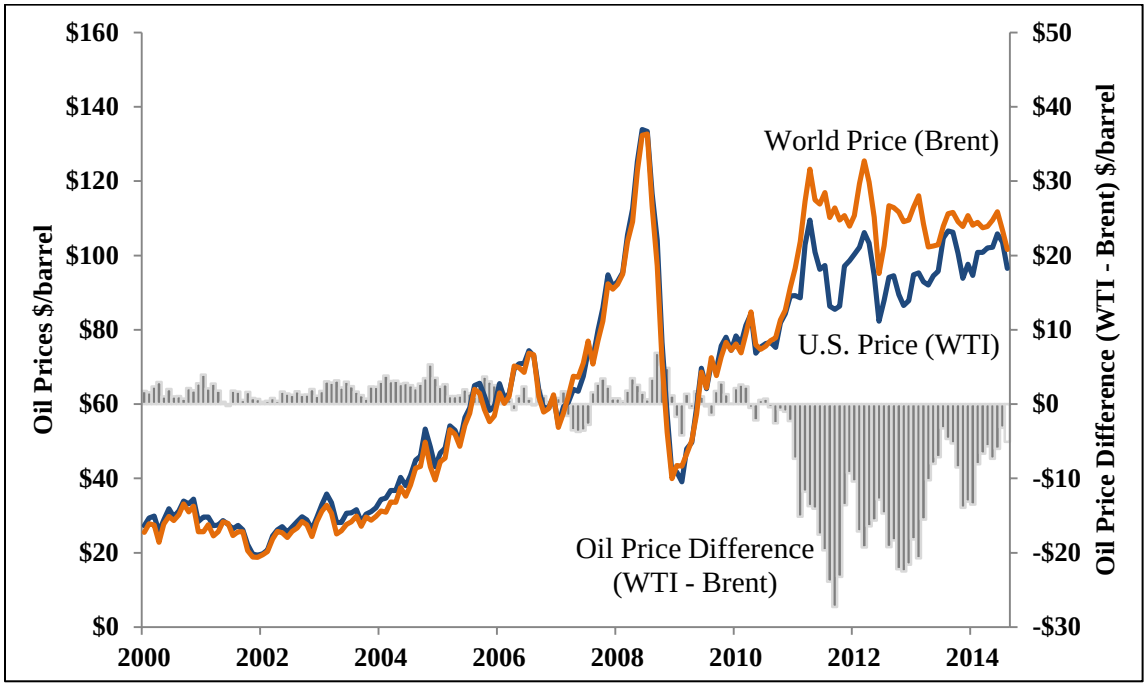
The sheer volume of new oil production from tight formations, the long distances between production sites and refineries designed for the higher-grade crudes, and the prohibition on exports of crude oil have resulted in producers selling at discounted prices. This discount can be seen in the "spread" between prices for the two major "benchmark crudes," Brent and West Texas Intermediate (WTI),[12] which changed direction and increased dramatically in early 2011 (EIA 2013a). WTI is a light, sweet crude that traditionally sold for a slightly higher price than Brent crude, which comes from the Atlantic basins such as the North Sea. As the tight oil boom accelerated, landlocked WTI began to sell at a discount to Brent because the existing transportation systems could not accommodate the combination of increased quantity and production locations, creating a bottleneck. For the same reasons, the price of the much more mobile Brent crude has been more responsive to world events. As markets have adjusted (e.g., refineries adjusting to plentiful light crude, rail and truck routes being added or used more heavily, and a major pipeline reversing direction), this discount has come down from a high of

[11] Domestic crude oil exports are strictly limited by multiple laws; there are a few Presidential exemptions consistent with the requirements of the Energy Policy and Conservation Act of 1975 (BIS 2013).

[12] Because prices differ for numerous types and locations of crude oil, and because those prices 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.

greater than $25 per barrel to less than $5 per barrel (see Figure 4-3) (Duesterberg 2014). Prices for crude oil imported from Canada have also been affected by lower U.S. oil prices.[13] This loss to producers in terms of product price has benefitted refining companies. Refiners have taken advantage of the spread between domestic prices and world prices, 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. Domestic refiners also have access to inexpensive natural gas to run the refineries. These cost advantages are presumably the major factor that allowed the United States to become a net exporter of petroleum products in 2011. However, as mentioned above, markets adjust, and this cost advantage (due to discounted oil prices) has been shrinking.

Figure 4-3: World and U.S. Domestic Oil Prices (Brent vs. WTI), 2000–2014



Key: WTI=West Texas Intermediate

Source Data: EIA 2013a

Another effect of the revolution of oil production from tight formations has been potentially greater responsiveness of domestic supply to changes in price. Traditional production techniques, including those used on the OCS, generally recover 35 to 40 percent of the resources in a field (Zitha et al. 2011). Onshore, technologies used for tight oil typically lead to recovery rates between 5 and 20 percent (Schaefer 2011). Fracking only results in production of the easiest 5 to 20 percent of a field's resources and a well's peak production is reached soon after production begins. (Development of new "extended oil recovery" techniques comparable to those that exist for traditional projects is likely to increase fracking recovery percentages in the long run.) Because of the quick initial return on investment, the need to drill additional wells to continue to produce, and the fact that onshore drilling rigs are mobile, planned and existing projects can be terminated and/or new projects can be started relatively quickly in response to

[13] Virtually all of Canada's oil exports are bound for United States refineries.

short-term changes in price or price expectations. This is in sharp contrast with OCS projects, which—while subject to general long-term price expectations—can take 10 years or more from lease award to initial production in deep water or Arctic areas. The economics of offshore, especially deepwater, projects tends to lead to choices of pipeline diameters designed not to accommodate short-term, maximum possible flow but rather to (more economically and efficiently) spread delivery of peak production from these projects over periods of years, providing steady and more predictable sources of oil and gas for a long time once production begins, regardless of fluctuations in prices and price expectations.

Conventional onshore and OCS areas can provide oil and natural gas for decades to come. Therefore, 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 not as susceptible to changes in markets or early assumptions about undiscovered resources, prices, technology, recovery rates, etc.[14] This overall stability allows for longer-term planning for infrastructure and other needs. Although such projects are more resource-efficient (i.e., they result in production of a greater percentage of resources before field abandonment) and provide more reliable long-term production estimates once started, they do not provide quick supply responses to changing conditions or expectations. [15] Conversely, fracking projects provide more timely responses to changing prices and other conditions, helping to mitigate market swings in supply and prices.

4.3.3 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 an even greater 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 planning and constructing liquefied natural gas (LNG) export terminals, hoping to take advantage of 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, processing natural gas is not as complex as refining crude oil. The downstream markets are not as varied and there is no ban on exporting onshore natural gas. The challenge is transporting the gas overseas, which is what has prompted recent applications to

[14] Many of the resource estimate assumptions are necessarily tentative, given the new fracking boom, associated data availability, and unforeseen technological advances that result from the suddenly large new market for innovations to increase recovery and reduce costs. Early indications suggest that future tight formation production may be underestimated, but new information or lower than expected prices during the 2017–2022 Program could contradict these early indications.

[15] OCS exploration results cannot yield precise expectations for future production for a given project. However, given the lag between exploration and production for major OCS projects, the length of time the project is likely to maintain high production levels (in large part due to pipeline size constraints), and the longer experience with OCS production profiles, such projects lend themselves to more predictable long-term production estimates than do onshore shale oil and gas projects. A similar experience gap exists for estimation of undiscovered resources.

build LNG export terminals. An example of how quickly energy markets can change is that, less than 10 years ago, companies were applying to construct LNG import terminals.

Less expensive natural gas has reduced manufacturing energy costs. Many companies are beginning or increasing U.S operations or returning manufacturing from overseas. This natural gas renaissance is helping to stem the long-term decline in U.S. manufacturing jobs and providing a competitive advantage for the U.S. manufacturing industry.

4.3.4 Oil and Natural Gas Consumption and Production Estimates

EIA forecasts that the United States will continue to heavily rely on oil and natural gas to meet its energy needs. In 2013, 64 percent of energy consumed in the United States came from oil and natural gas, and the EIA forecasts that this percentage will remain fairly constant through 2040. Figure 4-4 shows total U.S. energy consumption by fuel source from 1950 to 2013 and includes the EIA Annual Energy Outlook projections from 2014 through 2040. The projections shown in Figure 4-4 indicate that while the share of energy obtained from oil decreases slightly, the actual amount of oil needed to meet the Nation's energy needs will continue to grow until 2020 before it begins to decline. Figure 4-4 shows that domestic natural gas consumption is expected to grow through 2040.

As discussed, production in the United States has increased rapidly in recent years. The September 2014 Monthly Energy Review from the EIA showed continuation of this trend as domestic crude oil production increased 15 percent over the first 6 months in 2013, and natural gas production increased 5 percent (EIA 2014g). Figure 4-1 shows U.S. crude oil production by region. OCS Lower 48 crude oil production as a percent of total oil production peaked in 2009 at 30 percent of domestic production, and stood at 18 percent in 2013. Alaska production includes both onshore and offshore production on both state and federal lands. Figure 4-1 also shows EIA's forecast for oil production by region from 2014 to 2040. [16]

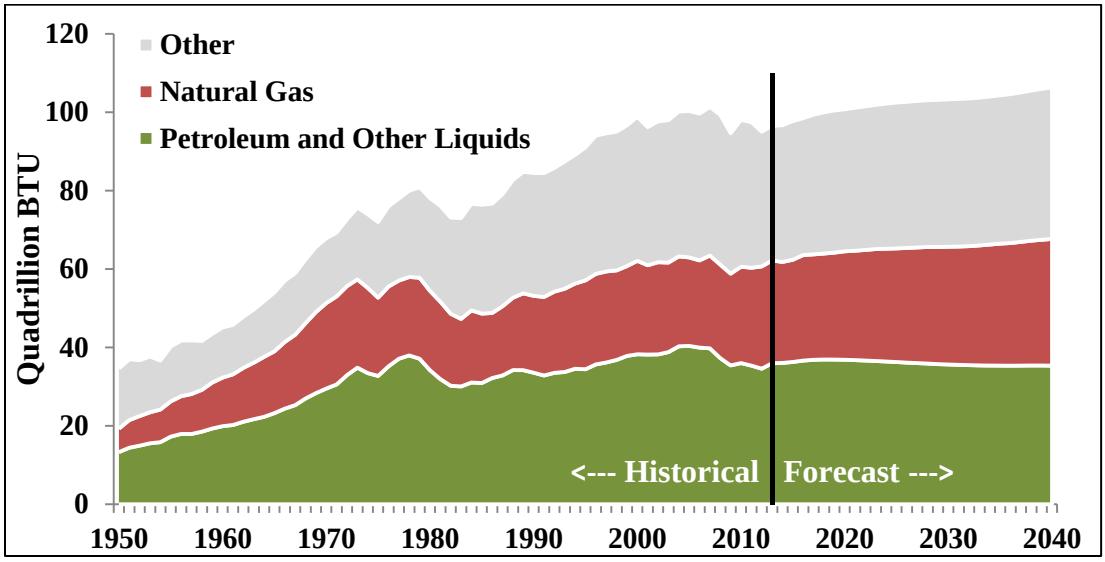
Figure 4-2 shows U.S. natural gas production by area. OCS natural gas production as a percent of total U.S. natural gas production peaked in 1990 at 27 percent of total U.S. natural gas production, and dropped to 5 percent in 2013. Figure 4-2 also shows the EIA projection for natural gas production from 2014 through 2040.

4.3.4.1 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, and access to oil and gas resources. The confluence of higher prices and improvements to existing technology has allowed access to hydrocarbon resources previously deemed to be too expensive to develop by more traditional means. This renaissance has reversed the long-term decline in U.S. oil production, catapulting the United States toward a position as the world's top producer in a very short time.

[16] EIA assumes that all OCS areas not withdrawn or under moratoria are available for leasing as of 2017.

Figure 4-4: Historical and Forecasted U.S. Energy Consumption by Fuel Type



Source Data: EIA Annual Energy Outlook 2014 (EIA 2014h)

Over time, markets will adjust, but some of these changes could take place fairly quickly. A combination of circumstances caused the price of oil to roughly double from mid-2007 to mid-2008 and then—largely because of a world-wide recession—to fall by more than two-thirds in the last 5 months of 2008. While neither the peak nor the trough lasted long, it was fortuitous that the ramp up in fracking activity was underway in response to the increasing oil and gas prices in the years 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.

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, or new technological breakthroughs. 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 40–60 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.

4.3.5 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. 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. The OCS program provides significant benefits above and beyond oil and gas for fuel and refinery feedstock. It also provides billions of dollars of revenues to Federal, state, and local governments, as well as important employment benefits.

4.3.5.1 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 4.3.2). 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.[17] 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, OCS leases necessitate due diligence in production of economic resources, as required by the OCS Lands Act.

The legal constraints governing the OCS Oil and Gas Program development and leasing processes effectively restrict them from being used to quickly make available additional undiscovered resources in response to major changes in 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 would have to be undertaken, and it would take years before new lease sales could be held and leases awarded. After leases are awarded, it would still take many more years before industry could begin production on new projects capable of noticeably increasing overall production, even in the Central and Western GOM. In frontier areas there would be further delays to build the infrastructure needed to support exploration, development, and production. Thus, when making decisions for this OCS Leasing Program, the Secretary has to consider energy needs decades in the future.

On the other hand, if the United States' need for oil and/or gas (relative to supply) declines, the OCS Leasing Program and the OCS industry can begin their responses fairly quickly. Lease sales can be cancelled, companies can bid on fewer blocks in the sales that are held, and operators can decide to abandon plans to explore, develop, or produce on blocks they already have under lease. Recent bidding activity on the GOM shelf, which is rich in natural gas

[17] Even with a ban on exports of crude oil, the United States market will be heavily influenced by world prices, not only because imports will have to be purchased at world prices but also in part because consumers use refined petroleum products, not crude. 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, where companies can put their resources where they bring the highest return, domestic prices even for crude would not remain stagnant, and attempts to control domestic prices have been shown to create disruptive, unintended consequences and to discourage investments that lead to increased domestic supply.

deposits, has declined in response to relatively low natural gas prices due to the marked increase in natural gas supply coming from shale gas plays onshore.[18]

4.3.5.2 Importance of OCS Production

Although overall net petroleum import levels have been decreasing and are expected to continue to decrease in the near future OCS production is still important to U.S. energy markets. All oil is not equal—the medium-to-heavy sour crudes produced from the OCS are still greatly needed in U.S. refineries. Many Gulf coast refineries spent billions of dollars several years ago on new equipment and facilities to accommodate the (less-expensive) heavier crude available from places like Venezuela or the OCS and are now not equipped to efficiently handle the light, sweet crudes from tight oil formations without incurring huge additional retooling costs.[19] Partly because Gulf Coast refineries are equipped for lower-quality crude rather than the light, sweet crude being produced in such abundance in recent years, there is a continued need for OCS crude, for which there is an existing network of pipelines from producing areas to nearby refineries. Markets will adjust to the abundance of tight oil over time if it endures, but adjustments beyond those currently in place may be very expensive and could take place over a very long time, especially as the price discount for (and incentive to use) tight oil diminishes.

New production from the OCS would help the United States meet continued energy demand and maintain a diversity of supply. Diversity of supply mitigates the effects of import disruptions and cushions the consequences of hurricanes and other disruptive forces on parts of the GOM as well as on refining and processing operations. 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 stabilize world oil supply, adding flexibility for U.S. foreign policy initiatives in a world that would otherwise be experiencing oil price shocks resulting from unrest and political turmoil in major oil producing countries. Even ignoring the mismatch between tight oil crude qualities and those needed by GOM and other U.S. refineries, it is clear that many of the numerous benefits flowing from the boom in fracking described in this analysis would have been negated if the production increases had been offset by significant declines in OCS oil production.

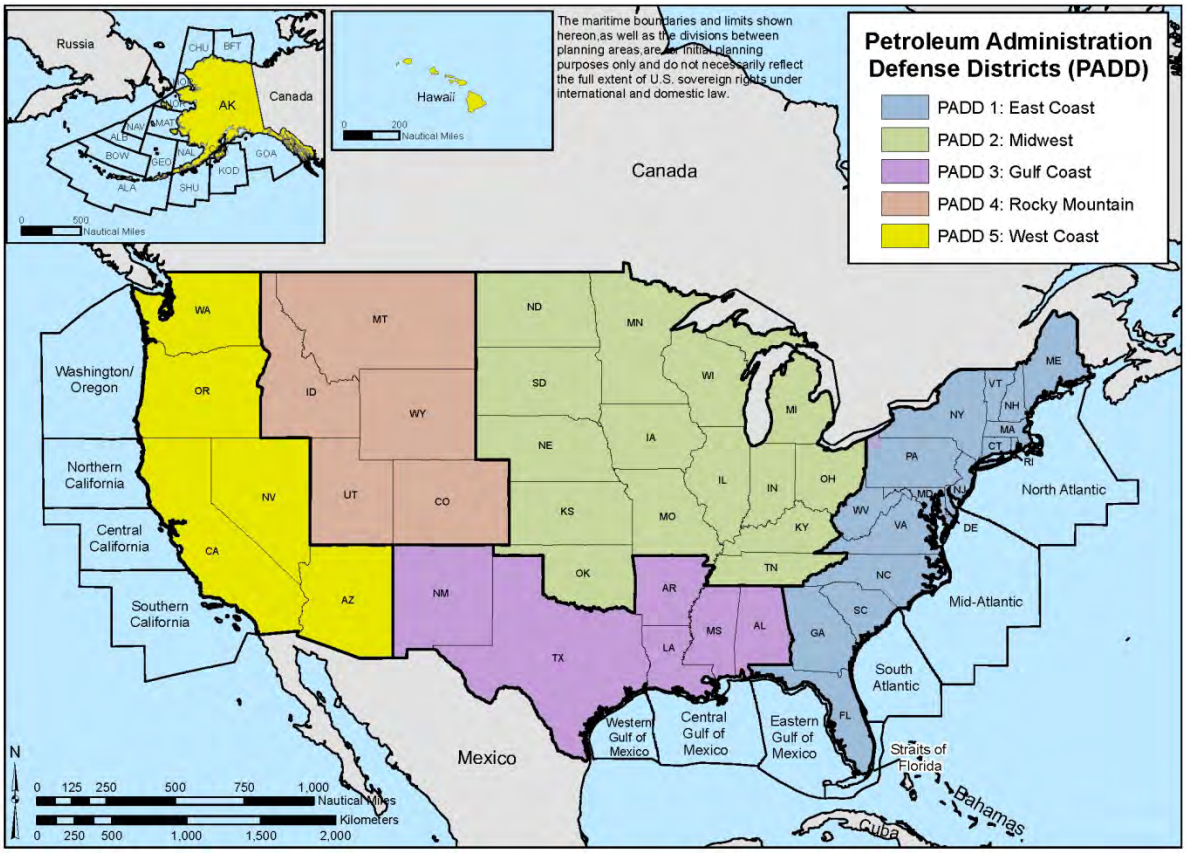
4.4 REGIONAL ENERGY MARKETS AND THE LOCATION OF OCS REGIONS

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." 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

[18] For example, only six blocks received bids in water depths of 0 to 200 meters in the Western GOM Planning Area Sale 238 in 2014, as opposed to 67 blocks in Western GOM Planning Area Sale 207 in 2008.
[19] When there is a price advantage to do so, refineries will blend light crude with much heavier crude to obtain the desired input quality. However, there are limits to the amount of light crude a given refinery can accommodate and still maintain refining efficiency.

energy production and consumption. To analyze energy markets regionally, BOEM uses Petroleum Administration for Defense Districts (PADDs) from EIA to group all 50 states by five separate districts.[20] The PADDs, shown in Figure 4-5, allow users, including BOEM, to analyze regional movements of natural gas and petroleum.

Figure 4-5: Petroleum Administration Defense Districts



4.4.1 Regional Production and Consumption

Regional energy markets are defined by the amount of crude production, refining, and consumption that occurs in each region. Figure 4-6 and Figure 4-7 show proportional petroleum production and consumption by region in the United States in 2012. Figure 4-8 and Figure 4-9 similarly show 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 Figures 4-6 through Figure 4-9. 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 more than 70 percent of the domestic oil and natural gas used in the United States, but supply only about 40 percent of domestic oil

[20] BOEM separates Alaska from other states in the West Coast PADD in Figures 4-6 through 4-9 because Alaska has its own OCS region, and, more importantly, its large oil production and low consumption mask a very different production-consumption relationship than that found in the other states. Based on data availability, Alaska is grouped with the remaining West Coast PADD states for the other tables and figures.

and 49 percent of natural gas production. In 2013, the GOM OCS itself was responsible for 18 percent of domestic oil production and 5 percent of domestic natural gas production. As shown in Chapter 5, the coastal PADDs all have significant offshore resources that could be used to meet regional energy needs.

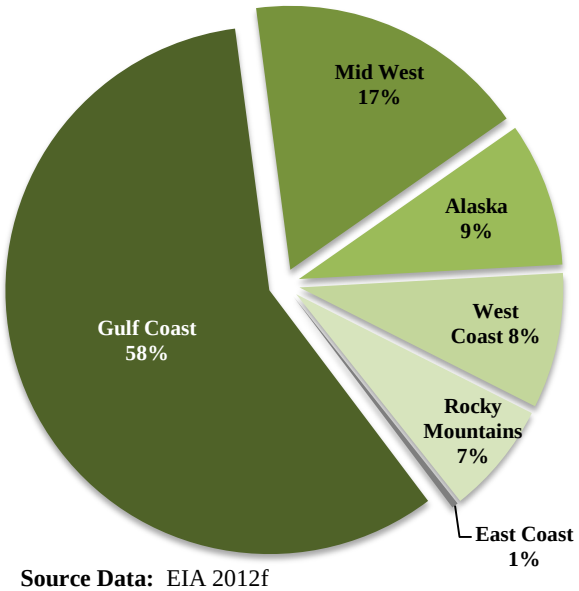
4.4.2 Regional Transportation

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. Energy is fungible, even more so once refined and processed, making location less relevant at that latter stage. Therefore, a key component of each region's ability to support its own or the national energy demand is the refinery capacity within that region. Figure 4-10 shows the percent of U.S. refining capacity in each PADD.

Even though the East Coast accounts for 27 percent of total U.S. oil consumption, it only contains 7 percent of the Nation's refining capacity. In order 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.

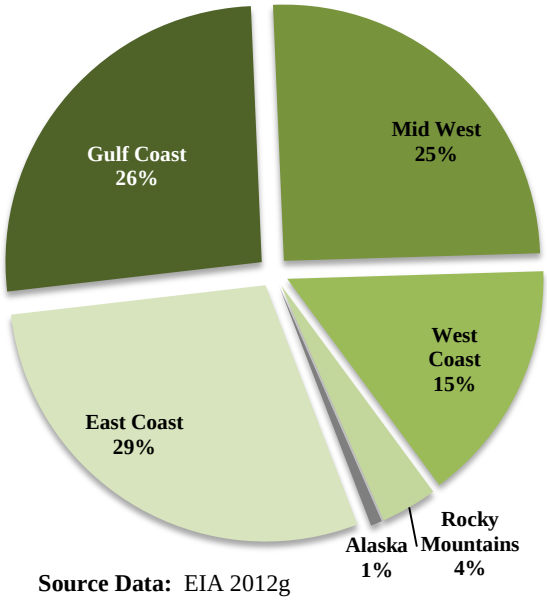
Each of the PADD regions receives crude oil and petroleum products in three different ways: production, regional imports, and foreign imports. Similarly, most of the regions have at least some regional and foreign exports. Figure 4-11 shows the crude oil and petroleum production and movement by pipeline, tanker, and barge 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 the largest share of both foreign and regional exports.

Figure 4-6: Contribution to Oil Production by PADD



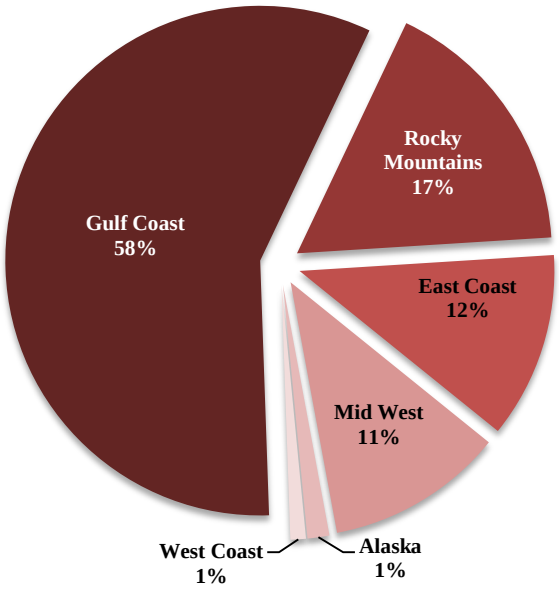
Source Data: EIA 2012f

Figure 4-7: Oil Consumption by PADD



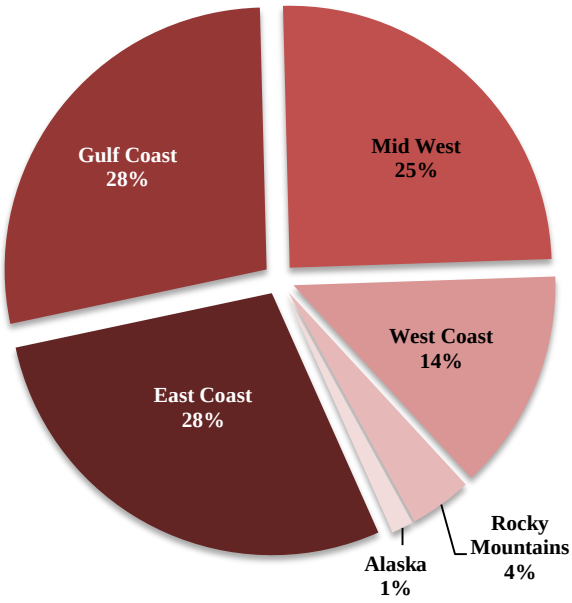
Source Data: EIA 2012g

Figure 4-8: Contribution to Marketed Natural Gas Production by PADD



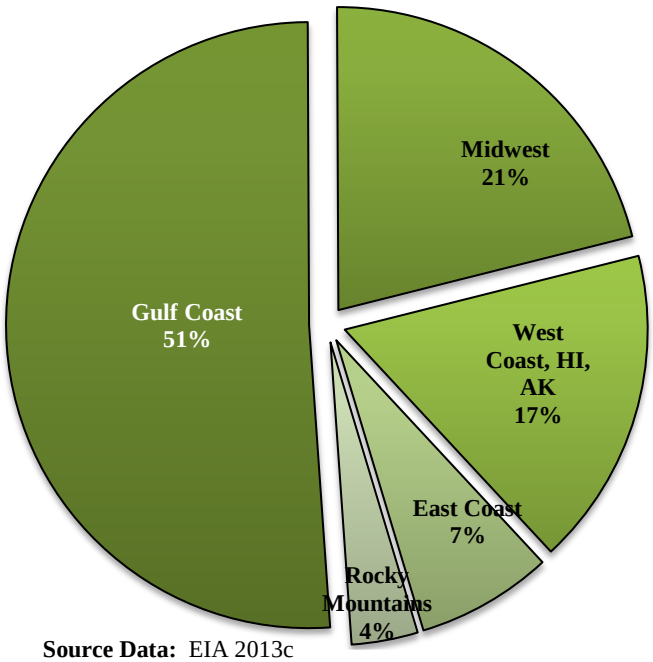
Source Data: EIA 2012h

Figure 4-9: Natural Gas Consumption by PADD



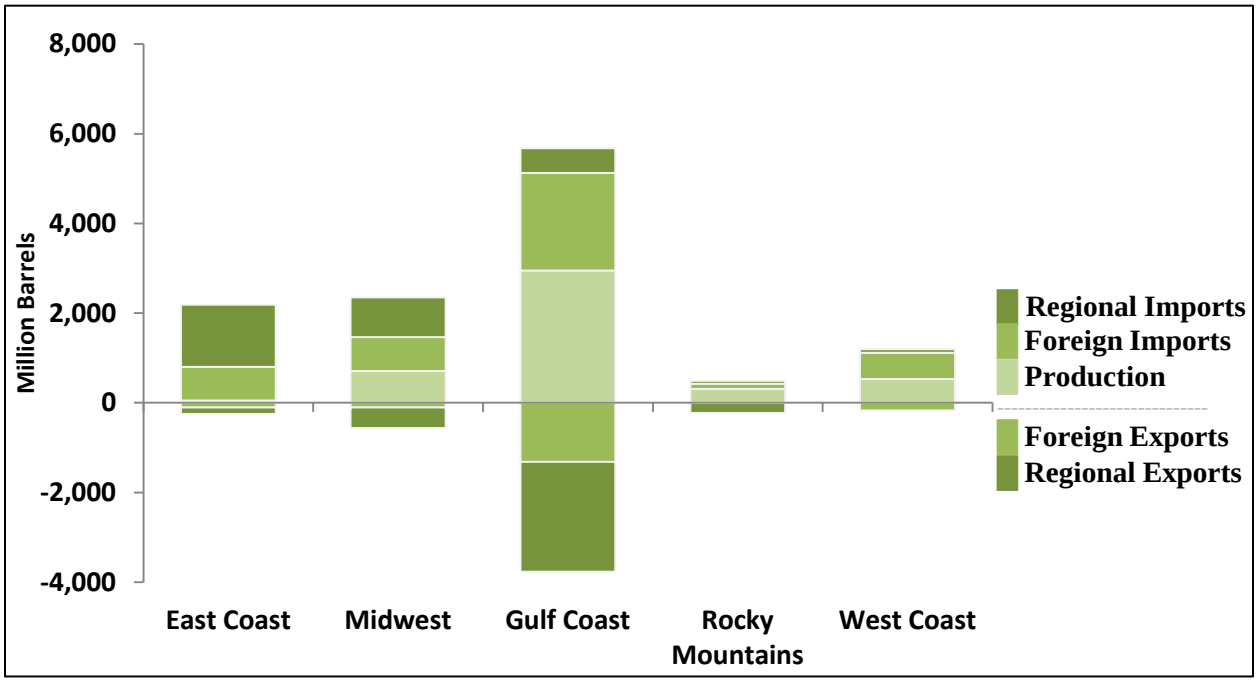
Source Data: EIA 2012i

Figure 4-10: U.S. Refining Capacity by PADD, 2013



Source Data: EIA 2013c

Figure 4-11: U.S. Crude Oil and Petroleum Production and Movement by Region, 2013



Source Data: EIA 2013d

Examining in particular the regional movement, Table 4-1 shows the 2013 inter-PADD movement of petroleum products by tanker, pipeline, and barge. EIA does not track movements by rail and truck, which may be highest for routes not serviced by pipelines.[21] More than three-quarters of the petroleum product movements by tanker, pipeline, and barge originated in the Gulf Coast PADD, which includes the GOM offshore. Three-quarters of these shipments went to the Northeast.

Table 4-1: 2013 Petroleum Product Shipments by Tanker, Pipeline, and Barge (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)*	0	32	1,173	0	0	1,205
To PADD 2 *(Midwest)*	111	0	265	57	0	433
To PADD 3 *(Gulf Coast)*	1	157	0	57	0	215
To PADD 4 *(Rocky Mtn.)*	0	36	0	0	0	36
To PADD 5 *(Pacific)*	0	0	51	15	0	66
Total Shipments	112	225	1,489	129	0	1,955

Source Data: EIA 2014f.

Table 4-2: 2013 Crude Oil Shipments by Tanker, Pipeline, and Barge (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)*	0	5	8	0	0	14
To PADD 2 *(Midwest)*	3	0	332	87	0	421
To PADD 3 *(Gulf Coast)*	9	182	0	6	0	198
To PADD 4 *(Rocky Mtn.)*	0	26	0	0	0	26
To PADD 5 *(Pacific)*	0	0	0	0	0	0
Total Shipments	12	214	340	92	0	659

Source Data: EIA 2014f.

[21] Although the recent abundance (and location) of tight oil production and the constraints imposed by the existing network of pipelines has led to a large increase in transportation by rail and truck, EIA does not regularly track such movements; therefore, this analysis is based on tanker, pipeline, and barge transportation of crude oil and petroleum products (EIA 2013b). The absence of data tends to mask new inter-PADD movements driven by recent tight oil production, and BOEM is looking into other possible sources of data for rail and truck transportation.

Table 4-2 shows the movement of crude oil between PADDs. Clearly, more petroleum products than unrefined oil are moved throughout the PADDs. Approximately half of the crude oil movements originate from the Gulf Coast PADD from either GOM offshore production or imports that come to the Gulf Coast ports. Of the feedstock that is regionally transferred, this is sent almost entirely to Midwest refineries (PADD 2). Canadian oil sands crude and increased production from North Dakota's Bakken formation have bolstered Midwest crude oil supplies in recent years; this has caused a decline in the volume of crude oil moving by pipeline from the Gulf Coast to the Midwest. Given the increase in Midwest production in recent years, a significant portion of crude oil is also transferred from the Midwest back to the Gulf Coast for refining (EIA 2012b), and recent completion of the Keystone Gulf Coast pipeline[22] is allowing Canadian crude to be sent directly to Gulf Coast refineries, where it can be mixed with lighter tight oil from the Midwest. Overall, a large proportion of the inter-regional crude oil pipeline movements occur among the states of the Midwest, Gulf Coast, and Rocky Mountain PADDs. As shown in Tables 4-1 and 4-2, however, the East Coast PADD does import a high volume of petroleum products from the Gulf Coast PADD. Rail shipments of crude from the Midwest to East Coast refineries have increased considerably in the past few years, but they are not reflected in the data available at this time. Likewise, (a much lower level of) West Coast petroleum product imports from the Gulf Coast and Rocky Mountain PADDs do appear in Table 4-2, but recent increases in crude oil movement by rail from the Midwest do not.

While Table 4-1 and Table 4-2 show the inter-PADD movements, the United States exports additional petroleum products internationally, as shown in Figure 4-11. 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 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 2012a). Because of these advantages, pipeline capacity, and other regulatory issues (including Jones Act restrictions on ocean vessel use), refineries in the Gulf coast often export gasoline to Latin America rather than shipping it to the East Coast (EIA 2012a). 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 2012a).

4.4.3 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. EIA estimates that in 2013 approximately 68 percent of the price of a gallon of gasoline is the cost of crude oil, 12 percent is from Federal and state taxes, 11 percent is from refining costs and profits, and

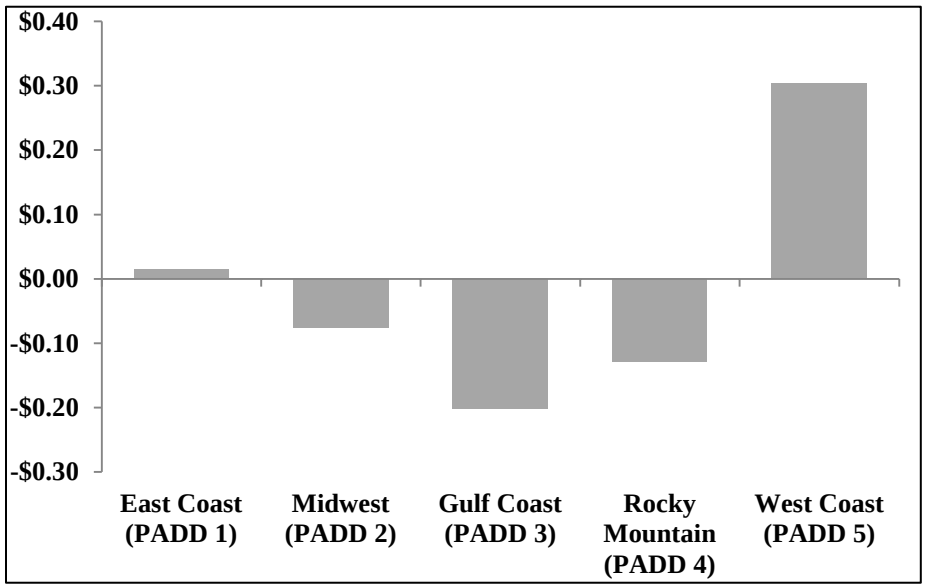
[22] The Keystone Gulf Coast pipeline is not part of the Keystone XL pipeline proposal but could connect to the XL pipeline (if built) via the Keystone Cushing Extension, which runs from Steele City, Nebraska, to Cushing, Oklahoma.

9 percent is distribution and marketing (EIA 2014e). 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 output[23] 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 2014e).

Figure 4-12 shows the difference from the U.S. average for retail gasoline prices in each of the five PADDs. The Gulf Coast PADD has the lowest average gasoline prices. While many factors affect retail gasoline prices, in general, they tend to be lower the closer the region is to ports, refineries, or pipeline terminals (EIA 2012b). Other factors that may affect gasoline prices include supply disruptions, retail competition, environmental programs that require additives, and environmental restrictions on refining.

Retail electricity prices can also vary greatly by region, as shown in Figure 4-13. Retail electricity generation comes from a variety of energy sources including coal, hydroelectric, natural gas, nuclear, petroleum, non-hydroelectric renewable energy, and other sources. Each of these energy sources has its own price fluctuations. For example, heating oil prices fluctuate based on seasonal demand for heating oil, changes in the cost of crude oil, competition, and regional operating costs. In particular, being farther from refineries increases the costs due to the higher cost of transporting the product. Because supplies for the Northeast largely have to come from either the Gulf Coast or from imports, the costs are higher (EIA 2012c).

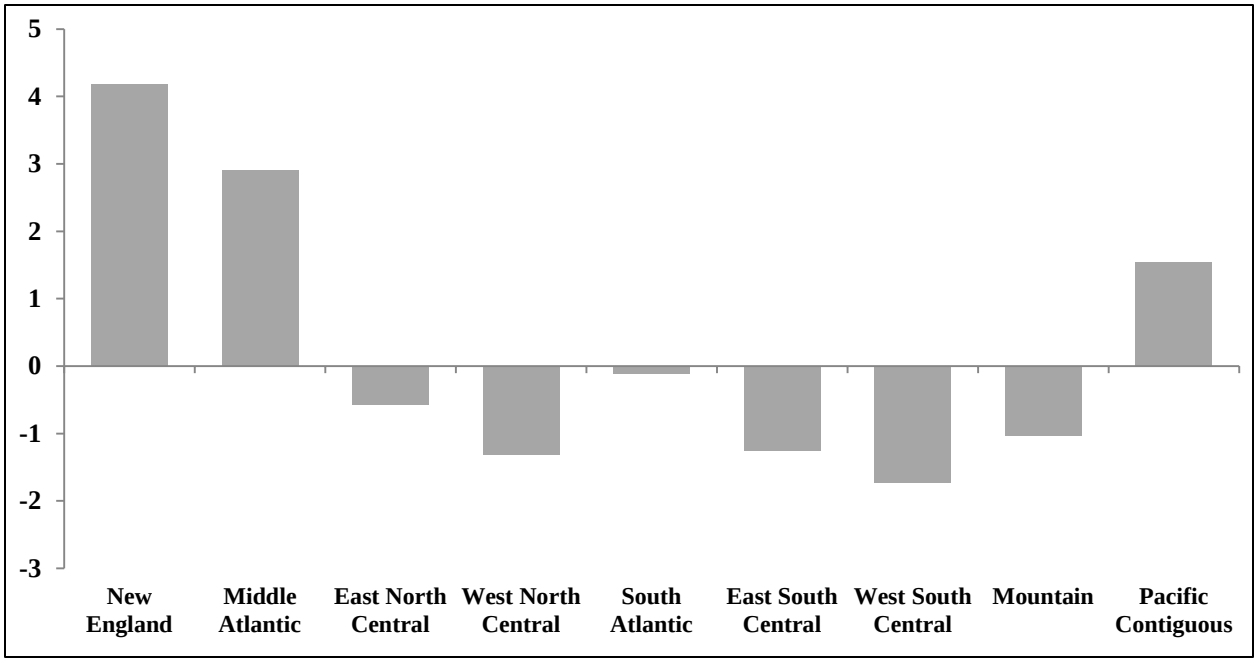
Figure 4-12: Retail Gasoline Prices by Region, 2012 Difference from U.S. Average



Source Data: EIA 2012d

[23] 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.

Figure 4-13: Retail Electricity Prices by Region, 2012 Difference from U.S. Average



Source Data: EIA 2012e

4.4.4 Alaska Regional Energy Markets

Outside the GOM, the Alaska OCS region holds the greatest resource potential (see Table 5-1). The Arctic areas are especially promising to help meet the country's energy needs. In particular, Arctic OCS oil may be crucial to Alaska for continued operation of the TAPS. Declining onshore production from Prudhoe Bay is endangering the usefulness of TAPS, which requires a certain level of throughput to operate without posing major technological challenges. New OCS production could 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). Extending the useful life of TAPS is particularly important to the Alaskan economy, as taxes related to oil flowing through TAPS provide approximately 90 percent of Alaska's general fund unrestricted revenue. State revenues continue to be sensitive to oil prices, oil production, and production costs. The State of Alaska and others raised the issue on the long-term viability of the TAPS pipeline and the role that OCS production could play in extending its life in RFI comments.

Many Alaska OCS areas have the potential to contribute significantly to U.S. energy needs in the future; however, more exploration is required, and additional 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 and commercial markets, the Alaska OCS is fairly remote. Heavy investments in new infrastructure would be required. However, for the Arctic planning areas, activity on existing leases could stimulate construction of much of that infrastructure, and new OCS production would help prevent the shut-in of substantial reserves on non-OCS lands.

4.4.5 Pacific Regional Energy Markets

West Coast gasoline prices are considerably higher than those in all other PADDs. In particular, California gasoline prices are higher than those in any other of the contiguous states. California requires gasoline to be "reformulated" to reduce the environmental impact of the burned gasoline. This process requires a special blend of fuels which is only produced at a limited number of refineries. In addition, California refineries are already running at capacity to meet demand. Because supplies are already limited, any disruption in supply can cause prices to spike even higher. Given the large distance between the West Coast PADD and the majority of refineries in the Gulf Coast PADD, as well as a lack of pipelines crossing the Rocky Mountains, replacement supplies are farther away and can cause the price spikes to last even longer (EIA 2012b).

The Pacific OCS has significant oil and natural gas resources (see Table 5-1), which could help meet regional energy needs, but the West Coast PADD would need additional refinery capacity to allow the region to use those resources.

4.4.6 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 U.S.'s top three consuming PADDs, the East Coast, Gulf Coast, and Midwest. However, as discussed, new tight oil production from Bakken and Eagleford fields and other Midwest tight oil formations have reduced the need for OCS crude in the Midwest. In fact, the existing pipeline infrastructure has created more supply to Cushing, Oklahoma, (a major center for oil refining and storage) than could easily be transported elsewhere, contributing to the recent devaluation of WTI, relative to Brent, crude referred to above. However, 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. EIA projects that more than 60 percent of the growth in domestic oil production anticipated over the next two years will be sweet crude, meaning that the GOM OCS oil still fulfills a specific need in the U.S. and regional energy markets (Sieminski 2014).

4.4.7 Atlantic Regional Energy Markets

The East Coast PADD has seen a shift in its energy sources in recent years. Given new crude-by-rail infrastructure, the East Coast has been able to receive increased crude from the Bakken formation and decrease imports from Europe (EIA 2014d). Although the Gulf Coast is a large exporter of gasoline, due to infrastructure constraints and Jones Act restrictions on using non-U.S.-flagged vessels for transport, it is still more efficient for the East Coast to receive some imports from Canada and Europe. The imports are especially needed during the winter when demand increases and production from other regions is insufficient to meet the increases in demand (EIA 2014a).

The Atlantic OCS contains significant resources, as shown in Table 5-1. Depending on refinery capability, production from OCS areas along the Atlantic coast could potentially feed directly into the market with the greatest import demand for petroleum products, distillate, and propane.

4.5 POSSIBLE OCS PRODUCTION SUBSTITUTES

BOEM uses its *Market Simulation Model* (*MarketSim*) at the Proposed and PFP stages to estimate the amount and percentage of substitutes the economy would adopt in the absence of all, or even some, new OCS production. *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. *MarketSim* calculates what fuel sources would replace forgone OCS production. This includes increases in onshore oil and natural gas production, imports of oil and natural gas, fuel switching to coal or other sources of electricity, and reduced consumption. At the PP stage, BOEM will evaluate the energy market substitutions that would be required to replace the OCS production based on the Secretary's decision on each option.[24]

A reduction in OCS oil and gas production would not lead to an equal reduction in the quantity of oil and gas demanded by energy markets. Instead, other energy sources—more imports, onshore production, coal, reduction in consumption, etc.—would substitute for most of the forgone OCS production.

A detailed discussion of the data and methodology underlying *MarketSim* is available in the documentation (Industrial Economics, Inc. 2012a), and a discussion of alternative sources of energy in the context of the 2012–2017 PFP is given in *Energy Alternatives and the Environment* (Industrial Economics, Inc. 2012b). The model (including elasticities/substitution rates) and the related publication will be updated for analyses conducted for the PP. In addition, the forthcoming analysis will contain specific estimates of production and quantities of other energy sources substituted for oil and gas should the Secretary select the "No Sale" option for any program area.

For the foreseeable future, forgone OCS production would not be replaced with appreciable quantities of renewable energy. Energy substitutes for production being considered for the next Program will come from energy industries likely to increase production or generation incrementally in response to small market changes. The determinants of growth in renewable energy capacity are not likely to include OCS production levels, but rather the overall market for clean, renewable energy, and there are no renewable energy projects capable of replacing OCS oil and gas that are being held off the market in search of slightly higher prices. Certainly, the Secretary has encouraged development of renewable energy on Federal lands and renewable energy is a pillar of the President's energy strategy. Furthermore, most oil consumption is driven by the needs of the transportation sector of which only a tiny portion could be met by renewable fuels in the foreseeable future. Renewable energy sources will continue to mature over the next decade and beyond, but oil and natural gas will remain important contributors to our energy mix throughout the foreseeable future.

[24] The DPP analysis is provided to assist the Secretary in making the initial programmatic decision and focuses on planning areas, rather than on specific options.

4.6 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 preparation process allows the Secretary to reconsider the current and likely energy needs of the United States. Each Program is a schedule of proposed OCS lease sales that can only stay the same or be reduced, delayed, or cancelled through the pre-sale process. Therefore, the Program effectively sets a ceiling for OCS offerings over a five-year period, because sales cannot be expanded, nor new sales added, without preparation and approval of a new Program, a process that usually takes two-and-a-half to three years.

While the analysis in Chapter 4 considers EIA projections for production, net imports, etc., the discussion is meant to be relevant to the price scenarios described in Chapter 5 and Appendix B of this document. At the time this analysis was completed, oil prices were unexpectedly near that in BOEM's low-price scenario. However, BOEM's estimates for each price scenario (in Chapter 5) are based on expectations of what is likely to occur at given levels within a wide range of possible prices, rather than on forecasts of what actual prices are likely to be over the life of the new Program.

The boom in oil production from tight formations over the past several years has resulted in significant changes to energy markets and has allowed the United States to reduce its dependence on foreign sources of oil.[25] However, qualities of petroleum vary considerably, and refineries are equipped to handle specific grades of crude, which they can create by blending lighter and heavier grades. It is extremely expensive to make major adjustments to capacity, and the Nation's downstream oil infrastructure is not yet fully suited to recent production trends and locations. Because markets have already replaced almost all imports of light crude with domestic tight oil, the limit of refineries' abilities to substitute tight oil for imports on a barrel-for-barrel basis appears to have been reached, at least for the short term. It is still unclear how recent low prices will affect forecasts for production of oil and gas from tight formations, and BOEM expects to have new information regarding these effects for its PP analyses.

The President's energy strategy has three key elements: supporting economic growth and job creation, enhancing energy security, and deploying low-carbon energy technologies and laying the foundation for a clean energy future. As shown, OCS production contributes to significant economic growth by increasing GDP growth and job creation and reducing the trade deficit. Through continued and expanded production, the OCS can enhance energy security by reducing dependence on foreign fuel sources. Further, the strategy recognizes that the United States needs to continue to pursue traditional sources of energy while encouraging development of renewable fuels. New energy alternatives are gaining market share, but will take decades to displace oil and gas. Furthermore, oil and gas provide widely used non-fuel products, such as plastics and fertilizer for which future alternatives will be needed. All current commercial substitutes for oil and gas have ceilings, and none provide the prospect of fully replacing the versatility of oil and gas for decades to come.

[25] As indicated above, "tight oil" production and the resulting price spread have allowed domestic refineries not only to reduce input costs but also to import more heavy crude from Canada, a dependable ally. The related increase in natural gas production has decreased fuel costs for consumers, refiners, and other domestic manufacturers as well.

Future energy needs and the ability of domestic sources to meet them cannot be predicted reliably. Even the best projections and forecasts can only provide helpful information on which to base energy-related decisions, and there will be two more periods of comment, analysis, and decision making during which potential effects of price movements not already contemplated in BOEM's low, mid, and high prices can be considered and analyzed. The Federal government, to the extent it makes decisions to promote or restrict energy development, should strive to increase the flexibility of markets to respond to future events and trends. The 2017–2022 Program provides one such opportunity.

4.7 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) activities, tourism and recreation, commercial shipping and transport, coastal recreation (including recreational fishing and diving), and subsistence use.[26] This section also provides information on the current status of BOEM's renewable energy leasing and non-energy marine minerals leasing[27] in the planning areas. This section summarizes the information at the regional level, but highlights important relative distinctions between the different planning areas in the region. 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 planning areas is BOEM's report entitled *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event Within OCS Regions"* (BOEM 2014; 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 planning areas.

The individual comments that BOEM received related to other uses of the OCS and potential conflicts between these other uses and oil and gas leasing program activities are summarized in Appendix A. 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.

4.7.1 Alaska OCS Region

For purposes of this discussion, the 15 planning areas that comprise the Alaska OCS Region are grouped into three subregions: (1) the Arctic subregion comprised of Beaufort Sea, Chukchi Sea, and Hope Basin; (2) the Bering Shelf subregion comprised of Navarin Basin, North

[26] BOEM will consider potential conflicts with aquaculture uses in the EIS for the 2017–2022 Proposed Program.
[27] BOEM's Marine Minerals Program issues agreements 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/.

Aleutian Basin, St. George Basin, Norton Basin, St. Matthew-Hall, Aleutian Basin, and Bowers Basin; and (3) the Pacific Margin subregion comprised of Cook Inlet, Gulf of Alaska, Shumagin, Kodiak, and Aleutian Arc.

4.7.1.1 Renewable Energy and Non-energy Marine Minerals

BOEM has not received nominations for renewable energy or marine mineral leasing in any of the planning areas in the Arctic subregion, the Pacific Margin subregion, or the Bering Shelf subregion 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 renewable energy resources will occur in the Arctic during the 2017–2022 timeframe. Any renewable energy leasing that may occur during the approximately 50-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 OCS Region.

4.7.1.2 Military Uses

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 to 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 and coordinates with the U.S. Navy to conduct ice thickness and acoustic surveys.

4.7.1.3 Arctic Subregion

Commercial activity in the Arctic subregion is limited. There is oil and gas production in state waters adjacent to the Beaufort Sea Planning 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 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 commissioned by the Alaska Department of Administration, over 25 percent of respondents living in the Alaska Arctic rely on subsistence for at least half of their food supply. The harsh Arctic climate and the difficulty of physically accessing the area limit most recreational activity in the Arctic. Some recreational fishermen are non-residents, who visit primarily in the summer, but Arctic oilfield workers account for most recreational fishing in the area. 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 (including ice roads during the winter) is an important means of moving fuel and supplies for area residents.

4.7.1.4 Bering Shelf Subregion

Because the Navarin Basin Planning Area is surrounded by open ocean, commercial activity and public use of marine resources in the planning area are both negligible. BOEM estimates that the UTRR in the Bowers Basin Planning Area and the Aleutian Basin Planning Area are negligible, thus the *Inventory Report* and this analysis do not present information on these planning areas. Hence, the discussion of the economic and public use of resources in and along the Bering Shelf subregion will focus on the remaining four planning areas (North Aleutian Basin, St. George Basin, St. Matthew-Hall, and Norton Basin). The most important other use in terms of economic significance in these planning areas is commercial fishing. Commercial fishing is the primary source of employment for residents of the North Aleutian Basin area, and the Bristol Bay area is one of the largest Alaska fisheries in terms of total fish harvested and processed. Combined with Bristol Bay, Kuskokwim Bay (St. Matthew-Hall region) is considered part of the largest sockeye salmon fishery in the world. While tourism and commercial shipping are less significant overall, they are important to many local economies. Tourism revolves almost exclusively around outdoor recreation, including recreational fishing, sport hunting, hiking, and wildlife viewing in the North Aleutian Basin and the Norton Basin (concentrated in Nome), and the St. Matthew-Hall area is one of the great birding areas of North America. Recreational activity in and near the St. George Basin Planning Area is limited due to its remoteness, with most fishing and hunting for subsistence rather than for recreation. The Port of Bristol Bay (North Aleutian Basin) and the Port of Nome (Norton Basin) service nearby villages and communities. The St. George Basin and the St. Matthew-Hall areas do not have any major commercial ports; however, the "Great Circle" shipping route between the Pacific Northwest and Asia passes through the St. George Basin Planning Area.

Recreational angling represents the most economically significant public use of natural resources in and near the Bristol Bay area, with expenditures contributing more than $100 million annually to the overall Alaskan economy. Most of the fishing by local residents in the other areas is for subsistence rather than for recreation. Subsistence fishing and hunting is a critically important public use of coastal and marine resources across all four planning areas. Communities engage in subsistence hunting and fishing for their economic, social, cultural, and spiritual value, and to meet basic nutritional needs. Alaska Natives comprise approximately 70 percent of the population along the North Aleutian Basin Planning Area. Approximately 90 percent of the population along the St. Matthew-Hall Planning Area is Alaska Native or part-Native, compared with roughly 15 percent for the entire state. In part because of the importance of these other uses in the North Aleutian Basin, President Obama issued a Presidential Memorandum on December 16, 2014 withdrawing this area from consideration for future oil and natural gas drilling for a time period without specific expiration.

4.7.1.5 Pacific Margin Subregion

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 tremendously important industries along the Gulf of Alaska, Aleutian Arc, Kodiak, and Shumagin, and while somewhat less important along Cook Inlet, they are still economically important. Commercial fishing in the Gulf of Alaska and near the Aleutian Arc Planning Area is critical to the regional and state economy, with the former accounting for over a third of the state's total wholesale commercial fisheries value and the latter providing more than half of the seafood consumed in the United States. Fish harvesting and processing also represent the largest source of jobs and earnings on Kodiak Island (particularly processing) and are the most important commercial industries in the Shumagin Planning Area. Tourism is a critical component of the Cook Inlet and Gulf of Alaska areas' economies, but is fairly limited in and near the Kodiak, Shumagin, and Aleutian Arc Planning Areas. For the Gulf of Alaska area, visitor industry-related employment accounts for over 10 percent of all employment in Juneau and roughly 20 percent of all sales tax revenue collected by the city. The subregion is also important for commercial shipping. The Port of Valdez in the Gulf of Alaska is the largest port in Alaska and one of the 20 largest in the United States as defined by total traffic, largely due to oil shipments. The Port of Anchorage on the eastern end of Cook Inlet is an essential port for many Alaska residents, as roughly 90 percent of all consumer goods are provided to nearly 80 percent of Alaska's population through the port. In addition, thousands of commercial vessels pass through the Gulf of Alaska, Kodiak, Shumagin, and Aleutian Arc annually along the "Great Circle" shipping route from the Pacific Northwest to Asia. Oil and gas production in state waters adjacent to the Pacific Margin subregion currently is limited 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, Gulf of Alaska, and Kodiak areas are popular destinations for outdoor recreational activities, particularly fishing, hiking, boating, hunting, and wildlife viewing. The majority of sport fishing in Alaska takes place along the south-central coast. Subsistence fishing and hunting is a critically important public use of coastal and marine resources across the five planning areas in the subregion. 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 subregion, 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 over 15 percent in 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.

4.7.2 Pacific OCS Region

The Pacific OCS Region is comprised of four planning areas: Washington/Oregon, Northern California, Central California, and Southern California. Although important throughout the region, commercial fisheries in and near the Washington/Oregon Planning Area (especially near Washington) and the Southern California Planning Area are particularly essential from an economic perspective. The industry provides roughly $3 billion in value added to Washington (contribution to state GDP), while the waters in and near the Southern California Planning Area account for roughly 75 percent of California's total commercial fishing landings, by pound, and contribute more than $5 billion in total value added. The ocean-dependent tourism and

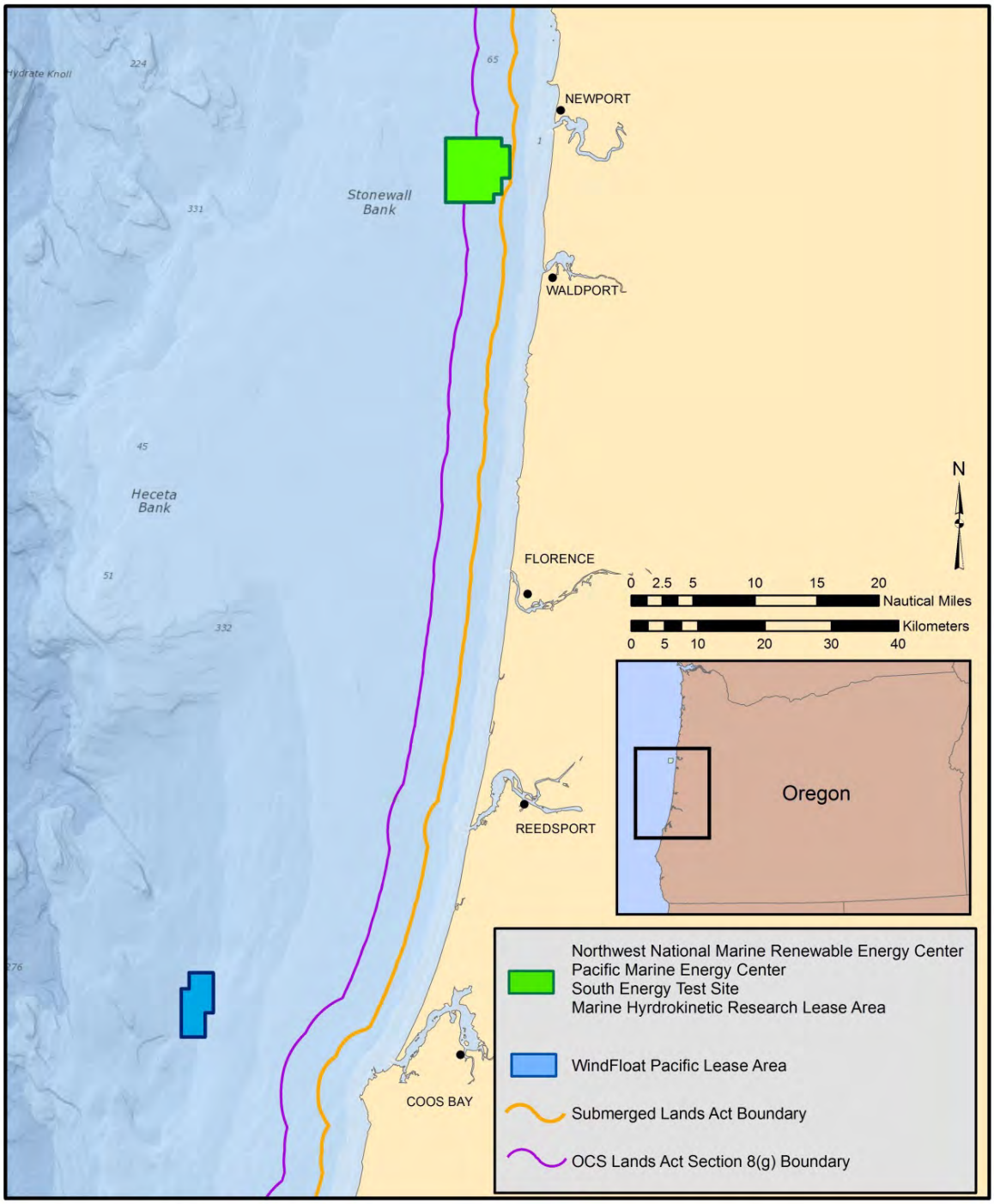
recreation sector is also significant, with counties near the Central California and Southern California Planning Areas each accounting for more than $7 billion in total value added, and counties near the Washington/Oregon Planning Area accounting for more than $3.5 billion in total value added. Within California, commercial shipping activity is concentrated in ports near the Central California Planning Area (San Francisco) and the Southern California Planning Area (Los Angeles and Long Beach, two of the United States' ten largest ports measured in terms of cargo tonnage). Seattle, the 26th largest port in the United States based on cargo tonnage, is the largest port near the Washington/Oregon Planning Area.

Outdoor coastal recreation is an important use of coastal resources along the Washington, Oregon, and California coasts. Washington and Oregon contain almost a dozen national wildlife refuges (NWRs) and a few large national parks (NPs) along their coasts that support coastal recreational activities such as beach visitation, bird watching, and wildlife and scenery viewing. Washington is one of the top five states in the Nation for scuba diving in terms of the number of participants. The coast of California is also home to a variety of NWRs and NPs that help support a range of outdoor recreational activities, particularly hiking, boating, and wildlife viewing in the northern region, as well as beach visitation, swimming, and surfing in the central and southern regions. Recreational fishing represents one of the most significant public uses of coastal resources located in and near the Pacific region, particularly in Washington and southern California in terms of economic impacts (with annual expenditures exceeding $1 billion for the former and $2 billion for the latter). Data on subsistence fishing and shellfish harvesting in the Pacific region is generally limited and primarily anecdotal. Washington and Oregon are home to a variety of indigenous, Asian, and Pacific Islander communities who rely on subsistence fishing as both a cultural tradition and an important economic staple. In California, official information on subsistence fishing is included within recreational fishing data. Subsistence fishing may be most prevalent in those areas designated as "fishing communities" by NOAA, defined as cities and towns with strong ties to commercial and/or recreational fishing.

4.7.2.1 Renewable Energy and Non-energy Marine Minerals

Offshore Oregon, Principle Power, Inc., has proposed to develop a grid-connected, 30-megawatt "WindFloat" technology demonstration project, funded in part by DOE. BOEM has determined that there is no competitive interest in the proposed lease area on the OCS about 12 to 15 miles offshore Coos Bay, Oregon. In 2015, BOEM expects to receive a construction and operations plan and will prepare and issue for public comment an EA for the project, after which a lease may be issued. Additionally, the Northwest National Marine Renewable Energy Center at Oregon State University (NNMREC-OSU) has applied to BOEM for a research lease about 5 nm offshore Newport, Oregon. The proposed marine hydrokinetic (MHK) energy research facility at the site would consist of four test berths to demonstrate the viability of wave energy off the coast of the United States by providing a grid-connected ocean test facility for prototype and utility scale wave energy devices. In 2014, BOEM determined that there was no competitive interest in the OCS offshore Newport, Oregon, where NNMREC-OSU has proposed the MHK research facility. BOEM is working with the Federal Energy Regulatory Commission as a cooperating Agency in preparing environmental documents for the proposed project. The locations of these project areas are shown in Figure 4-14.

Figure 4-14: Marine Hydrokinetic Research Project and WindFloat Lease Area Offshore Oregon



Interest in renewable energy off California has been expressed, but ideas to develop renewable energy have not moved forward in this area. Several early efforts to place MHK projects in waters off California were abandoned for lack of funding or other reasons. There also have been expressions of interest in offshore wind technology testing and research. In 2014, with funding from DOE, the Institute for Advanced Technology and Public Policy at California Polytechnic State University at San Luis Obispo assessed the feasibility of a grid-connected national wave

energy testing facility at two sites, one in the Northern California Planning Area and one in the Southern California Planning Area. To date, BOEM has not received any lease requests. BOEM has not issued any leases or agreements for non-energy, marine minerals in the Pacific OCS Region.

4.7.2.2 Military Uses

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 to 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 DOD include Navy at-sea Operational Areas (OPAREAS). Testing and training does not occur on all days of the year, but may occur during any season. These activities vary depending on where in the OPAREA they occur (e.g., open water versus near shore) and may be concentrated within a smaller geographic area than the OPAREA footprint. The Pacific Northwest OPAREA is off the Washington and Oregon coasts, and the Southern California-Point Mugu OPAREA is off the central and southern California coasts and extends into waters south of the U.S.-Mexico border. Vandenberg Air Force Base is on the coast in the Southern California Planning Area and has an active launch program which has been taken into account via lease stipulations in the past. There are also other smaller areas associated with onshore military installations.

4.7.3 Gulf of Mexico OCS Region

The GOM OCS Region is comprised of three planning areas: the Western, Central, and Eastern GOM Planning Areas. 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 do Alabama or Mississippi. However, while tourism and recreation contribute more to GDP in those states with more coastline and more coastal population centers (Texas, Louisiana, and Florida), 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 along the Western and Central GOM Planning Areas and over $10 billion in GDP along the Eastern GOM Planning Area. 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 over $4 billion in GDP). The commercial fishery sector is largest in Louisiana, followed by Texas and then Florida. However, Florida does contribute most to GDP because of its contributions further along the seafood supply chain (e.g., processors, retailers). 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). 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.[28] 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 (Hemmerling and Colton 2003).

4.7.3.1 Renewable Energy and Non-energy Marine Minerals

BOEM has not received nominations for renewable energy leasing in the Western, Central, or Eastern GOM Planning Areas and is not aware of any specific plans or proposals to develop OCS renewable energy resources in any of these areas 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 for as long as commercial production continues, any renewable energy leasing that may occur during the approximately 50-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, or plans to issue, leases and agreements for sand and gravel projects along the GOM, specifically, offshore the west coast of Florida, Mississippi, and Louisiana. The GOM Region marine minerals program expects to be a significant resource to the Gulf Coastal region as funds from the RESTORE Act are used for restoration projects by Coastal states. Typically, the borrow areas are in 30 feet to 60 feet of water in close proximity to the coast.

4.7.3.2 Military Uses

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 to 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 may occur throughout the U.S. Gulf of Mexico 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 testing and training areas in the GOM include the Gulf of Mexico Range Complex, the Naval Surface Warfare Center, Panama City Division, and the Key West Complex located off of the southwestern tip of Florida.

[28] For recent information on state oil and gas leasing programs in the Gulf of Mexico, see Section 3.3.2 of BOEM's Final Supplemental EIS for Central Planning Area Lease Sales 235, 241, and 247 (BOEM 2014).

DOD and USDOI will continue to coordinate extensively under the 1983 Memorandum of Agreement, which states that the two parties shall reach mutually acceptable solutions when the requirements for mineral exploration and development and defense-related activities conflict.

4.7.4 Atlantic OCS Region

Four planning areas comprise the Atlantic OCS Region: North Atlantic, Mid-Atlantic, South Atlantic, and Straits of Florida. Commercial fishing, ocean-dependent tourism, and commercial shipping and transportation are important economic uses in and along all the Atlantic planning areas. The North Atlantic supplies much of the fish and shellfish consumed in the United States, with Massachusetts having the highest landings value (more than $2.5 billion), followed by New York (more than $1.7 billion). The economic impacts of commercial fishing along the entire Mid-Atlantic Planning Area total more than $1.5 billion in total value added (GDP); the industry is especially large in Virginia. Ocean-dependent tourism in and along the North Atlantic Planning Area is an enormous industry, with the economic impacts for New York by far the highest (more than $16 billion in total value added). Ocean-dependent tourism is also a significant economic use for the Mid-Atlantic, South Atlantic, and Straits of Florida Planning Areas (accounting for over $6.5 billion, $4.4 billion, and $6 billion in value added, respectively, to adjacent coastal areas). Ocean-dependent tourism is also particularly important for Maryland, Virginia, North Carolina, South Carolina, and Florida.

North Atlantic Planning Area ports handle roughly 10 percent of the United States' total imports and exports, and the Port of New York is one of the United States' five largest ports. Ports located in the Mid-Atlantic Planning Area handle approximately 5 percent of total U.S. waterborne traffic, and Norfolk Harbor is one of the 20 largest ports in the United States. While the South Atlantic Planning Area does not have as many adjacent ports as the other planning areas, three are in the top 40 ports in the United States in terms of traffic. The Straits of Florida is one of the most heavily trafficked shipping areas in the world, with more than 40 percent of the world's marine commerce passing through the region every year.

The Atlantic coastal region contains numerous NWRs (roughly 70), NPs, and national seashores (NSs), as well as many state parks and recreational areas where the public engages in various recreational activities. Beach visitation, swimming, wildlife viewing, recreational boating, and fishing are the most popular activities across the Atlantic states. Beach recreation is critically important to the Florida economy. Among the states adjacent to the North Atlantic Planning Area, the economic impacts of recreational fishing are highest in New Jersey, followed by Massachusetts and New York. Recreational fishing expenditures resulted in total value added in the Mid-Atlantic economy of more than $2 billion (with North Carolina accounting for more than half); more than $1.3 billion in the South Atlantic economy (with East Florida accounting for the vast majority); and nearly $2 billion to the economies in the counties near the Straits of Florida Planning Area. Very little data exist on subsistence fishing and shellfish harvesting in and along the Atlantic planning areas, and what information is available is largely informal or speculative. It may be most prevalent in those areas designated as "fishing communities" by NOAA, due to their strong ties to commercial and recreational fishing. Overall, NOAA has identified 47 fishing communities near the South Atlantic Planning Area and 9 near the Straits of Florida Planning Area. According to NOAA's profiles of fishing communities in the Northeast,

the limited information available on subsistence fishing and harvesting is for the urban communities, and suggests a relative importance to immigrant populations in these areas.

4.7.4.1 Renewable Energy and Non-energy Marine Minerals

Renewable energy leases have been executed along the east coast, with site assessment and construction activities potentially occurring in the 2017–2022 timeframe. BOEM is considering offering additional areas for lease and is processing unsolicited requests for research and limited leases and right-of-way grants. An overview of the current and proposed lease areas is provided in Figure 4-15. Information is provided for individual planning areas in order to capture the relevant level of detail.

BOEM has issued leases and agreements for sand and gravel projects along the Atlantic coast from New Jersey south to Florida. Typically, the borrow areas are located in 30 feet to 60 feet of water in close proximity to the coast. Some recent interest has been expressed in the potential future use of OCS sand offshore New York and the New England states.

4.7.4.2 North Atlantic Planning Area

In 2010, the first commercial offshore renewable energy lease in the United States was issued to Cape Wind Associates. On September 9, 2014, BOEM completed its review of the Facility Design Report and Fabrication and Installation Report submitted by Cape Wind Associates for a proposed 460-megawatt wind power facility, allowing Cape Wind Associates to proceed with its project. The project is in a non-competitive leased area of Nantucket Sound off the coast of Massachusetts. In June 2014, BOEM announced plans to lease an additional 742,000 acres offshore Massachusetts for commercial wind energy development. These four lease areas are in addition to two commercial leases off the Massachusetts and Rhode Island shorelines that were executed in September 2013 with Deepwater Wind New England LLC.

Additionally, BOEM received an application from Deepwater Wind requesting a right-of-way grant for an 8-nm-long, 200-foot-wide corridor in Federal waters offshore Rhode Island. Because the majority of the activities and permanent structures related to the entire wind farm project will be sited in state waters and on state lands, the U.S. Army Corps of Engineers issued an EA and Finding of No Significant Impact (FONSI) in September 2014. On October 27, 2014, BOEM adopted the EA and issued a FONSI for the issuance of a right-of-way grant, and approval of Deepwater Wind's General Activities Plan, with modifications. On December 19, 2014, BOEM executed the grant (with effective date of December 1, 2014) to Deepwater Wind for the Block Island Transmission System and approved Deepwater Wind's General Activities Plan for the submarine cable.

In May 2014, BOEM announced a Call for Information and Nominations to solicit companies interested in commercial wind energy leases within a proposed area 11 nm south of Long Beach, New York. Additionally, BOEM requested public input regarding the area, including a request for comments on existing uses that would be relevant to BOEM's authorization process. After completion of the necessary environmental reviews, consideration of the existing uses of the area, and review of stakeholder feedback, BOEM will decide whether to offer the area for leasing.

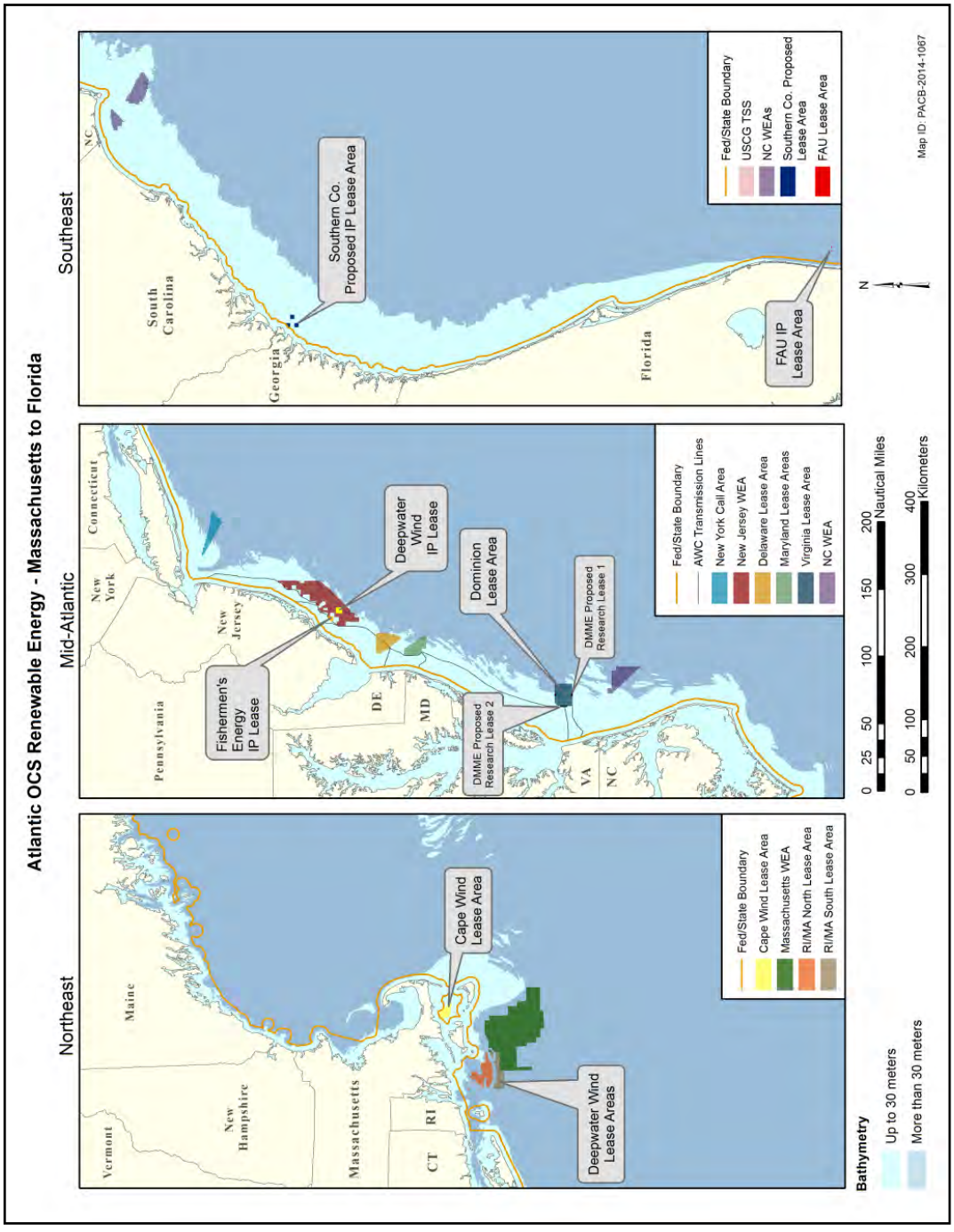


Figure 4-15: Current and Proposed Renewable Energy Projects on the Atlantic OCS

Note: Prior to the promulgation of final regulations for renewable energy leasing, BOEM (then the MMS) issued an interim policy to jumpstart data collection and technology testing activities on the OCS. Remaining leases issued under the Interim Policy have a five-year term and provide no subsequent rights to commercial development.

Key: AWC=Atlantic Wind Connection; DMME=Virginia Department of Mines, Minerals, and Energy; FAU=Florida Atlantic University; IP Lease=Interim Policy Lease; USCG TSS=U.S. Coast Guard Traffic Separation Scheme; WEA=Wind Energy Area.

Both Deepwater Wind and Fishermen's Energy of New Jersey are engaged in approved site assessment activities offshore New Jersey. These two limited leases expired in November 2014. In July 2014, BOEM proposed to auction two commercial leases about 7 nm off the coast from Atlantic City. After considering public comments, BOEM is expected to hold a sale of these areas in 2015.

Additional areas of interest identified through discussions with BOEM include locations relating to wind resources off New Hampshire and Maine, but discussions are only in the preliminary stages. Renewable energy leasing that may occur during the approximately 50-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, if oil and gas leasing occurs (e.g., lease sale, exploration plan, and development and production plan stages).

4.7.4.3 Mid-Atlantic Planning Area

In November 2012, BOEM executed a commercial wind energy development lease with Bluewater Wind, LLC approximately 11 nm off the coast of Delaware. On May 1, 2013, Atlantic Grid Holdings LLC submitted a supplement to its application for the Atlantic Wind Connection. The supplement updates the project application, in which the company proposes to build an offshore high voltage direct current transmission system offshore New York, New Jersey, Maryland, Delaware, and Virginia that would interconnect offshore wind generation to the onshore grid.

In August 2014, BOEM held a lease sale for the Maryland wind energy area, located about 10 nm off the coast of Ocean City. US Wind, Inc. submitted the winning bid for both lease areas. BOEM also executed a commercial lease in Virginia, effective November 1, 2013, with Dominion Virginia Power. In addition, BOEM is negotiating two research leases with the Virginia Department of Mines, Minerals, and Energy (DMME). DMME has proposed to demonstrate a grid-connected, 12-megawatt offshore wind test facility in an area adjacent to the commercial lease, with construction to be completed in 2017.

In August 2014, BOEM announced three wind energy areas offshore North Carolina for leasing consideration. Before any leases are offered, BOEM will complete an EA to determine potential impacts associated with issuing leases and approving site assessment activities, in accordance with NEPA. BOEM anticipates holding a competitive auction and potentially executing three leases during the next several years, possibly within the 2017–2022 Program implementation timeframe. Any additional renewable energy leasing that may occur during the approximately 50-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, if oil and gas leasing occurs (e.g., lease sale, exploration plan, and development and production plan stages).

4.7.4.4 South Atlantic Planning Area

An area off Georgia was nominated under the interim policy for leasing relating to wind power by Southern Company. Currently, BOEM is considering public comments on its EA before publishing a decision on the deployment of a meteorological tower and/or buoys during a five-year lease term. Stakeholder discussions continue in South Carolina regarding potential Call

areas, which are preliminary OCS areas to be analyzed prior to identification as a wind energy area for commercial development. Planning with respect to renewable energy development in both of these areas is in the early stages, and the prospects are uncertain; however, commercial leasing may proceed during the 2017–2022 timeframe.

4.7.4.5 Straits of Florida Planning Area

Four areas along the Straits of Florida Planning Area southeast coast were nominated for interim policy leasing relating to ocean current power. Experts believe these locations are within one of the prime areas for ocean current power development due to the large volume and steady flow of the Gulf Stream. While the ocean current power industry is perhaps the most nascent of the offshore renewable energy sources, multiple developers, utilities, and academic institutions have expressed interest in the resource potential. On May 30, 2014, BOEM executed a limited lease with Florida Atlantic University for MHK technology testing, located 10 to 12 nm offshore Fort Lauderdale. Although BOEM is aware of some commercial interest in MHK project leasing offshore Florida, renewable energy development in this area is not certain at this time.

4.7.4.6 Military and NASA Uses

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 to 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 DOD include Navy at-sea training areas. Training and testing may occur throughout the U.S. East Coast OCS waters, but will be concentrated in Operating Areas and testing ranges. On the east coast the major testing ranges include the Naval Undersea Warfare Center, Division Newport and the Naval Surface Warfare Center, Panama City Division. In the North Atlantic, Navy range complexes include Atlantic City, Narragansett Bay, and Boston; in the Mid-Atlantic, range complexes include Virginia Capes, Cherry Point, and portions of Chesapeake Bay; and Jacksonville Range Complex in the South Atlantic.

In addition to military installations, there are several facilities along the U.S. Atlantic coast operated by the National Aeronautics and Space Administration (NASA) that incorporate marine components. Wallops Flight Facility on Wallops Island, Virginia, is a key location for operational test, integration, and certification of NASA and commercial orbital launch technologies. The facility has an offshore launch hazard area in adjacent waters. It also supports many Federal Agency activities, including Department of the Navy activities in the Virginia Capes OPAREA. Farther south in the Straits of Florida Planning Area, NASA operates the Kennedy Space Center, which is on Cape Canaveral and most well-known for its function as a former launch site for the U.S. space shuttles. The waters around the Kennedy Space Center are recognized as a *de facto* marine reserve since human entry is prohibited there.

BOEM received comments from both NASA and DOD regarding the possibility of oil and gas activities in U.S. Atlantic waters. NASA indicated that there is potential for these activities to impact operations at its Wallops Island Flight Facility. DOD indicated that it will conduct a comprehensive analysis of mission compatibility with offshore oil and gas development for the relevant planning areas which are included in the DPP.

Chapter 5 Valuation of Planning Areas

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 current DPP analysis, BOEM considers 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. 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 risks have been reduced or eliminated, and the degree of uncertainty reflected in the range of possible outcomes has been narrowed considerably.

BOEM considers recent geophysical, geological, and technological information in order 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 two recent publications:

- BOEM 2011 *Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2011* (BOEM 2011)
- BOEM 2014 *Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Atlantic Outer Continental Shelf, 2014 Update* (BOEM 2014a).

The results of BOEM's resource assessments are found in the publications above. These results in turn are used an inputs for the economic analysis presented in this chapter.

5.2 Introduction to Hydrocarbon Resources on the OCS

Each of the OCS regions is comprised of geologic characteristics and petroleum system elements that provide an opportunity for the emplacement of oil and gas resources. These often favorable conditions are not ubiquitous across the entire OCS, however, the assessment of hydrocarbon resources requires that geologic plays be delineated, which incorporates local geologic conditions. A 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. Oil and gas are thermally generated as organic matter in sedimentary

strata and 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 prior to burial depths of approximately 3,000 feet.

Two types of geologic plays are defined for this resource assessment:

- **established plays:** geologic plays in which hydrocarbons have been discovered and a petroleum system has been proven to exist.
- **conceptual plays:** geologic plays 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 are comprised of oil and gas pools, where a pool is defined as a discovered or undiscovered accumulation of hydrocarbons. In many instances, one or more pools will comprise a prospect (undiscovered case) or a field (if discovered). 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.

Figures 5-1 through 5-5 show the geologic plays analyzed for BOEM's 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 and, in many cases, are stacked on top of each other. Therefore, the figures below showing the geologic plays do not always represent the full extent of an individual geologic play.

5.2.1 Resource Commodities Assessed

For the current analysis, 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 BBO; natural gas is reported in aggregate as 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 (BBOE).

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.

Figure 5-1: Geologic Plays in the Beaufort and Chukchi Seas Planning Areas

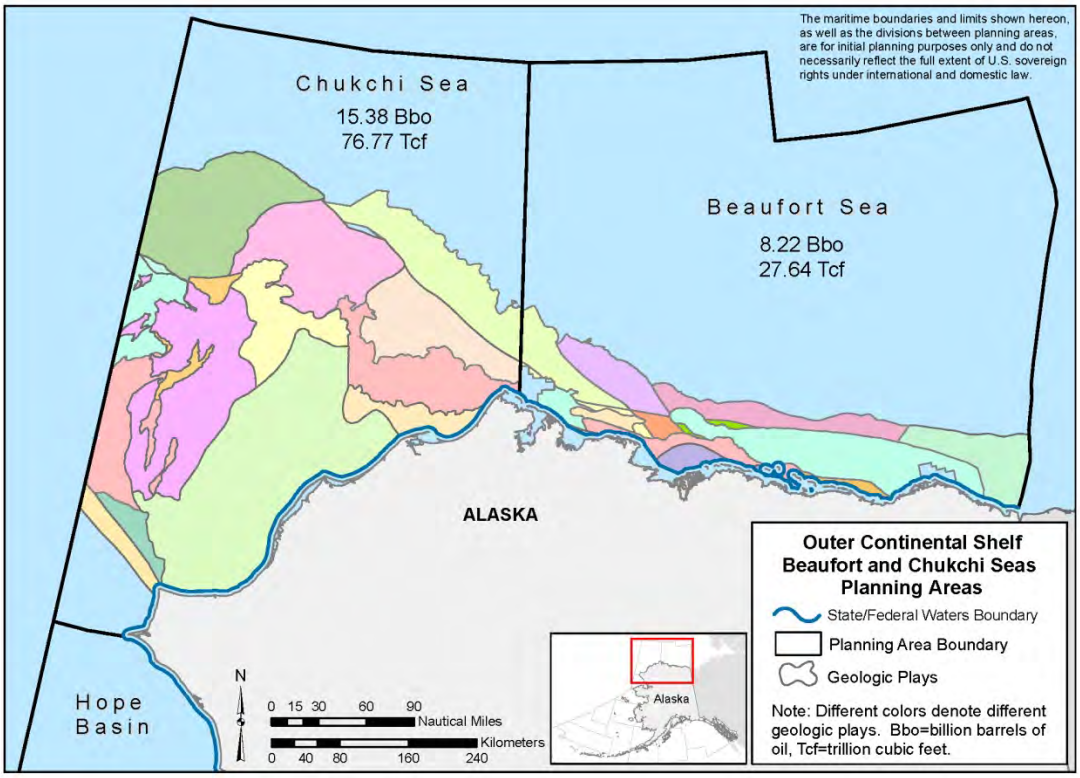


Figure 5-2: Geologic Plays in the Cook Inlet Planning Area

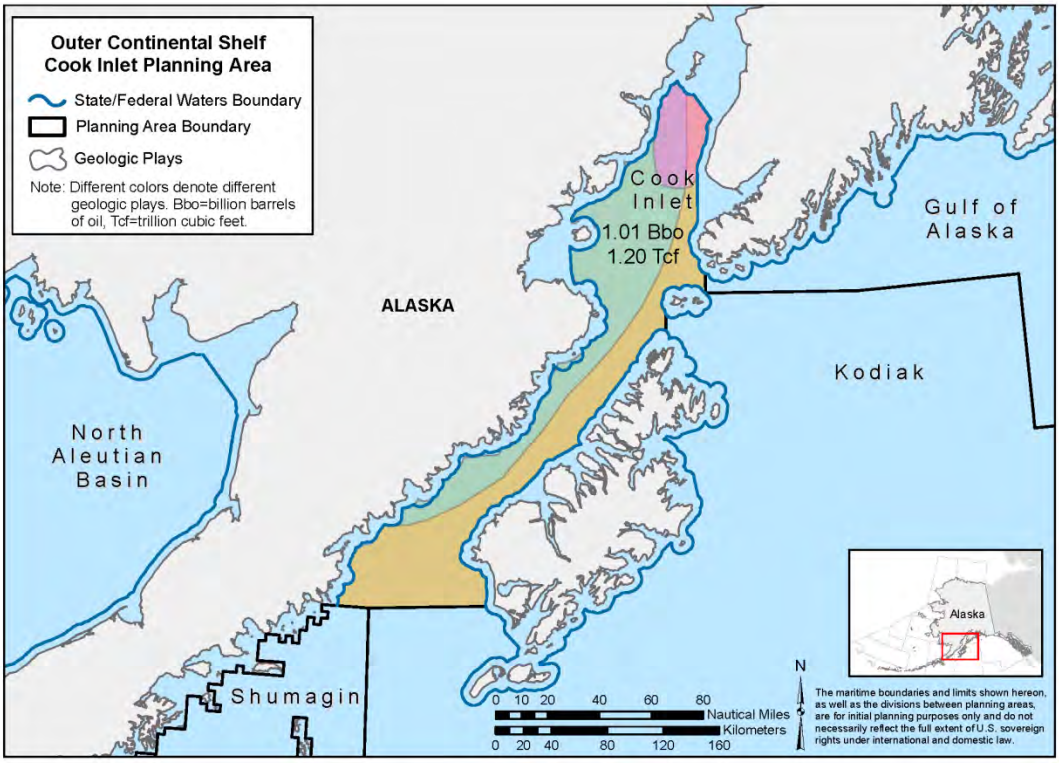


Figure 5-3: Geologic Plays in the Pacific Planning Areas

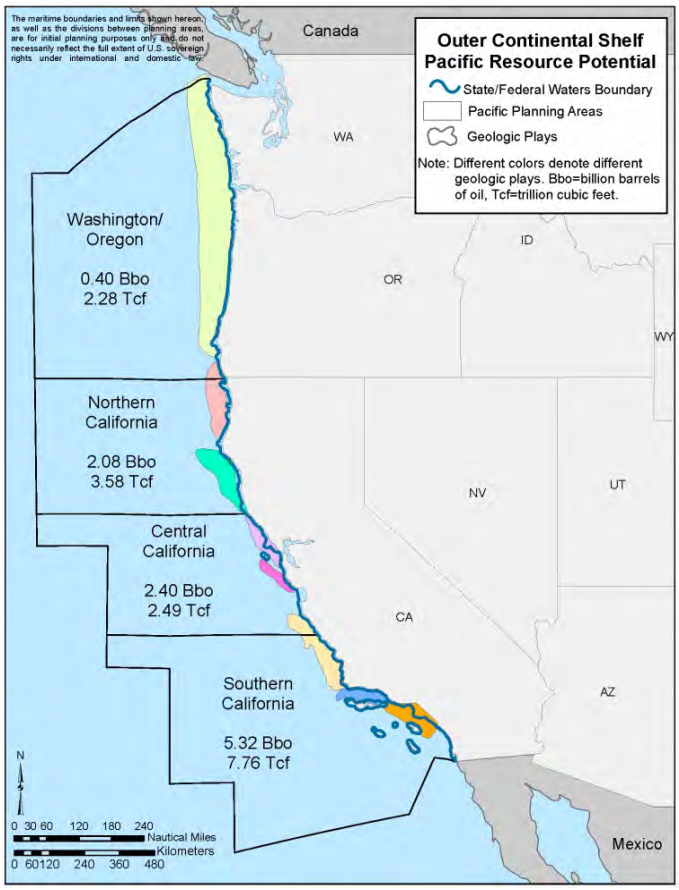


Figure 5-4: Geologic Plays in the Gulf of Mexico Planning Areas

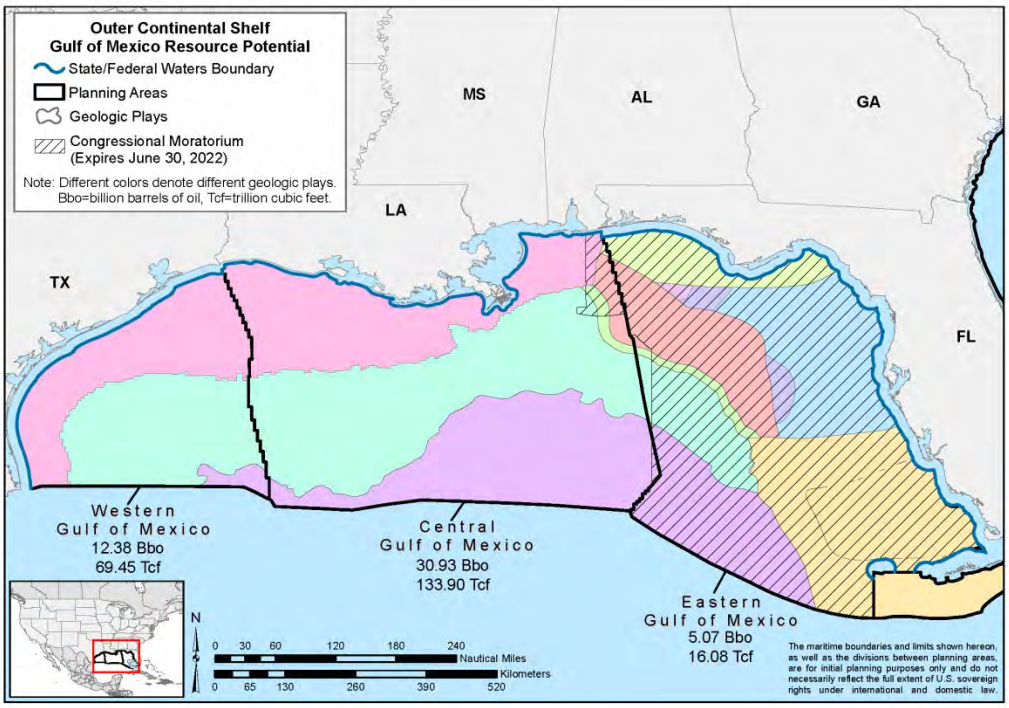
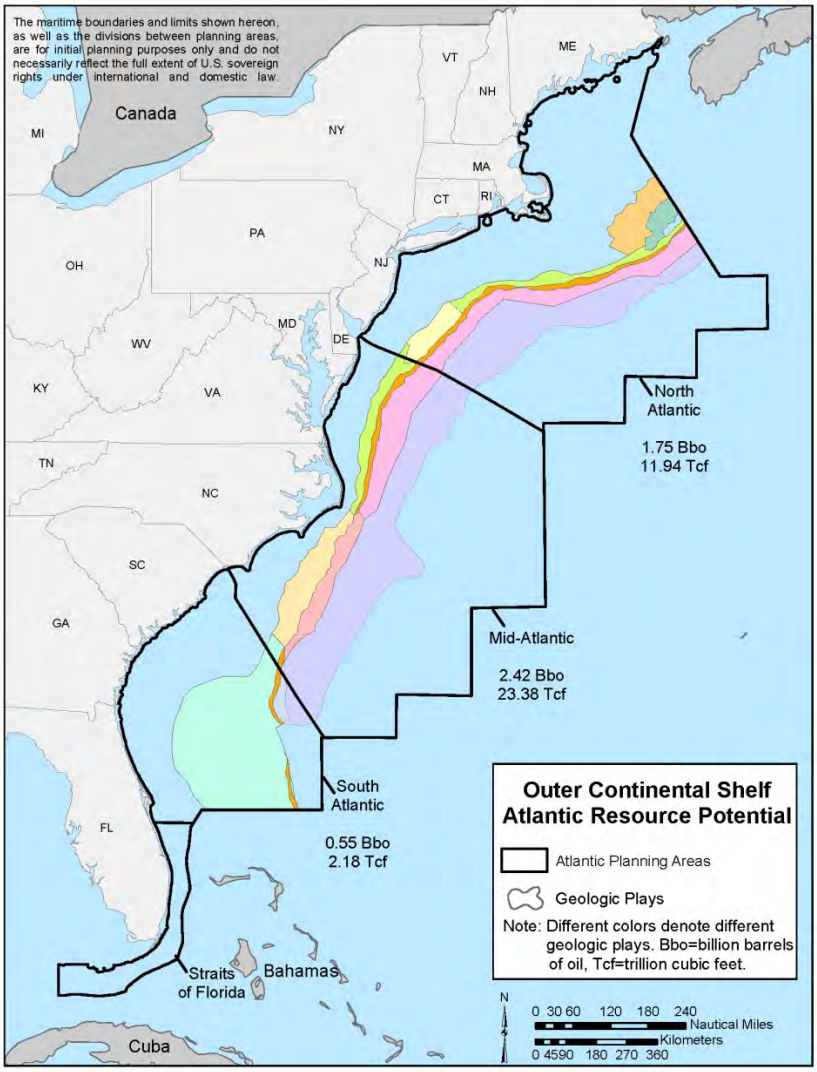


Figure 5-5: Geologic Plays in the Atlantic Planning Areas



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 the BOEM conceptual plays in the Alaska and Atlantic OCS Regions, as well as in part of the Pacific OCS Region, analog-based parameters are

developed using a more subjective approach 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 assessments of oil and gas resources. 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 consist of 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 include over 250,000 OCS blocks of 3-D coverage and over 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, over 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 cycle 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, in order 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. For the purpose of the DPP analysis, only the mean estimate is provided.

For the DPP analysis, estimates of unleased, UERR are derived from a geologic play-based approach that spans large geographic areas. This approach differs from that which is used for individual OCS tract evaluations to determine the FMV of OCS blocks receiving bids in a particular lease sale. For these sale specific evaluations, a more detailed prospect analysis is performed and subsequently subjected to economic parameters and fiscal regimes specific to the timing and location of that particular lease sale.

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 following steps comprise the execution of the GRASP model 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 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 Assessment (BOEM 2011) and 2014 Atlantic Assessment update (BOEM 2014a) form the basis of the current DPP analysis. These estimates are shown in Figure 5-6.

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 points and utilizes a 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 Unleased Undiscovered Economically Recoverable Resources

The DPP analysis requires an assessment of the UERR that are expected to be available for lease (i.e., currently unleased) as of July 2017. As depicted in Figure 5-7, this analysis follows a multi-step process:

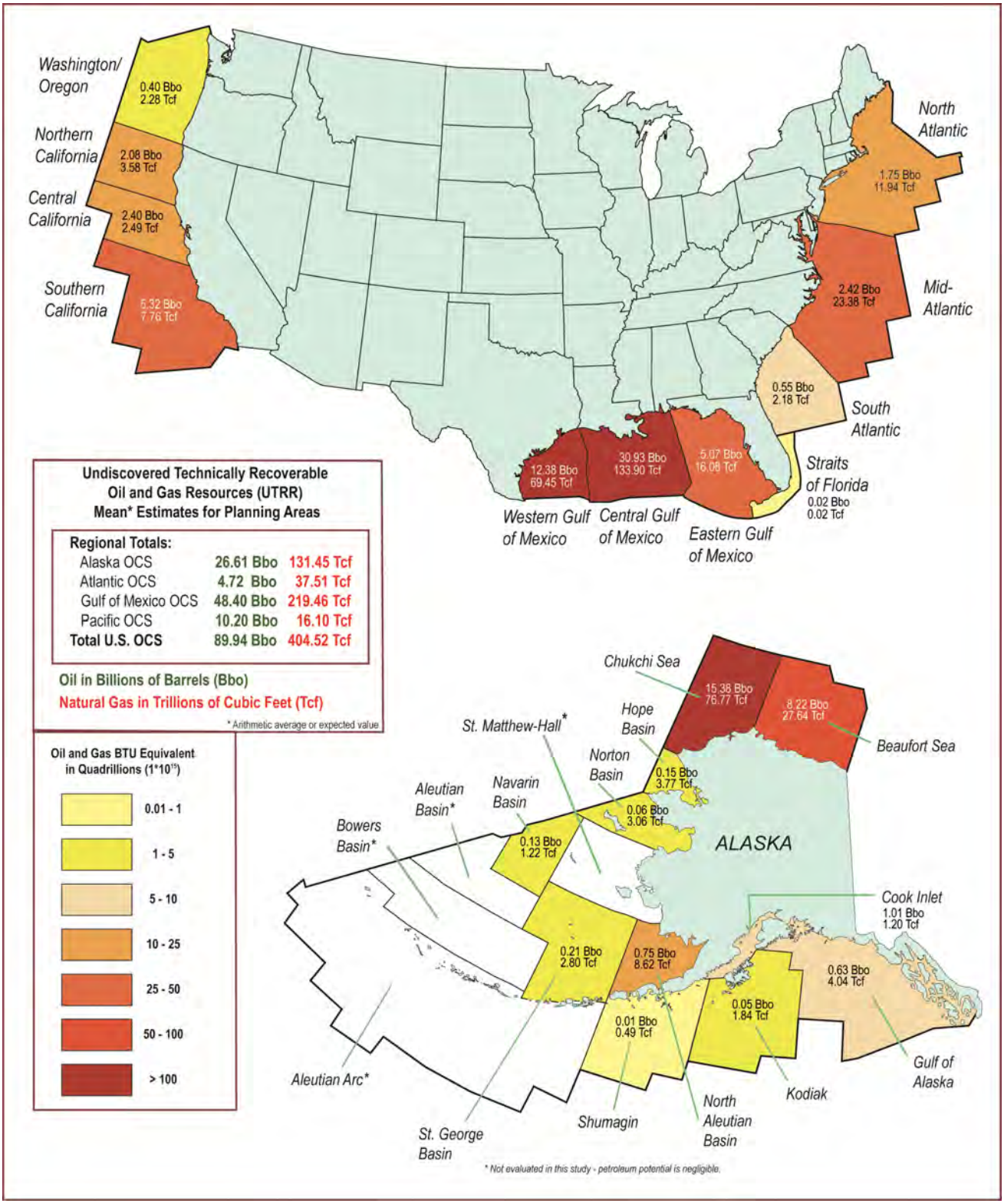
1. Assess all oil and gas that could be produced from the subsurface using conventional extraction techniques without any consideration of economic viability (UTRR).
2. Reduce the UTRR to that portion of oil and gas resources that is economically recoverable under specified economic and technologic conditions, including prevailing prices and costs (UERR).
3. Further reduce the UERR to only the portion expected to be available for lease (i.e., currently unleased) as of July 2017.

As shown in Figure 5-7, the DPP analysis uses as its resource base all of the unleased UERR available in each planning area. Figure 5-8 shows the relative ranking of the planning areas based on the estimates of unleased UERR in BOE for the mid-price case, based on an inflation-adjusted oil price of $110/barrel of oil (bbl) and an inflation-adjusted natural gas price of $7.83/thousand cubic feet (mcf).[29] The planning areas are ranked from those with the largest amount of resources to those with the least. Aleutian Arc, Aleutian Basin, Bowers Basin, and St. Matthew-Hall are excluded from this figure as they contain negligible resource quantities.

To account for some of the uncertainty surrounding oil and natural gas prices and the possibility that prices can change greatly during development of a Five-Year Program and during implementation of the 2017–2022 Program, the DPP analysis is conducted using three different price scenarios and corresponding sets of resource estimates. The UERR for the 22 OCS planning areas with non-negligible resource estimates are displayed in Table 5-1 at the three different price scenarios. The price scenarios are based on price pairs of $60/bbl ($4.27/mcf), $110/bbl ($7.83/mcf), and $160/bbl ($11.39/mcf). The estimate of resources is provided at each of these three price cases to show the different level of available resources at three very different sets of energy market conditions. The price scenarios are discussed in more detail in Appendix B. The planning areas are ranked in Table 5-1 in order of unleased BOE resources in the mid-price case.

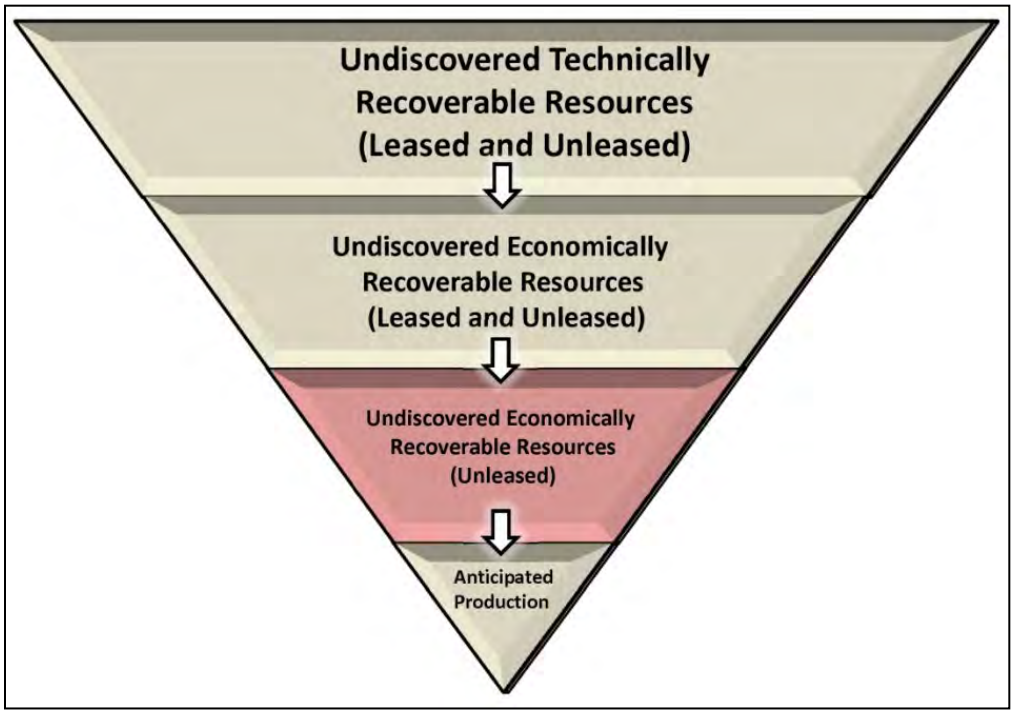
[29] Prices are discussed in Price Level Assumptions in Appendix B. BOEM uses three inflation-adjusted price cases to represent the great uncertainty in oil and natural gas price levels.

Figure 5-6: Assessment of UTRR of the OCS, 2011 (Atlantic OCS Updated 2014)



Note: UTRR include leased and unleased areas. Because geologic plays within the Straits of Florida are extensions of plays in the Eastern GOM, the UTRR for the Straits of Florida are included in GOM estimates.

Figure 5-7: Conceptual Workflow Showing Transition from UTRR to Anticipated Production



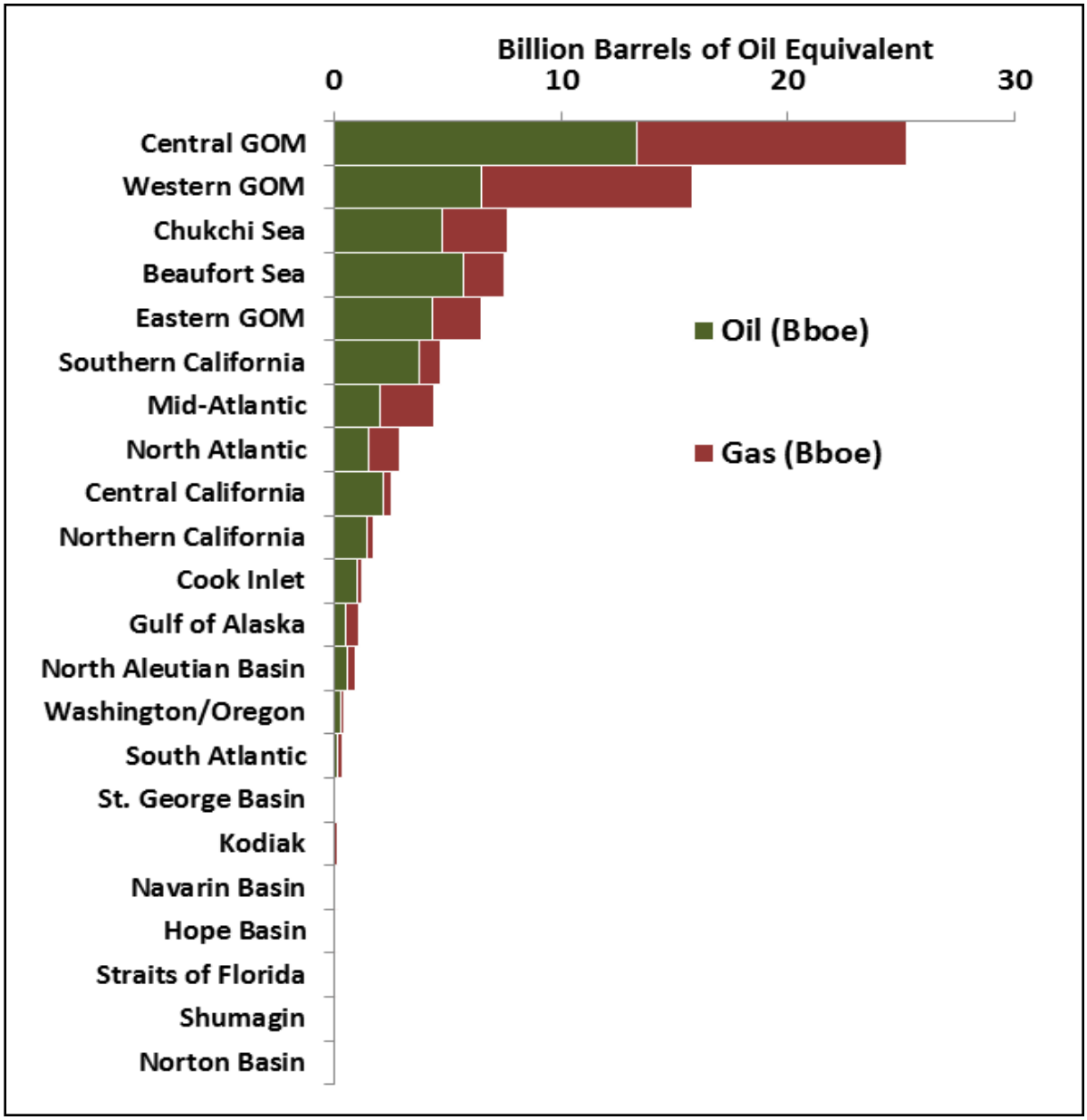
Note: For this DPP, only the unleased UERR (shown in pink) was considered for analysis. Anticipated production is considered for analysis in the PP and PFP.

In addition to the four Alaska planning areas with negligible resources, BOEM classifies seven planning areas as having only modest hydrocarbon potential and negligible development potential. Based on the current analysis, these planning areas all have approximately 100 million BOE of unleased UERR or less at the mid-price, which compose less than 0.5 percent of the total unleased UERR at the mid-price case. Six of these planning areas (St. George Basin, Kodiak, Navarin Basin, Hope Basin, Shumagin, and Norton Basin) are in the Alaska OCS Region and one (Straits of Florida) is in the Atlantic OCS Region. The six Alaska planning areas are geologically such that there are likely primarily natural gas resources in many small fields of generally sub-commercial sizes. The Straits of Florida resources also are likely to be sub-commercial sizes.

After excluding the four planning areas that are estimated to have negligible resources and the seven areas with negligible development value, BOEM fully analyzes the remaining 15 planning areas. Figure 5-9 shows the portion of total unleased UERR for each of these 15 planning areas at the mid-price case. The three GOM planning areas (Central, Western, and Eastern) contain 57 percent of the total mid-price case UERR, with 30 percent of the total unleased UERR in the Central GOM Planning Area. The five Alaska planning areas included in this part of the assessment comprise 22 percent of the total unleased UERR, with the Alaskan Arctic (Beaufort Sea and Chukchi Sea) containing 18 percent. [30] The four Pacific planning areas (Southern, Central, and Northern California, and Washington/Oregon) contain 11 percent, and the three remaining Atlantic planning areas (North, Mid-, and South Atlantic) contain 9 percent.

[30] Numbers do not sum to 100 percent due to rounding.

Figure 5-8: Unleased UERR (Mid-price Case)



Note: The mid-price case assumes an inflation-adjusted price of $110/bbl and $7.83/mcf for natural gas over the life of the 2017–2022 Program. Aleutian Arc, Aleutian Basin, Bowers Basin, and St. Matthew-Hall are estimated to contain negligible resource quantities and are not shown in this figure.

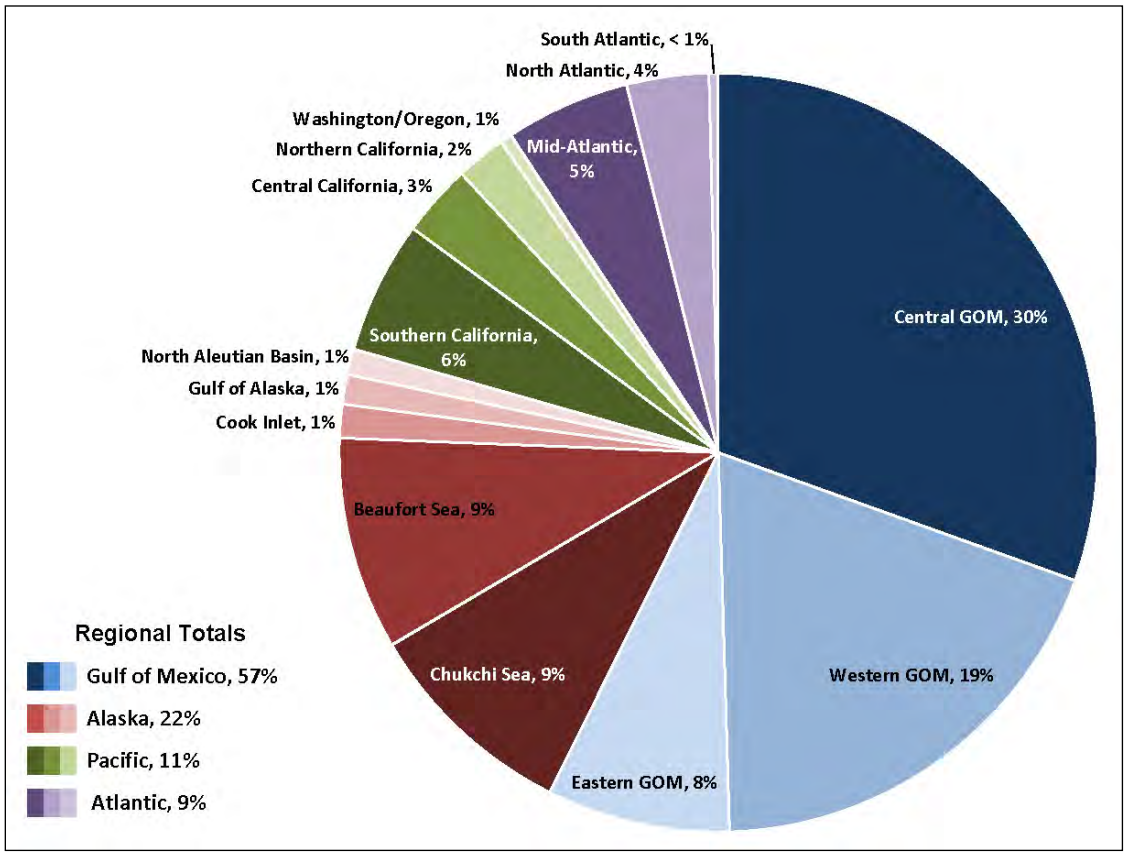
Table 5-1: Unleased UERR for July 2017, Ranked by BOE for the Mid-price Case

Rank	Planning Area	Oil (BBO)			Gas (Tcf)			BOE (BBOE)		
		Low $60/bbl $4.27/mcf	Mid $110/bbl $7.83/mcf	High $160/bbl $11.39/mcf	Low $60/bbl $4.27/mcf	Mid $110/bbl $7.83/mcf	High $160/bbl $11.39/mcf	Low $60/bbl $4.27/mcf	Mid $110/bbl $7.83/mcf	High $160/bbl $11.39/mcf
1.	Central GOM	12.35	**13.34**	13.72	60.18	**66.80**	69.22	23.06	**25.23**	26.04
2.	Western GOM	5.95	**6.46**	6.65	48.13	**52.33**	53.73	14.52	**15.77**	16.21
3.	Chukchi Sea	2.20	**4.76**	5.70	4.54	**16.01**	23.74	3.01	**7.61**	9.92
4.	Beaufort Sea	3.94	**5.66**	6.36	4.74	**10.40**	16.39	4.78	**7.51**	9.28
5.	Eastern GOM	3.99	**4.34**	4.48	10.48	**11.98**	12.72	5.86	**6.47**	6.74
6.	Southern California	3.26	**3.76**	3.98	4.56	**5.22**	5.55	4.07	**4.69**	4.97
7.	Mid-Atlantic	1.79	**1.98**	2.06	9.93	**13.64**	15.37	3.55	**4.40**	4.80
8.	North Atlantic	1.42	**1.52**	1.56	6.45	**7.80**	8.44	2.56	**2.90**	3.07
9.	Central California	1.95	**2.15**	2.22	2.05	**2.24**	2.31	2.31	**2.55**	2.63
10.	Northern California	1.18	**1.44**	1.55	1.37	**1.78**	2.00	1.42	**1.76**	1.91
11.	Cook Inlet	0.94	**1.00**	1.01	0.80	**1.03**	1.10	1.09	**1.18**	1.21
12.	Gulf of Alaska	0.40	**0.50**	0.54	2.40	**3.04**	3.28	0.83	**1.04**	1.12
13.	North Aleutian Basin	0.45	**0.56**	0.65	0.30	**1.98**	4.74	0.50	**0.91**	1.49
14.	Washington/ Oregon	0.21	**0.25**	0.28	0.74	**0.96**	1.09	0.34	**0.42**	0.47
15.	South Atlantic	0.09	**0.14**	0.17	0.89	**1.09**	1.19	0.25	**0.33**	0.38
16.	St. George Basin	0.05	**0.09**	0.12	0.05	**0.14**	0.60	0.06	**0.11**	0.23
17.	Kodiak	0.00	**0.02**	0.03	0.00	**0.47**	1.22	0.00	**0.10**	0.25
18.	Navarin Basin	0.02	**0.05**	0.07	0.03	**0.16**	0.33	0.03	**0.08**	0.13
19.	Hope Basin	0.01	**0.04**	0.05	0.02	**0.11**	0.31	0.01	**0.06**	0.11
20.	Straits of Florida	0.01	**0.01**	0.01	0.01	**0.01**	0.01	0.01	**0.01**	0.01
21.	Shumagin	0.00	**0.00**	0.00	0.00	**0.01**	0.07	0.00	**0.00**	0.01
22.	Norton Basin	0.00	**0.00**	0.01	0.00	**0.00**	0.25	0.00	**0.00**	0.05

Note: All price scenarios represent a constant, inflation-adjusted price throughout the life of the 2017–2022 Program. The Aleutian Arc, Aleutian Basin, Bowers Basin, and St. Matthew-Hall Planning Areas contain negligible hydrocarbon resources and are not shown in this table.

Key: BBO=billion barrels of oil, bbl=barrels of oil, BBOE=billion barrels of oil equivalent, BOE=barrel of oil equivalent, mcf=thousand cubic feet of natural gas, Tcf=trillion cubic feet of natural gas, UERR=Undiscovered Economically Recoverable Resources.

Figure 5-9: Unleased UERR by Planning Area (Mid-Price Case)



Note: St. George Basin, Kodiak, Navarin Basin, Hope Basin, Shumagin, Norton Basin, and Straits of Florida Planning Areas are excluded from this figure as they have only negligible development value and less than 0.5 percent of available UERR. Aleutian Arc, Aleutian Basin, Bowers Basin, and the St. Matthew-Hall Planning Areas contain only negligible resources and are excluded from this figure. Numbers may not sum due to rounding.

5.3 NET SOCIAL VALUE

The NSV analysis provides the Secretary with a quantitative ranking of planning areas based on resources and the economic, environmental, and social costs required to extract those resources. The analysis looks at the NSV associated with the resources in each planning area because it considers the benefits of these resources, but nets out the private, social, and environmental costs of these resources. This quantitative ranking compares planning areas and assumes the ultimate recovery of all UERR estimated to be available as of July 2017 as shown in Table 5-1. The NSV analysis presented here assumes that all economically recoverable resources, that is, all UERR, currently unleased will be included in lease sales held in the 2017–2022 Program and then explored and produced. As noted in Figure 5-7, this differs from future stages of Program analysis when we consider only production anticipated to be leased in sales during the Program. 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 DPP decision. Hence, the benefits and costs derived from these previously leased resources are not included in this analysis. Moreover, the NSV is only one way in which the Secretary considers the Section 18 balancing factors.

The NSV analysis is presented without pre-supposing any decision on the size, timing, and location of OCS sales. The NSV at the DPP stage is an appraisal of each planning area's value after considering the resources and the costs associated with extracting those resources. This information is used in preparation for the Secretary's initial decision on size, timing, and location of lease sales for the 2017–2022 Program. The results of the NSV analysis are presented in the form of a ranking of planning areas by NSV, as shown in Figure 5-12 and Table 5-2.

All 26 OCS planning areas are included in the DPP analysis, but 4 of the planning areas have negligible resources and 7 others have negligible development potential. Therefore, NSV is only calculated for the remaining 15 planning areas, all of which have more than 100 million BOE in the mid-price case.

The three-step NSV calculation is fully explained in Appendix B. Results of the NSV analysis are shown at three price scenarios representing the estimated available resources at different price levels. The three price scenarios are discussed in Appendix B and are designed to provide planning area-specific information to the Secretary of the value of OCS resources under three different sets of energy market conditions. The entire NSV analysis is discounted at a rate of 3 percent as described in Appendix B.

The first stage of the NSV analysis calculates potential gross revenues by multiplying the unleased UERR associated with each price scenario by the applicable oil and gas prices related to those scenarios. The second stage in the calculation subtracts the private costs of exploration, development, production, and transportation of the UERR from gross revenues to find NEV. Then, the third stage in the analysis subtracts the external costs from the NEV. The external costs are the environmental and social costs that companies do not generally pay for but are still associated with the exploration, development, production, and transportation of resources from the OCS, as described in Section 5.2.2. The resulting value is the NSV. Each component of the NSV analysis is briefly described below along with a ranking of planning areas under the mid-price scenario at each stage.

5.3.1 Net Economic Value

NEV is the private value to society derived from developing hydrocarbon resources found in the OCS. The NEV equals the discounted gross revenues from the produced oil and natural gas minus the 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. The NEV can be considered as the present value of the expected economic rent for all available unleased UERR. A portion of the NEV goes to the U.S. government, as lessor, 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.[31]

[31] Appendix B discusses a 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 this DPP analysis, is only the domestic value.

Table 5-2: Ranking of Planning Areas by Net Social Value for Unleased UERR as of July 2017

Rank	Planning Area	Net Economic Value			Environmental and Social Costs			Net Social Value		
		$ billions								
		Low $60/bbl $4.27/mcf	**Mid** $110/bbl $7.83/mcf	**High** $160/bbl $11.39/mcf	**Low** $60/bbl $4.27/mcf	**Mid** $110/bbl $7.83/mcf	**High** $160/bbl $11.39/mcf	**Low** $60/bbl $4.27/mcf	**Mid** $110/bbl $7.83/mcf	**High** $160/bbl $11.39/mcf
1.	Central GOM	$290.0	**$795.1**	$1,358.9	$16.4	**$17.8**	$18.3	$273.6	**$777.3**	$1,340.5
2.	Western GOM	$45.8	**$278.4**	$556.1	$16.1	**$17.3**	$17.7	$29.7	**$261.1**	$538.4
3.	Eastern GOM	$55.1	**$183.9**	$328.3	$4.5	**$5.0**	$5.2	$50.6	**$178.9**	$323.2
4.	Southern California	$57.8	**$148.7**	$245.6	$2.2	**$2.7**	$3.1	$55.6	**$146.0**	$242.5
5.	Chukchi Sea	$1.8	**$127.3**	$332.4	$0.2	**$0.5**	$0.6	$1.6	**$126.7**	$331.8
6.	Beaufort Sea	$2.9	**$122.6**	$347.3	$0.5	**$0.7**	$0.8	$2.5	**$122.0**	$346.5
7.	Central California	$40.5	**$93.6**	$147.4	$1.2	**$1.5**	$1.8	$39.2	**$92.1**	$145.6
8.	Mid-Atlantic	$24.2	**$89.7**	$171.0	$1.2	**$1.5**	$1.6	$22.9	**$88.2**	$169.4
9.	North Atlantic	$23.2	**$72.1**	$130.3	$0.9	**$1.0**	$1.1	$22.3	**$71.2**	$129.2
10.	Northern California	$18.7	**$52.6**	$88.4	$0.6	**$0.7**	$1.0	$18.1	**$51.9**	$87.5
11.	Gulf of Alaska	$7.8	**$32.9**	$56.9	$0.0	**$0.1**	$0.1	$7.7	**$32.8**	$56.9
12.	Cook Inlet	$5.3	**$27.7**	$53.5	$0.1	**$0.1**	$0.1	$5.2	**$27.6**	$53.4
13.	North Aleutian Basin	$0.6	**$11.9**	$44.5	$0.0	**$0.1**	$0.1	$0.6	**$11.8**	$44.4
14.	Washington/ Oregon	$3.2	**$9.5**	$17.0	$0.2	**$0.2**	$0.3	$3.0	**$9.3**	$16.7
15.	South Atlantic	$0.0	**$3.5**	$10.6	$0.1	**$0.1**	$0.2	-$0.1	**$3.4**	$10.4

Note: St. George Basin, Kodiak, Navarin Basin, Hope Basin, Shumagin, Norton Basin, and the Straits of Florida Planning areas are excluded from this table as they have only an estimated negligible development value. Aleutian Arc, Aleutian Basin, Bowers Basin, and the St. Matthew-Hall planning areas are excluded from this table as they are estimated to contain only negligible resources. 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.

Figure 5-10 shows the range of estimated NEV for each of the fifteen planning areas (greater than 100 million BOE) between the low and high-price scenarios. The areas are ranked based on NEV under the mid-price case, which is indicated in the figure with the orange line.

The NEV ranking of planning areas is slightly different than the resource rankings presented in Table 5-1. For example, the Chukchi and Beaufort Seas Planning Areas rank third and fourth in total resources, but drop to fifth and sixth in the ranking of NEV. This is driven by higher operating costs in the Arctic, which generate a lower NEV per BOE produced. As such, the NEV received per BOE in the Central GOM would be approximately $33, whereas the NEV per BOE in the Chukchi and Beaufort Seas Planning Areas would be $17.

Similar to the resource-to-price relationship, the NEV-to-price relationship is not linear. While costs do rise as prices increase, higher prices prompt companies to pursue resources that are more difficult and more expensive to develop and produce. If prices advance toward the levels of the "high" scenario, it will allow for a mix of lower-cost and higher-cost fields to be developed at the same time. On the other side, if prices fall to levels of the "low" scenario, as they did in late 2014, companies will focus more of their efforts on the most profitable projects. Given the differences in resources and costs under the different price scenarios, the estimates of NEV for each area and price scenario are provided in the first three columns of Table 5-2.

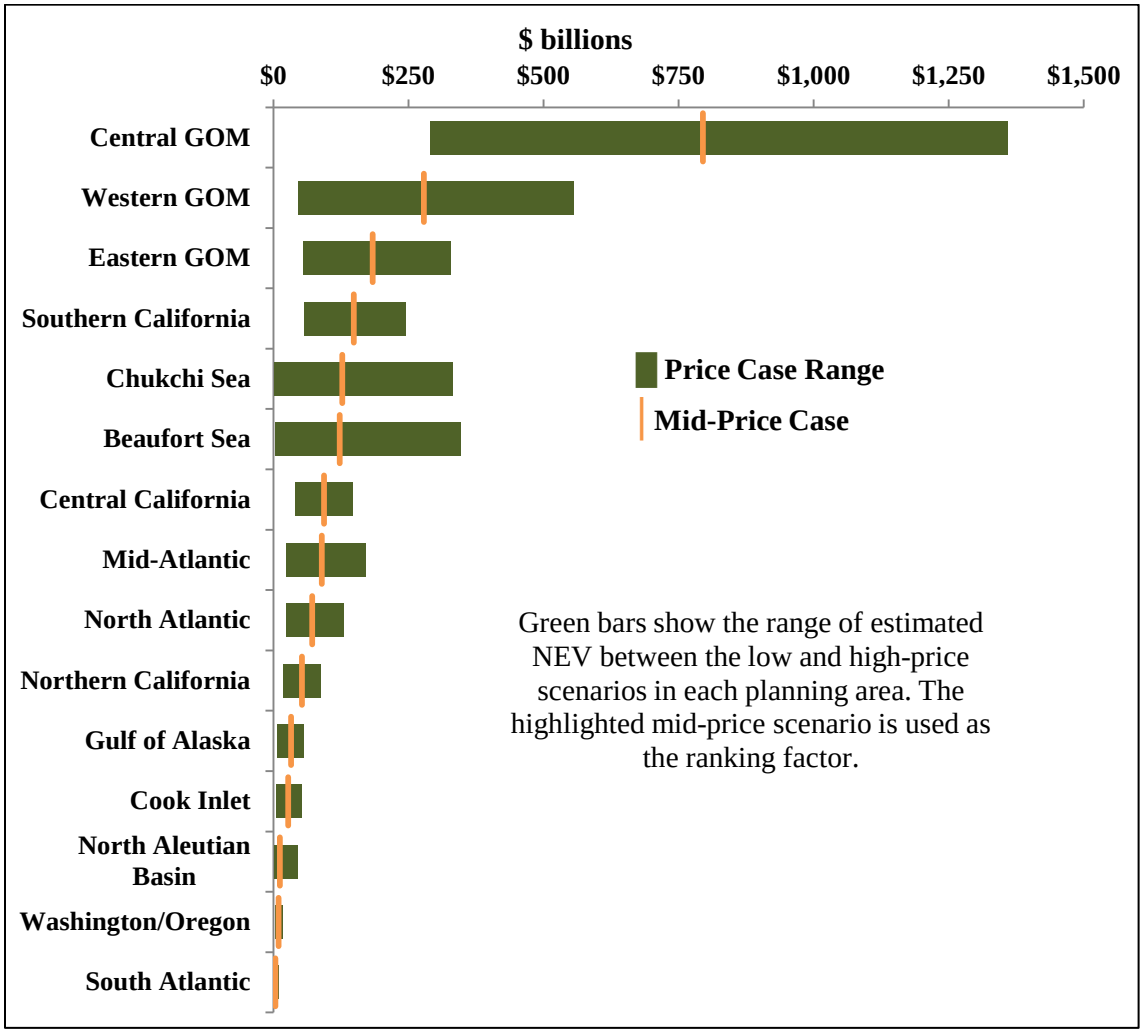
While the NEV analysis treats the private expenditures on exploration, development, production, and transportation as costs, this spending can actually be considered a benefit in a broader macroeconomic context. For example, the use of labor and capital to search for and extract oil and gas resources still 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, etc. A discussion of additional benefits of OCS production is included in Appendix B under the non-monetized benefits, and is further discussed in Chapter 4 and Chapter 7.

5.3.2 Environmental and Social Costs

Beyond the private costs used to calculate the NEV, society incurs 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 to air quality, water quality, commercial fisheries, and beach recreation. 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 developed in 2001 and revised substantially in 2012. It is designed to model the impact of typical activities associated with OCS production and typical oil spills occurring on the OCS. The model uses economic inputs, resource estimates, and exploration and development scenarios as the basis for its calculations.

While the model captures a wide range of environmental and social costs, it is not designed to represent impacts on unique resources such as endangered species. Impacts on unique resources such as endangered species are discussed in Chapter 6 and will be discussed in more detail in the PEIS prepared in conjunction with the PP. Further, these impacts will be subject to mitigation measures at later stages in the development process.

Figure 5-10: Net Economic Value Ranges by Planning Area (Ranked by Mid-Price Case)



Note: NEV is provided as a range from the low-price case to the high-price case. The mid-price case is highlighted in orange. Each of these price cases assumes an inflation-adjusted price of $60/bbl for oil and $4.27/mcf for natural gas in the low-price case, $110/bbl for oil and $7.83/mcf for natural gas for the mid-price case and $160/bbl and $11.39 for the high-price case. St. George Basin, Kodiak, Navarin Basin, Hope Basin, Shumagin, and Norton Basin and the Straits of Florida Planning Areas are excluded from this figure as they have an estimated negligible development value. Aleutian Arc, Aleutian Basin, Bowers Basin, and the St. Matthew-Hall Planning Areas are excluded from this figure as they are estimated to contain only negligible resources. All values are discounted at a real discount rate of 3 percent.

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 NSV analysis. In 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 risk and impact of catastrophic oil spills are not considered in the NSV analysis. Catastrophic oil spills are discussed and considered in Chapter 6 and in the supporting paper *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (BOEM 2014b).

An analysis of the costs of an unlikely, but theoretically possible, catastrophic oil spill was first included in the *Economic Analysis Methodology for the 2012–2017 Proposed Final Program* (BOEM 2012). Additional information related to catastrophic oil spills, including but not limited to potential impacts to endangered species, will be analyzed in depth at the PP and PFP stages through the PEIS.

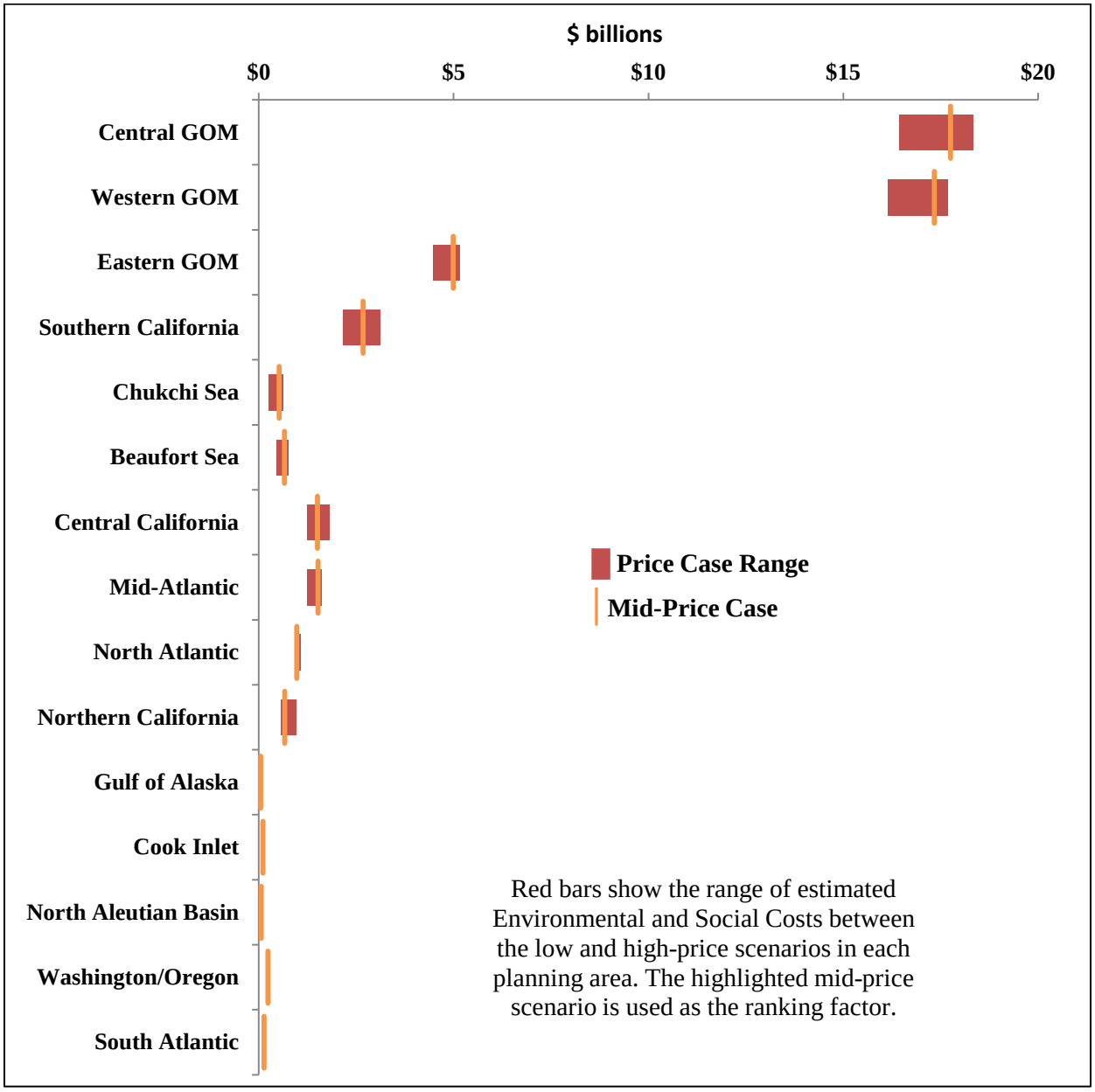
Figure 5-11 shows the range of environmental and social costs over the three price cases. The planning areas are ranked based on the environmental and social costs of the mid-price case, which is indicated with the orange line. The environmental and social costs for each of the three different price cases are shown in the middle three columns of Table 5-2. The total environmental and social costs (i.e., OECM results) originating from OCS activities are subtracted from the NEV to calculate the NSV. Additional information about the calculation of the environmental and social cost can be found in Appendix B.

The ranking of the planning areas in terms of environmental and social costs in Figure 5-11 varies from their rankings based on UERR resources in Figure 5-9. Notably, the Alaska Arctic planning areas (Beaufort Sea and Chukchi Sea Planning Areas) rank ninth and tenth in total environmental and social costs, but rank fourth and third in resources, and fifth and sixth in NEV, respectively. The Mid-Atlantic Planning Area, which ranks seventh in resources and eighth in NEV, ranks fifth in environmental and social costs. The ranking differences stem from the relative environmental and social impact.

Recreation and air quality impacts are two of the largest monetized components of the OECM. For example, an oil spill in the Mid-Atlantic Planning Area may threaten recreational activities, but a spill of equal magnitude in the Arctic may not have the same effect on activities such as recreational fishing and beach visitation because fewer people participate in them in the Arctic. As such, the OECM will show a greater reduction in social welfare in the Mid-Atlantic Planning Area when compared to the Alaskan Arctic even though the Alaskan Arctic includes other costs such as damages to subsistence harvests. Similarly, the OECM contains an air quality model that evaluates the onshore damages caused by dispersed criteria pollutants emitted offshore. Because the Mid-Atlantic is more developed and populous, air emissions create larger monetized environmental impacts to human health, agriculture, and material damage than in the Alaskan Arctic. These differences are especially noticeable when comparing the environmental and social costs per BOE between the regions. For example, the five Alaska planning areas have environmental and social costs less than ten cents per BOE, whereas costs in the Western GOM are more than one dollar per BOE. The model monetizes potential subsistence harvest impacts from those spills modeled in OECM (of less than 100,000 barrels) for Alaska, but not for other regions.[32] Additional information on the OECM environmental and social cost components and calculations is included in Appendix B.

[32] The OECM is limited to subsistence harvests in Alaska planning areas because of the relative importance of subsistence harvests in Alaska and the availability of Alaskan subsistence harvest data (Industrial Economics, Inc. 2012). Though other OCS regions have some subsistence harvests, data of the type needed for the OECM are not available. BOEM continues to review existing information on subsistence harvests in other regions, and if data on the scope and value of these harvests become available, BOEM can modify the OECM to incorporate these impacts. Some information on the presence of subsistence harvests in the other regions is discussed in the separate report

Figure 5-11: Environmental and Social Costs by Planning Area (Ranked by Mid-Price Case)



Note: The range of environmental and social costs is shown from the low-price to the high-price case. The mid-price case is highlighted in orange. Each of these price cases assumes an inflation-adjusted price of $60/bbl for oil and $4.27/mcf for natural gas in the low-price case, $110/bbl for oil and $7.83/mcf for natural gas for the mid-price case and $160/bbl and $11.39 for the high-price case. St. George Basin, Kodiak, Navarin Basin, Hope Basin, Shumagin, and Norton Basin and the Straits of Florida Planning areas are excluded from this figure as they have only an estimated negligible development value. Aleutian Arc, Aleutian Basin, Bowers Basin, and the St. Matthew-Hall planning areas are excluded from this figure as they are estimated to contain only negligible resources. All values are discounted at a real discount rate of 3 percent.

Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions (BOEM 2014b).

There is an important difference between the environmental social cost calculation done for the DPP analyses and that which is done for the PP and PFP analyses. The DPP only considers the environmental and social costs of extracting OCS resources, while the PP and PFP consider incremental environmental and social costs. 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 OCS program is approved. Only the incremental environmental and social costs are included as some environmental and social costs would occur regardless of whether the program was approved. In the absence of OCS production, substitute energy sources, which have their own environmental and social costs, would be needed to fulfill U.S. demand. This "incremental" analysis is reserved for the PP and PFP analyses.

As stated above, the scope of analysis in the DPP is inherently different than in later Program formulation stages. The DPP analysis considers the large volumes of all available UERR with no leasing or market constraints such as rig or worker availability, and defers until later program formulation stages the assessment of specific planning area proposals and options. For these reasons, it would be inappropriate to compare the resulting figures generated in the DPP with domestic demand, the supply of other energy resources including imports, or any other energy market factors. Thus, the substitution analysis and calculation of net environmental and social costs is reserved for the PP and PFP analyses.

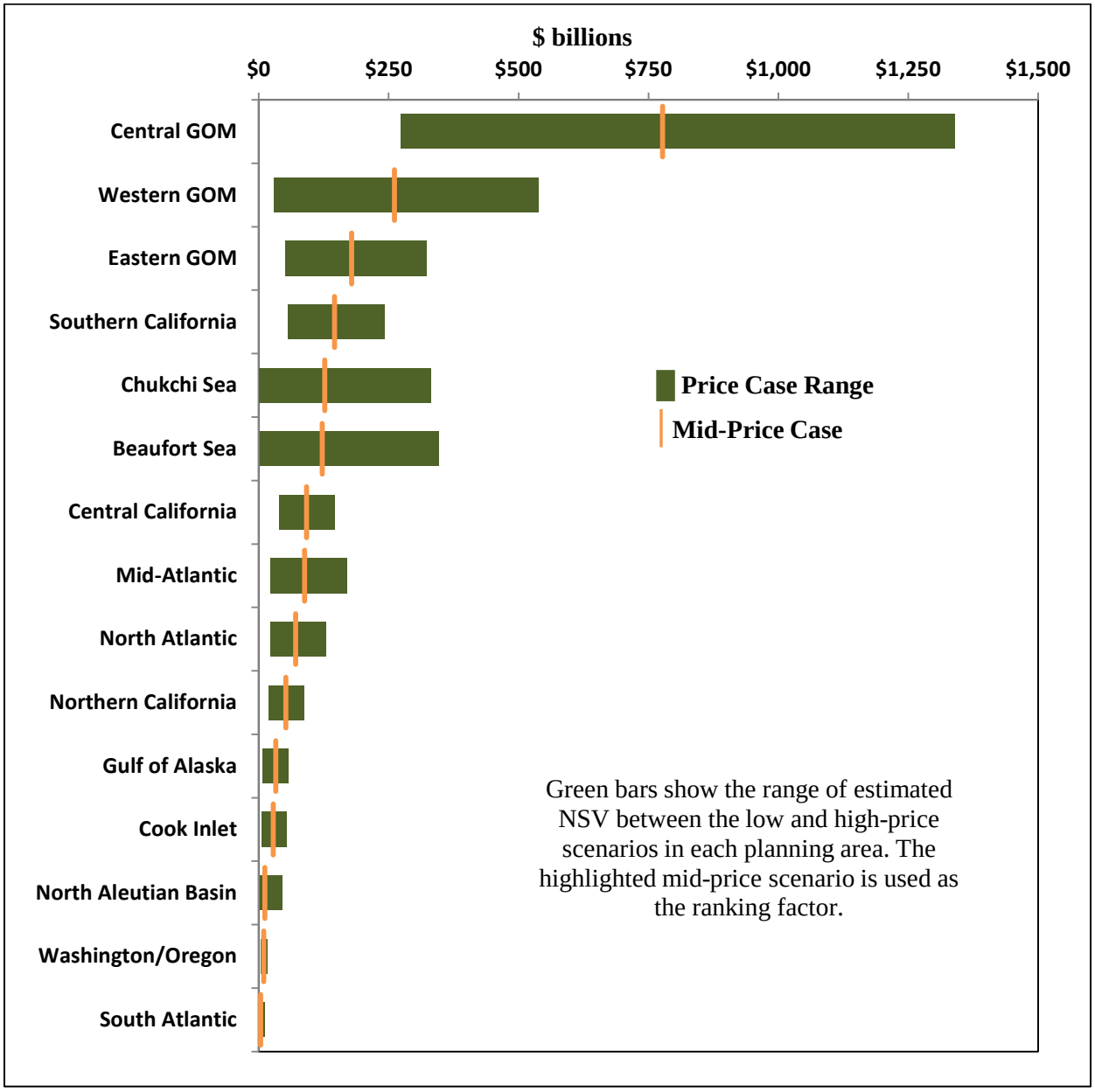
5.3.3 Net Social Value Calculation

The final result at this program stage, the NSV, is the NEV less the present value of environmental and social costs anticipated from the planning area. The range of NSV is shown in Figure 5-12, ranked from largest value to smallest by the mid-price case. The NSV is the monetized benefits of oil and gas resources less the private, environmental, and social costs associated with extraction. The higher values represent larger benefits to society.

The NSV ranking for the mid-price case shown in Figure 5-12 follows the same order as the NEV. In fact, the total environmental and social costs from all planning areas are estimated to be between 1 (high price case) and 8 (low price case) percent of the NEV. For the mid-price case, in aggregate, NSV is roughly 98 percent of the NEV (meaning for the mid-price case environmental and social costs are only approximately 2 percent of NSV).

Detailed measures of the NEV, environmental and social costs, and NSV for each planning area are shown in Table 5-2. Planning areas are ranked by the NSV of the mid-price case. The first three columns show the NEV per planning area, second three columns show the environmental and social costs, and the final three columns show the results of the NSV calculation (NEV less environmental and social costs). Table 5-2 allows the comparison of planning areas for each of the price cases. The three different price cases show what the estimated benefits and costs would be under three vastly different energy market conditions. However, these estimates are rooted in uncertainty at many levels beyond just price. In addition to the price uncertainty, there is also resource uncertainty, extraction cost uncertainty, environmental and social cost uncertainty, and others. Actual values different from those used in the NSV analysis can greatly affect the NSV. The nature of these uncertainties is discussed in Chapter 8.

Figure 5-12: Net Social Value Ranges by Planning Area (Ranked by Mid-Price Case)



Notes: The range of NSV results is shown from the low-price to the high-price case. The mid-price case is highlighted in orange. Each of these price cases assumes an inflation-adjusted price of $60/bbl for oil and $4.27/mcf for natural gas in the low-price case, $110/bbl for oil and $7.83/mcf for natural gas for the mid-price case and $160/bbl and $11.39 for the high-price case. The mid-price case assumes an inflation-adjusted price of $110/bbl for oil and $7.83/mcf for natural gas. St. George Basin, Kodiak, Navarin Basin, Hope Basin, Shumagin, and Norton Basin and the Straits of Florida Planning areas are excluded from this figure as they have only an estimated negligible development value. Aleutian Arc, Aleutian Basin, Bowers Basin, and the St. Matthew-Hall planning areas are excluded from this figure as they are estimated to contain only negligible resources. All values are discounted at a real discount rate of 3 percent.

The entire NSV analysis is described in more detail in Appendix B, which also includes a discussion of relevant costs and benefits that are not monetized in the DPP analysis. The NSV analysis captures the important costs and benefits associated with new OCS leasing that can be reliably estimated with current or best available information. Some of the other costs and benefits do not lend themselves easily to quantification and monetization, whereas others are more appropriately estimated in later program stages. Nevertheless, these costs and benefits are addressed qualitatively in the DPP analysis.

In addition to the inclusion of incremental environmental and social costs, the NSV analysis is expanded for the PP and PFP analyses to include domestic consumer surplus. Domestic consumer surplus measures the additional benefits that U.S. consumers receive from the slight energy market price decreases which occur through the production of OCS resources. Calculating consumer surplus is not applicable at the DPP stage since BOEM's consideration of all available resources would skew the results when combined with other real-world energy market information and forecasts. More information on the treatment of incremental environmental and social costs and consumer surplus in later program stages is included in the Economic Analysis Methodology paper for the 2017–2022 Program (BOEM 2012).

5.4 CONCLUSION

Chapter 5 provides a valuation of the OCS planning areas based on the estimated hydrocarbon resources and the NSV provided by those resources. Estimates are provided as a range of three vastly different price cases, but there are multiple other uncertainties that could greatly change the results of the analysis. In addition to the price uncertainty, there is also resource uncertainty, extraction cost uncertainty, environmental and social cost uncertainty, and others. These uncertainties are discussed in Chapter 8.

The valuation of planning areas is provided as one metric in which the Secretary can evaluate multiple Section 18 factors. As this is only one of the multiple factors the Secretary considers in making a decision, simply because a planning area ranks high, or low, does not determine its inclusion or exclusion in the Program.

Chapter 6 Environmental Consideration Factors and Concerns

6.1 Environmental Setting and Ecological Characteristics

The environmental setting of an area where oil and gas leasing activities may occur is defined by various geological, geographical, and ecological characteristics. The geology of the planning areas is discussed in Section 5.1. The geographical setting includes the location of the region and its associated planning areas, as well as any unique physical characteristics.

The ecological characteristics that define the environmental setting encompass all facets of a particular group of related species, habitats, or other ecologically significant parameters. The same general resource areas exist for all of the regions in which oil and gas leasing may occur; however, the relative importance of a given resource may vary depending on the geographic location. This can be due to many factors, such as relative abundance, sensitivity, the presence of federally protected species, the level of activity that occurs, or the presence of multiple uses that may impact the same resource areas, among others. Resources may include the physical and biological components of the larger ecosystem; resource areas are defined components that are closely related, such as species groups (e.g., marine mammals) or interrelated habitats such as those that occur on the sea floor (see Table 6-1).

Table 6-1: Potential Natural Resources in Planning Areas

Air quality	Marine benthic[a] habitats
Water quality	Marine pelagic[b] habitats
Protected areas	Invertebrates/lower trophic levels
Human use	Marine mammals
Fish	Birds
Fisheries	Sea turtles
Coastal and estuarine habitats	

[a] Benthic refers to habitats on the sea floor.
[b] Pelagic refers to habitats within the water column.

The sections below provide a brief overview of the most relevant components of these resource areas by region. Relevance may be defined through distinctiveness of a resource, ecological importance, potential for impact, resiliency, state or Federal laws and policies, and ecosystem service value. For example, the Endangered Species Act (ESA) affords legal protection to individual animals and their habitats based on their current status and the threats those animals may face in the future. Species or species segments (Distinct Population Segments [DPS]) may be classified as endangered, threatened, candidate, or proposed for listing. The majority of information found in these sections is from the 2012–2017 Program PEIS (BOEM 2012a) and from *Marine Ecoregions of North America* (Wilkinson et al. 2009), unless otherwise cited. Additional information on the environmental resources that may be found in the planning areas is provided in the documents listed in Section 6.3.1.

6.1.1 Alaska

The three separate ecological regions within the Alaska region are defined by geography, physical oceanography, and biological communities: (1) the Arctic, comprised of the Beaufort and Chukchi Seas; (2) the East Bering Sea, defined by the Bering Strait to the north and the Alaskan Peninsula and Aleutian Islands to the south; and (3) the Gulf of Alaska, defined by mainland Alaska to the east and north and the Alaska Peninsula to the northwest.

The Alaska region includes all of the planning areas around the State of Alaska: Beaufort Sea, Chukchi Sea, Hope Basin, Norton Basin, Navarin Basin, St. Matthew-Hall, Aleutian Basin, Bowers Basin, Aleutian Arc, St. George Basin, North Aleutian Basin, Shumagin, Kodiak, and Gulf of Alaska (see Figure 1-2). Table 6-2 provides a breakdown of planning areas by ecological region. There were 0.6 million people living in Alaska coastal counties as of 2008 (Wilson and Fischetti 2010).

Table 6-2: Ecological Regions of Alaska Planning Areas

Ecological Region	Planning Areas
Arctic	Beaufort Sea, Chukchi Sea, Hope Basin
Bering Sea	Norton Basin, Navarin Basin, St. Matthew-Hall, Aleutian Basin, Bowers Basin, St. George Basin, North Aleutian Basin, Aleutian Arc (partial)
Gulf of Alaska	Aleutian Arc (partial), Shumagin, Kodiak, Gulf of Alaska, Cook Inlet

6.1.1.1 Arctic

The U.S. Arctic OCS includes the Chukchi and Beaufort Seas. The U.S. Chukchi Sea extends from the Bering Strait, north and east along the coast of Alaska to approximately Point Barrow, Alaska. The Beaufort Sea extends from approximately Point Barrow eastward along the north coast of Alaska to Canada. The Chukchi/Beaufort region is generally shallow, with a broad (100 to 300-mile-wide) shallow shelf in the Chukchi Sea, and a narrower (> 60 miles) shelf in the Beaufort Sea; the shallow continental shelf drops off sharply to the Arctic Basin.

The Chukchi/Beaufort region is characterized by several unique physical and ecological characteristics. Seasonal pack ice moves south into the region during the winter months when it is dark from mid-November to mid-January. The ice covers the Beaufort Shelf for about nine months of the year and reaches its maximum extent in March. Landfast ice (ice that forms adjacent to and extends from the land) starts to form in October and can extend up to 25 miles from shore. During the summer, the Alaskan Arctic experiences daylight from approximately early May through the end of July. The pack ice retreats during the summer, reaching its minimum extent in September. The movement and presence of sea ice is a dominant feature of the Arctic seascape and impacts the physical, biological, and cultural aspects of life in the area. The presence of seasonal ice contributes to low salinities in the region. The Mackenzie River Delta on the Canadian Beaufort Sea also contributes to the turbidity and lower salinity of the region.

In the Arctic OCS, the Chukchi Sea and Beaufort Sea Planning Areas have the lowest levels of net primary productivity (NPP) (refer to Section 6.2) of all the planning areas, ranking 25th and

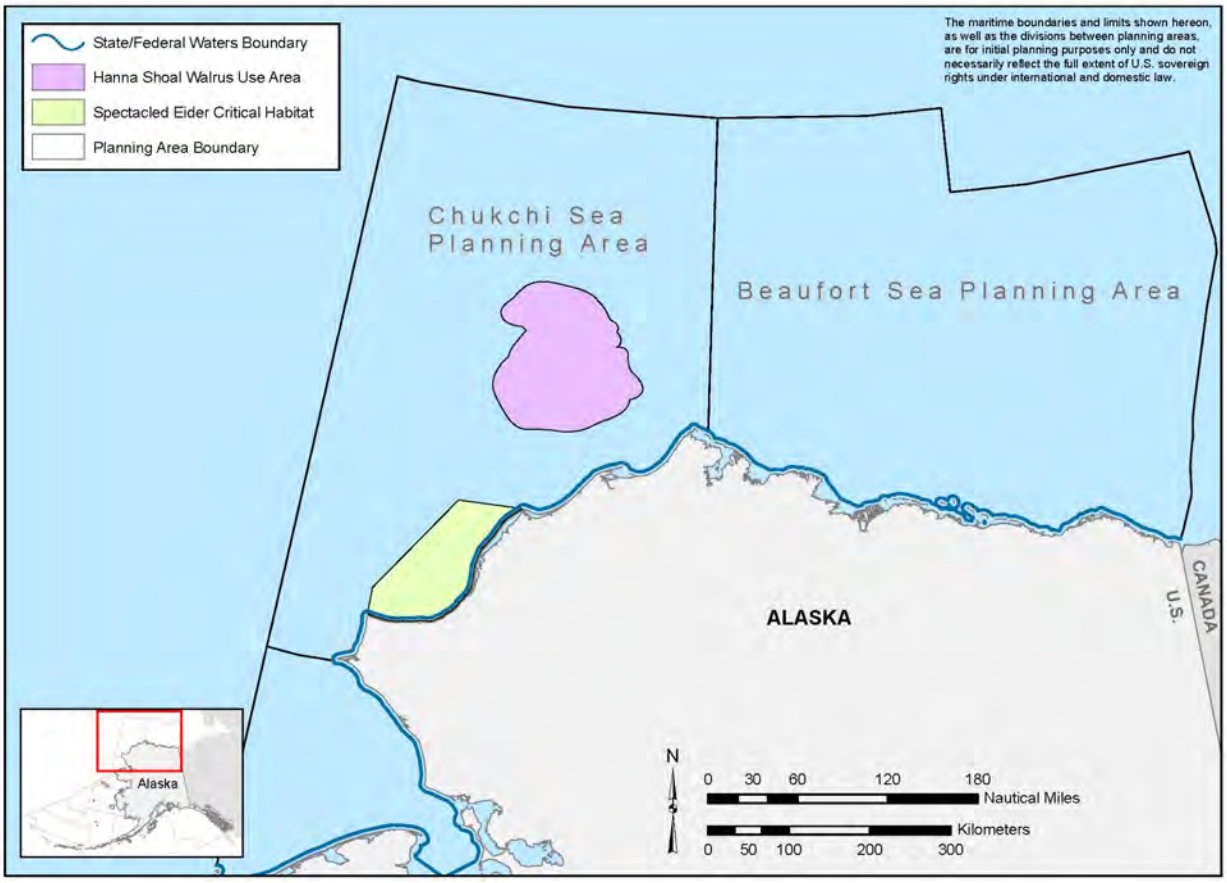
26th, respectively. The Hope Basin Planning Area has higher NPP, ranking 14th (see Figure 6-6). The Arctic OCS is known for its ice-associated animals, including several species of seals, Pacific walrus (ESA candidate [c]), and polar bears (ESA threatened [t]). Other marine mammal species, all of which are protected by Federal law, occur in the area. These include bowhead (ESA endangered [e]) and gray whales, and belugas (e). Many bird species are found on the shore and in the waters of the Arctic OCS; the Mackenzie River Delta is important wetland habitat for migrating birds, such as waterfowl (e.g., king eider, long-tailed duck, and geese), and shorebirds, such as the red-necked phalarope. The Chukchi/Beaufort region provides habitat for 40 species of fish, including commercially valuable species such as cod and herring. The Arctic also contains deep-water coral habitats. Deep-water corals are an important part of the seafloor (benthic) habitat in Alaska. They occur across a variety of depths (78 feet to more than 15,000 feet) and provide habitat for commercial fish and crab species. The northernmost report of the presence of deep-water corals in Alaska is in the Beaufort Sea. The Beaufort Sea and Chukchi Sea Planning Areas rank among the highest for environmental sensitivity (see Section 6.2). These regions have the highest sensitivity scores for birds and invertebrates. The high sensitivity scores also are driven by the region's high susceptibility to climate change.

Several species that occur in the U.S. Arctic OCS are listed or proposed for listing as threatened or endangered under the ESA. These include five marine mammal species (bowhead [e], humpback [e], and fin [e] whales, ringed [t] seals, and the polar bear [t]), and three bird species (spectacled eider [t], Steller's eider [t], and yellow-billed loon [c]). Designated critical habitat for the spectacled eider is on the Chukchi coast of Alaska (see Figure 6-1). In addition, the U.S. Fish and Wildlife Service has designated portions of the Hanna Shoal region as core use areas for Pacific walrus, known as the Hanna Shoal Walrus Use Area, which is shown in Figure 6-1.

The land areas adjacent to the Arctic OCS waters are sparsely populated. The subsistence communities of the North Slope depend largely on the natural environment for food and materials, especially the marine environment. Each year, communities across northern Alaska participate in a bowhead whale hunt that is central to their cultural tradition. Other uses of the OCS are discussed in detail in Section 4.7.

BOEM received several comments in response to the RFI that related to the Arctic OCS planning areas (see Table 6-2), which are summarized in Appendix A. Comments included recommendations to exclude from the Program the following marine areas based on significant ecological or cultural importance: Harrison Bay, Central U.S. Beaufort Sea, Eastern U.S. Beaufort Sea, Chukchi Corridor, Barrow Canyon Complex, Hanna Shoal Region, and Herald Shoal. Commenters also raised concerns regarding the coastal habitats of the Beaufort Sea Planning Area, specifically the possibility of effects to polar bear and caribou habitat.

Figure 6-1: Critical Habitat for Spectacled Eider and Hanna Shoal Walrus Use Area



6.1.1.2 Bering Sea

The Alaska Peninsula separates the Bering Sea from the Gulf of Alaska to the southeast. The Bering Sea is bounded by Alaska to the east and northeast, Russia's Far East and Kamchatka Peninsula to the west, the Aleutian Islands to the south, and the Bering Strait to the far north. The continental shelf in the Bering Sea is very broad, extending more than 300 miles from shore at its widest extent. Water moves from the Bering Sea through the Bering Strait and into the Arctic Ocean via the Chukchi Sea.

The Bering Sea planning areas (see Table 6-2) include the third highest and four of the eight lowest ranked areas for NPP. As shown in Figure 6-6, the Bering Sea planning areas rank as follows for NPP out of all 26 planning areas:

- Norton Basin (3)
- North Aleutian Basin (7)
- St. George Basin (12)
- St. Matthew-Hall (13)
- Navarin Basin (19)
- Aleutian Basin (20)
- Aleutian Arc (21)
- Bowers Basin (22).

The U.S. OCS waters of the Bering Sea include extensive eelgrass beds, such as those found in Izembek NWR in Bristol Bay, and host at least 450 species of fish, crustaceans, and mollusks; 50 species of seabirds; and 25 species of marine mammals. Many of these species are protected, such as marine mammals, or are commercially valuable, such as king crab and cod. Species that occupy the outer shelf area and feed in the pelagic, or open-water, zone include seabirds, mammals, and fish that consume smaller, schooling fishes. One of the most important of these is the walleye pollock, which comprises a significant portion of the total amount of marine life in the offshore system and is an important food source for nesting seabirds and seals. Inshore shelf waters consist more commonly of bottom-dwelling or bottom-associated species, such as demersal fishes and crabs, which feed primarily on organisms that live on or in the seafloor.

Sea ice forms throughout the Bering Sea each year, entering and retreating from the region through the Bering Strait. The movement of the sea ice is seasonal and affects the distribution of ice-associated species within the Bering Sea, including fishes, walruses, and seals. This is due to the fact that species such as walrus actively haul-out and forage from the ice and due to increased productivity as a result of the retreat of ice. Many species occur seasonally in the Bering Sea: Gray and fin (e) whales occupy the Bering Sea during the summer and early fall; Steller sea lions (e) and northern fur seals move north into the Bering Sea during the summer and retreat to the Aleutian and Pribilof Islands, or farther south, during the winter.

The eastern Bering Sea also contains deep-water coral habitats. Deep-water corals are an important part of the seafloor (benthic) habitat in Alaska. They occur across a variety of depths (78 feet to more than 15,000 feet) and provide habitat for commercial fish and crab species. Soft corals are common in the Bering Sea.

Several species occur in the Bering Sea that are listed or proposed for listing as threatened or endangered under the Federal ESA. These include:

- five species of birds (Steller's eider [t], spectacled eider [t], short-tailed albatross [e], yellow-billed loon [c], and Eskimo curlew [e]); and
- twelve species of marine mammals (humpback [e], fin [e], bowhead [e], sperm [e], blue [e], sei [e], and North Pacific right whales [e]; western DPS of Steller sea lion [e]; bearded [t] and ringed [t] seals; polar bear [t]; and the southwest Alaska DPS of northern sea otter [t]).

A large portion of the Bering Sea between the Seward Peninsula and the Aleutian Islands is designated as critical habitat for the North Pacific right whale. The majority of the Aleutian Islands, the Pribilof Islands, St. Matthew and St. Lawrence Islands, and nearshore areas on the northern shore of Bristol Bay are designated critical habitat for the western DPS of Steller sea lions. Designated critical habitat for Steller's eider is located on the north shore of the Alaskan Peninsula and along the shore of Yukon Delta NWR.

Several Marine Protected Areas exist in the Bering Sea. The Alaska Maritime NWR extends throughout the Aleutian Islands, to the Pribilof Islands, Bristol Bay, and north along Norton Sound and the Seward Peninsula. The Yukon Delta NWR is on the coast between Bristol Bay and Norton Sound.

Human coastal communities of the Bering Sea region rely on subsistence and commercial fishing. Some of the most productive fisheries in the world are found in the Bering Sea, including sockeye salmon, crab, and pollock. Bristol Bay is an especially valuable area for commercial fishing; this area was also identified as ecologically sensitive during the comment process. Other uses of the OCS are discussed in detail in Section 4.7.

6.1.1.3 Gulf of Alaska

The Gulf of Alaska is a large, semicircular bight bounded by the coast of mainland Alaska to the north and east and the Aleutian Islands to the west. It opens into—and is largely exposed to—the North Pacific Ocean. The Gulf of Alaska has a relatively narrow continental shelf, ranging from about 30 miles off Southeast Alaska to over 100 miles near Kodiak Island. Cook Inlet is located along the west-central coast of the Gulf of Alaska, bounded at the entrance by Kodiak and Afognak Islands. The climate of the Gulf of Alaska is warmer than the Arctic and northern Bering Sea. Sea ice does not occur regularly here; however, Cook Inlet does have ice formations of various kinds in the winter.

The planning areas in the Gulf of Alaska include the highest ranked planning area for NPP—the Cook Inlet Planning Area. The remaining three planning areas rank as follows out of all 26 planning areas: Gulf of Alaska, 11th; Kodiak, 16th; Shumagin, 17th; and Aleutian Arc, 21st (see Figure 6-6). The Gulf of Alaska hosts a wide variety of marine life, including as many as 24 species of marine mammals, a variety of seabirds and sea ducks, and at least 383 species of fish, including five species of salmon. The marine mammals that occur in the Gulf of Alaska include whales, dolphins, seals, sea lions, and otters; some of these animals remain in this area year-round, while others move seasonally. The offshore, nearshore, and coastal habitats of the Gulf of Alaska OCS provide feeding, nesting, and migratory areas for a variety of seabirds, sea ducks, and shorebirds. The fish assemblages of the Gulf of Alaska are extremely diverse, including both sub-Arctic and temperate species, with Arctic species favoring the western portions of the Gulf and the temperate species occurring more in the eastern portions. Many commercially valuable fish species occur in the Gulf of Alaska, including salmon, walleye pollock, cod, and crab.

The Gulf of Alaska and Aleutian Islands contain deep-water coral habitats. The Aleutians have the greatest number and variety of kinds of deep-water corals. Deep-water corals are an important part of the seafloor (benthic) habitat in Alaska. They occur across a variety of depths (78 feet to more than 15,000 feet) and provide habitat for commercial fish and crab species.

Numerous species in the Gulf of Alaska are listed or proposed for listing as threatened or endangered under the ESA and include:

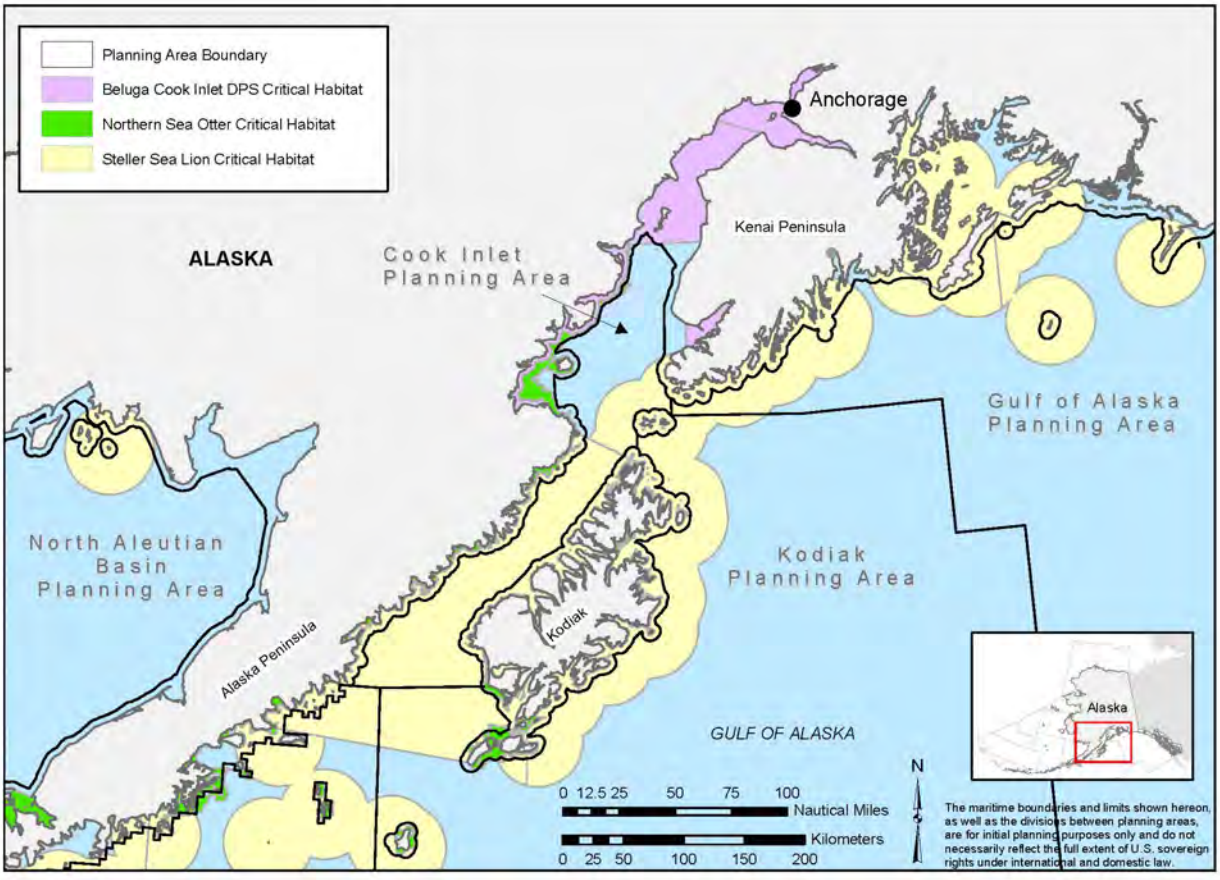
- marine mammals such as the humpback (e), fin (e), and North Pacific right (e) whales, the Cook Inlet DPS of beluga whales (e), the western DPS of Steller sea lions (e), and the southeast Alaska DPS of northern sea otter (t); and
- threatened and endangered birds include short-tailed albatross (e), Steller's eider (t), and yellow-billed loon (c).

Critical habitat is designated in or adjacent to the Gulf of Alaska for North Pacific right whales, the Steller sea lion western DPS, Steller's eider, the Cook Inlet beluga whale DPS, and the northern sea otter. The locations of designated critical habitat in or adjacent to the Cook Inlet Planning Area are shown in Figure 6-2.

Several MPAs are located in the Gulf of Alaska. The previously mentioned Alaska Maritime NWR includes large portions of the Aleutian Islands, Kodiak and Afognak Islands, and nearshore areas of mainland Alaska. Glacier Bay NP is in the eastern Gulf of Alaska, north of Sitka.

The most important human-use issues in the Gulf of Alaska are commercial fisheries, subsistence fishing, and tourism. Tourism consists largely of sightseeing cruise ships and eco-tourism, including whale and bear watching; recreational fishing, including charter boats; camping, and hiking. Other uses of the OCS are discussed in detail in Section 4.7.

Figure 6-2: Critical Habitat in the Vicinity of Cook Inlet



6.1.2 Pacific

The Pacific OCS Region includes four planning areas (see Figure 1-1) that are within one large ecological region defined by the California Current. The California Current system is a transitional zone between subarctic and subtropical water masses bounded by the Subarctic

Current to the north and equatorial waters to the south. The system is highly susceptible to climatic changes, such as the El Niño-Southern Oscillation (ENSO) phenomenon that results in higher water temperatures and decreased upwelling within the California Current system.

The U.S. west coast is approximately 1,300 miles long from north to south, with the coast of California accounting for 65 percent of that distance. In 2008, approximately 30 million people resided in Pacific Region coastal counties (Wilson and Fishetti 2010). The continental shelf along the U.S. west coast is generally very narrow (10 to 70 miles wide) and drops off steeply at the shelf break. Offshore southern California, the area beyond the shelf break consists of a topographically complex region that includes islands, banks, and basins. In addition, the Southern California Bight (SCB) includes the Channel Islands, which emerge from the deepest part of the seafloor beyond the continental shelf.

The California Current system is highly productive due to strong upwelling along the coast, where deep, cold, nutrient-rich water rises to the surface. The Pacific planning areas are all ranked in the top 10 for NPP. The Washington/Oregon Planning Area ranks 6th out of all 26 planning areas. Central California is 4th, and Northern and Southern California rank 9th and 10th, respectively (see Figure 6-6). The California Current system hosts a wide variety of marine mammals, seabirds, sea turtles, marine fishes, and invertebrates, in part due to its transitional nature. Subarctic species are more common in the northern portions of the region, while temperate and subtropical species generally are found farther south. In years with warmer water temperatures, such as during an ENSO event, warm-water species may venture farther north along with the warmer water. In the northern portion of the region, killer whales, salmon, and seabirds, such as the common murre, are integral parts of the ecological and cultural setting. Large baleen whales such as blue, fin, and gray whales, and large, open-water, predatory species such as white sharks are present along the entire west coast. Dall's porpoise, scoters, rockfish, herring, and salmon species are also found in the northern portions of the Pacific OCS. Farther south along central California, coastal wetlands provide habitat for resident and migratory shorebirds and waterfowl. The central California coast primarily is dominated by cold-water species, including iconic giant kelp; marine mammals such as sea lions, seals, whales, sea otters, dolphins and porpoises; seabirds such as albatross, gulls, and brown pelicans; and squid, crab, rockfish, bonito, and many other fish and invertebrate species. The SCB represents the southernmost and northernmost limits for the distribution of high-latitude and equatorial species, respectively. For example, the southern edge of the distribution of giant kelp beds is in the SCB. The area is also important habitat for the early life stages of many commercially valuable fish species. The Channel Islands and surrounding waters serve as breeding and foraging habitat for seabirds such as Guadalupe (Xantu's) murrelet; for marine mammals, including northern elephant seals, California sea lions, northern and Guadalupe fur seals; and over 27 species of whales and dolphins.

The U.S. west coast also contains deep-water coral habitats. Off of the Washington coast, coral communities occur as deep as 2,000 feet and provide habitat for many species of invertebrates and fish, including several rockfish species. There are records of deep-water corals both on and off the shelf from Puget Sound, Washington, to San Diego, California. These coral communities tend to be spread over discrete areas of suitable habitat and provide "islands" of habitat within larger areas of homogenous substrate. They may occur in a variety of regions, including on the continental slope, in underwater canyons, or on underwater mountains known as seamounts.

Numerous commercially valuable species are found along the west coast, including salmon, open-water schooling fishes such as sardines and herring, Pacific halibut, shrimp, crab, and clam. Most fisheries stocks in the area experience very high fishing pressure. Fisheries also are affected by changes in the climatic regime; this is particularly true for schooling pelagic fishes such as sardines and anchovy. A decrease in the abundance of these fish stocks can affect the entire ecological system, as many larger predators such as birds and marine mammals rely upon them for food. The environmental sensitivity scores for the California planning areas and the Washington/Oregon Planning Area rank lowest relative to the other planning areas (see Section 6.2). This region has relatively low sensitivity scores for marine mammals, sea turtles, fish and invertebrates. These, in addition to the relatively low sensitivity to climate change, contribute to an overall low sensitivity score in these areas.

Several species in the California Current system are listed as threatened or endangered under the ESA, including:

- nine marine mammals (North Pacific right [e], humpback [e], sei [e], fin [e], blue [e], and sperm whales [e]; the Southern Resident DPS of killer whales [e]; Guadalupe fur seal [t]; and southern sea otter [t]);
- four sea turtle species (leatherback [e], green [t], loggerhead [e], and olive ridley [t]);
- four bird species (short-tailed albatross [e], Western snowy plover [t], marbled murrelet [t], and California least tern [e]); and
- eight fish or invertebrate species (tidewater goby [e]; steelhead trout [t/e]; green sturgeon [t]; white abalone [e]; and chum [t], coho [t/e], sockeye [t/e], and chinook [t/e] salmon).

Critical habitat is designated for killer whales, leatherback sea turtle, tidewater goby, green sturgeon, and salmon within and adjacent to Pacific OCS waters.

Many federally protected areas are in or adjacent to Pacific OCS waters, which include:

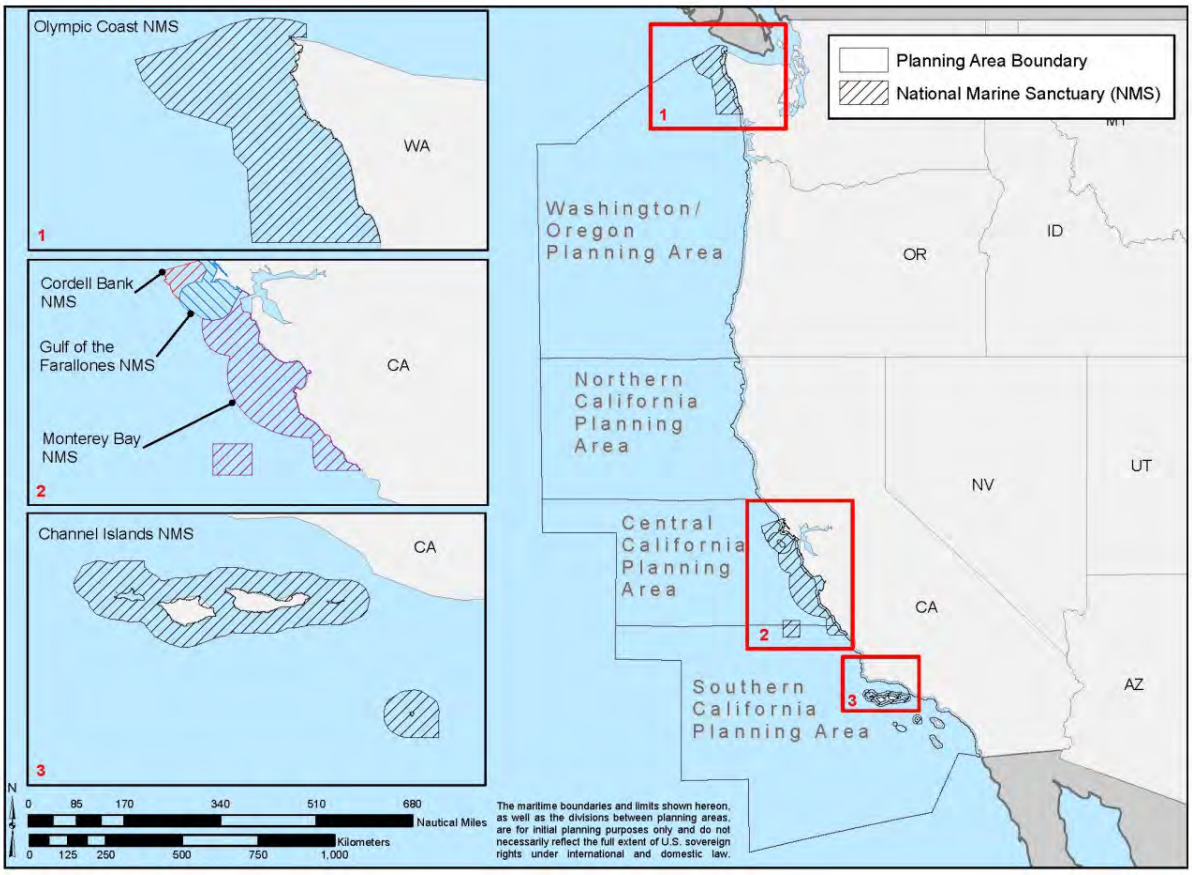
- five NMSs: Olympic Coast (Washington), Cordell Bank (California), Gulf of the Farallones (California), Monterey Bay (California), and Channel Islands (California);
- one NS: Point Reyes NS (California);
- one NP: Channel Islands NP (California);
- five national estuarine research reserves: Padilla Bay (Washington), South Slough (Oregon), San Francisco Bay (California), Elkhorn Slough (California), and Tijuana River (California); and
- various other Federal and state protected areas.

As noted in Chapter 3, an indefinite withdrawal initiated by President Clinton in 1998 and continued by President G.W. Bush in 2008 is in effect on lease blocks in designated marine sanctuaries that were in existence at the time. This applies to all NMSs on the U.S. West coast, shown in Figure 6-3.

Human use of the Pacific OCS waters is extensive, most notably the presence of valuable commercial and recreational fisheries. Various onshore and offshore activities contribute to degraded water quality from pollution, as well as to air quality below national standards in major metropolitan areas along the coast. Other uses of the OCS are discussed in detail in Section 4.7.

BOEM received several comments related to the Pacific OCS planning areas, which are summarized in Appendix A. They include comments on the habitats of the west coast, as well as the numerous protected areas in the region.

Figure 6-3: National Marine Sanctuaries on the West Coast



6.1.3 Gulf of Mexico

The GOM Region includes three planning areas: Western, Central, and Eastern (see Figure 1-1). The GOM is a semi-enclosed water body about 950 miles in diameter and consists of one large ecological region. The U.S. GOM OCS waters are located only in the northern GOM; there will be no discussion specifically of the southern GOM. However, several distinctions exist between the western and eastern portions of the northern GOM that warrant discussing them separately. For the purposes of this section, the western GOM refers to the portion of the northern GOM that includes the Western and Central GOM Planning Areas, and the eastern GOM refers to the portion of the northern GOM that includes the Eastern GOM Planning Area.

The western GOM is the area west of the DeSoto Canyon offshore Alabama, Mississippi, Louisiana, and Texas. The continental shelf in the western GOM is broadest (up to 135 miles) off Houston, Texas, and east to offshore the Atchafalaya Delta, Louisiana. It reaches its narrowest point (approximately 12 miles) near the mouth of the Mississippi River southeast of

New Orleans, Louisiana. The continental shelf is narrow offshore Mobile Bay, Alabama, but broadens significantly offshore Florida to almost 200 miles wide.

The GOM is distinctive from other parts of the OCS in physical oceanography and freshwater influx. Three major, persistent currents exist in the GOM. The Loop Current flows clockwise into the GOM between Cuba and the Yucatan Peninsula, Mexico, and circulates into the eastern GOM before exiting the GOM as the Florida Current, where it ultimately joins the Gulf Stream in the Atlantic. Small-scale, ephemeral currents known as eddies form off of the Loop Current and may enter the western GOM. The GOM also experiences freshwater input from several rivers, most importantly the Mississippi River. The Mississippi River and its tributaries drain a large portion of the continental United States and carry large amounts of freshwater into the GOM along with sediment and a variety of nutrients and pollutants. The highest volume of freshwater from the Mississippi River flows into the GOM during late winter into early summer.

The Central GOM Planning Area ranks 5th in NPP out of all planning areas; the Western GOM Planning Area is ranked 8th, and the Eastern GOM Planning Area is 15th (see Figure 6-6). The GOM is a semi-tropical climate, and this is reflected in the diversity of marine mammal, sea turtle, seabird, shorebird, fish, and invertebrate species. Many fish and invertebrate species are commercially valuable, including tunas, snapper, menhaden, oysters, crab, and shrimp. Five sea turtle species occur in the GOM: the leatherback (e/t), green (e), hawksbill (e), Kemp's ridley (e), and loggerhead (t). Nesting activity for all these species has been recorded in the GOM. Loggerheads nest primarily in the eastern GOM on the coast of Florida, and the western GOM is the primary nesting ground for Kemp's ridley turtles (e). The majority of marine mammals that occur in the GOM are delphinids, which are relatively small, toothed species that include dolphins, killer whales, and pilot whales. There are two species of large whale that occur in the GOM: Bryde's whale, and a resident population of sperm whales (e) in the north-central GOM. The West Indian manatee (e) occurs primarily in coastal waters of the eastern GOM around Florida but may be found offshore and as far west as Texas in the western GOM. The GOM is part of three major migratory paths for birds, known as flyways (Atlantic, Mississippi, and Central). The GOM provides wetland, nearshore, and offshore habitats for songbirds, seabirds, shorebirds, waterfowl, sea ducks, and wading birds. There are several Fishery Management Plans for the GOM: coastal migratory pelagics (mackerels and cobia), red drum, reef fish (snappers, groupers, tilefishes, jacks, triggerfishes, and wrasses), shrimp (brown, white, pink, and red), spiny lobster, and corals of the classes Hydrozoa and Anthozoa. Each of these plans includes an amendment identifying the locations of Essential Fish Habitat for the managed species.

The western GOM hosts the northernmost tropical coral reef system in the United States at the Flower Garden Banks, an isolated system of predominantly encrusting corals atop salt dome formations. This system attracts reef fishes and large open-water species such as hammerhead and whale sharks, and predatory fishes such as jack, tuna, and rays. Deep-water corals also are in the GOM. Two of the most common reef-building deep-water coral genera, *Lophelia* and *Oculina*, occur in the GOM. *Lophelia* communities are scattered along the shelf break and upper continental slope in water depths ranging from 980 feet to more than 1,600 feet. *Oculina* has been documented in the eastern GOM and on oil rigs off the Mississippi Delta. Similar to other areas, deep-water coral communities provide important habitat for many species of invertebrates and fish. The GOM ranks among the highest in environmental sensitivity scores for all planning

areas (see Section 6.2). This is due primarily to sensitive seafloor habitats, such as deep-water coral, that do not always recover quickly from disturbance. The GOM also has high relative sensitivity scores for birds, fish, marine mammals, and sea turtles.

A number of species in the GOM are listed as threatened or endangered under the ESA, including:

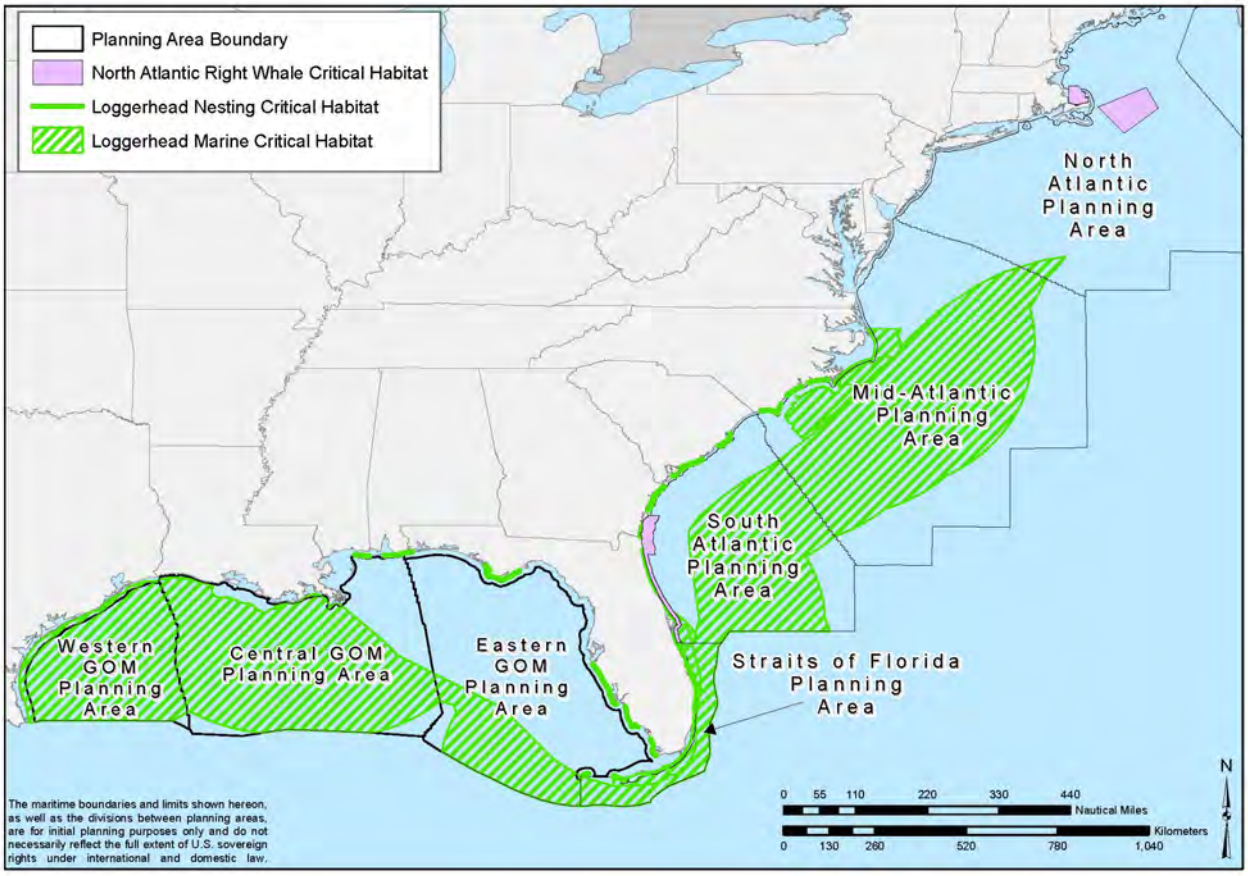
- two marine mammal species (sperm whale [e] and West Indian manatee [e]);
- all five sea turtle species (leatherback [e], green [e/t], hawksbill [e], Kemp's ridley [e], and loggerhead [t]);
- ten bird species (Audubon's crested caracara [t], Bachman's warbler [e], Cape Sable seaside sparrow [e], Eskimo curlew [e], least tern [e], piping plover [t], roseate tern [t], whooping crane [e], Mississippi sandhill crane [e], and wood stork [t]);
- three fish species (Alabama sturgeon [e], Gulf sturgeon [t], and smalltooth sawfish [e]; and
- five coral species (elkhorn [t], *Mycetophyllia ferox* [t], and three species of *Orbicella* star corals [t]).

Critical habitat is designated in the GOM for loggerhead turtles (see Figure 6-4), Gulf sturgeon, smalltooth sawfish, and piping plover.

An enormous amount of human use of marine resources exists in the GOM. The coastal population of the Gulf States is expected to reach 61.4 million by 2025 (USEPA 2014). Commercial, recreational, and charter fisheries are very valuable. Tourism, including fishing and scuba diving, are also quite important. Offshore oil and gas exploration, development, and production are a long-standing industry in the GOM and contribute greatly to the culture and economy of the region. Other uses of the OCS are discussed in detail in Section 4.7.

Onshore and offshore activities contribute to degraded water and air quality. The agricultural runoff that enters the GOM from the Mississippi River creates a large area of low oxygen (hypoxic) conditions in shelf waters during most summers that can contribute to unfavorable conditions for marine life. High levels of nutrient run-off are also associated with the development of harmful algal blooms ("red tides") that occur when colonies of algae grow out of control; these algae produce toxins that kill fish, make shellfish dangerous to eat, and make it unsafe to enter the water.

Figure 6-4: North Atlantic Right Whale and Loggerhead Turtle Critical Habitat



6.1.4 Atlantic

The Atlantic OCS Region includes the North Atlantic, Mid-Atlantic, South Atlantic, and Straits of Florida Planning Areas (see Figure 1-1). Atlantic OCS waters stretch from the U.S.-Canada border in the north to southern Florida. Two distinct ecological regions exist along the U.S. Atlantic OCS: the Northeast U.S. Continental Shelf ("northeast") and the Southeast U.S. Continental Shelf ("southeast"). The northeast extends from the U.S.-Canada border to Cape Hatteras, North Carolina, and includes the North Atlantic and half of the Mid-Atlantic Planning Areas; the southeast extends from Cape Hatteras to southern Florida and includes the southern half of the Mid-Atlantic Planning Area, the South Atlantic Planning Area, and the Straits of Florida Planning Area. The northeast and southeast ecological regions are divided further into the northeast United States, north of Cape Cod, Massachusetts; the Mid-Atlantic Bight (MAB), which extends from Cape Cod to Cape Hatteras, North Carolina; and the South Atlantic Bight (SAB), which extends from Cape Hatteras to Cape Canaveral, Florida. The water temperature, substrate type, and distribution of marine mammals, sea turtles, birds, fish, invertebrates, and habitats vary dramatically from north to south along the U.S. Atlantic coast.

The continental shelf of the U.S. Atlantic seaboard varies dramatically in width. In the North Atlantic Planning Area, the shelf extends out approximately 250 miles into the Gulf of Maine and narrows to less than 80 miles off Cape May, New Jersey. From there, the shelf narrows to

its minimum extent of approximately 20 miles wide off Cape Hatteras, North Carolina, before broadening again in the South Atlantic Planning Area. The U.S. Atlantic continental shelf reaches its maximum extent of approximately 280 miles wide offshore southern Georgia.

The most important oceanographic feature of the Atlantic OCS is the Gulf Stream. The Gulf Stream is a warm-water current that flows northward along the east coast of Florida and then continues parallel to the southeast coast of the United States. It comes nearest to the U.S. Atlantic coast just offshore Cape Hatteras. From there, it turns northeast and flows into the central North Atlantic. The Gulf Stream is a dynamic area of higher productivity, and it has a strong influence on the distribution of species off of the mid-Atlantic coast. The Atlantic planning areas rank relatively low in NPP, with the exception of the North Atlantic Planning Area. The Mid-Atlantic and Straits of Florida Planning Areas are ranked as 23rd and 24th, respectively. The South Atlantic Planning Area is ranked 18th. However, the North Atlantic Planning Area has high NPP, ranking 2nd out of all the planning areas (see Figure 6-6).

Marine mammals are common throughout the U.S. Atlantic OCS waters. Certain species, such as the North Atlantic right whale and humpback whale, undergo well-defined seasonal migrations from northern to southern latitudes, although not all individuals participate. The species composition in a given area may also vary by season. Beaked whales are almost always encountered in very deep waters offshore, whereas species like the fin and minke whale may be encountered very near shore as well as offshore. Pinniped species on the Atlantic OCS waters include wide-ranging ice seal species, such as harp, hooded, and ringed seals. Harbor seals and gray seals make smaller seasonal movements along the U.S. North and Mid-Atlantic coasts. While the majority of the marine mammal species that may occur in the Atlantic OCS could be found in most or all of the planning areas, there are species that are expected to occur mainly in the northern portions of the OCS (e.g., white-sided dolphins) or mainly in the southern portions of the OCS (e.g., West Indian manatee, Fraser's dolphin).

Five sea turtle species occur in U.S. Atlantic waters: the leatherback (e), loggerhead (t), Kemp's ridley (e), hawksbill (e), and green (e/t). Leatherback, loggerhead, and green turtles are found more commonly within the Atlantic OCS planning areas at certain periods (e.g., nesting season) and life stages. Kemp's ridley and hawksbill turtles are less common in Atlantic OCS waters. Green, leatherback, and loggerhead turtles use coastal beaches along the U.S. southeast Atlantic coast as nesting sites, primarily in Florida. Most sea turtle species make deliberate movements along the Atlantic coast, seasonally and between nesting events.

Numerous marine and coastal bird species are present throughout Atlantic OCS waters, including resident and migratory species. These include seabirds, waterfowl, and shorebirds. Seabirds are species that search for and feed on prey in the open water. Many of these species occur within and along the edges of the Gulf Stream. Waterfowl such as the tufted and long-tailed ducks typically form large flocks and rest in large groups on the sea surface. Shorebirds, including sandpipers, plovers, and stilts, utilize coastal environments for nesting, feeding, and resting. Many bird species, including northern gannet, red knot, and scoters, make long-range seasonal movements.

Fish and invertebrate species are distributed throughout the Atlantic OCS. The U.S. Atlantic OCS supports approximately 700 fish species and over 2,000 species of benthic organisms. The

general diversity of species increases as latitude decreases; there are about half as many species in the Gulf of Maine as in the Mid-Atlantic Bight. There are commercially valuable fisheries for bottom and open-water fishes and invertebrates, including lobster, scallop, schooling fishes such as menhaden and herring, tunas, snapper and grouper, flounder, rockfish, dolphin (mahi-mahi), billfish and sharks.

In the northeast, soft bottom habitat is distributed throughout the continental shelf; the seafloor consists predominantly of soft sediments, mostly sands, but grading to silt and clay in deeper areas. Hard bottom habitats are distributed sparsely over the northeast shelf and into the mid-Atlantic and are composed of bare rock, gravel, shell hash, and artificial reefs. Hard bottom includes "live" bottom habitat, which includes a variety of invertebrates that are fastened to rock or other bare areas of the seafloor. Extensive areas of live bottom are on the southeast U.S. continental shelf. In deeper water, hard bottom habitats are associated with canyon walls in the Mid-Atlantic. Deep-water corals occur in many areas of the Atlantic OCS, particularly the South Atlantic and Straits of Florida Planning Areas. The Mid-Atlantic and South Atlantic and Straits of Florida Planning Areas rank among the highest relative environmental sensitivity scores of all the planning areas (see Section 6.2). The southeast has the highest scores for marine mammals and sea turtles and above average scores for fish species (see Section 6.2).

Several species in and near the Atlantic OCS are listed as threatened or endangered under the ESA, including:

- seven marine mammal species (North Atlantic right [e], blue [e], fin [e], sei [e], humpback [e], and sperm [e] whales and the West Indian manatee [e]);
- all five sea turtle species (leatherback [e], loggerhead [t], Kemp's ridley [e], hawksbill [e], and green [e]);
- three bird species (piping plover [t], roseate tern [t/e], and Bermuda petrel [e]);
- seven species of coral (elkhorn [t], staghorn [t], *Mycetophyllia ferox* [t], *Dendrogyra cylindrus* [t]; three species of *Orbicella* star corals [t]); and
- one plant species (Johnson's seagrass [t]).

Designated critical habitat exists in the Atlantic OCS for the North Atlantic right whale and loggerhead sea turtle (see Figure 6-4), as well as for elkhorn and staghorn coral and Johnson's seagrass.

A number of state and federally protected areas exist in proximity to the Atlantic OCS. These include:

- four NMSs (Stellwagen Bank [Massachusetts], Monitor [North Carolina], Gray's Reef [Georgia], and Florida Keys [Florida]); and
- nine NPs or NSs: Acadia NP (Maine), Cape Cod NS (Massachusetts), Fire Island NS (New York), Assateague Island NS (Maryland/Virginia), Cape Hatteras NS and Cape Lookout NS (North Carolina), Cumberland Island NS (Georgia), and Canaveral NS and Biscayne NP (Florida).

The U.S. Atlantic coastal counties were home to 41.5 million people as of 2008 (Wilson and Fischetti 2010). As of 2010, more than a third of people in the United States lived in a state with

shoreline on the east coast. The most densely populated areas are in the mid-Atlantic and northeast from Washington, D.C., to Boston, Massachusetts; the southeast coast is also heavily populated, particularly around metropolitan areas. Many recreational activities and commercial industries along the Atlantic coast are marine-based. There are numerous commercial fisheries throughout Atlantic OCS waters. Recreational boating and fishing are popular along the Atlantic coast. Other uses of the OCS are discussed in detail in Section 4.7.

BOEM received numerous comments regarding environmental concerns about oil and gas leasing activities in the Atlantic planning areas; these comments are summarized in Appendix A. Most comments related to the sensitivity of habitats in the coastal and nearshore environments and concerns about impacts to those resources and the people that rely on them. Some comments related specifically to concerns about the North Atlantic right whale and some included recommendations for regional baseline studies of benthic habitats and marine mammals.

6.2 Environmental Sensitivity and Marine Productivity

6.2.1 Summary of Methodology and Results

BOEM is required to consider the relative environmental sensitivity and marine productivity of the OCS per Section 18(2)(G) of the OCS Lands Act when making decisions regarding exploration and development. In this DPP, BOEM has built upon previous assessments of these two environmental considerations, utilizing an improved model to analyze relative environmental sensitivity and taking advantage of technological advancements to estimate productivity. The marine productivity and environmental sensitivity 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 they will be further refined throughout the development of the 2017–2022 Program.

The current approach to relative environmental sensitivity accounts for 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). The OCS was divided into nine BOEM ecoregions based on distinguishing physical and ecological characteristics and incorporated all 26 planning areas. The vulnerability and resilience of representative species and habitats to a suite of impacts within each BOEM ecoregion was determined using best-available scientific data and a purpose-built model (Niedoroda et al. 2013). The habitats examined span the scope of BOEM's jurisdiction, and potential impacts include those possible from the shoreline to the edge of the continental shelf. Bird, invertebrate, fish, mammal, and turtle species were selected on the criteria of conservation importance, ecological role, and fisheries importance. NOAA's ESI for shorelines also was incorporated into the model (NOAA 1995, NOAA 2002). To account for impact-independent stressors, a climate change index was applied to the baseline sensitivity scores based on the expected impacts of climate change and increased carbon dioxide concentrations. The potential impacts of proposed activities on the OCS must be considered carefully using data-driven, geospatially-focused analyses. Combined scores for each BOEM ecoregion were obtained and applied to the corresponding planning areas.

The total range in sensitivity was small (15.2–19.8), indicating similar sensitivities across the OCS. The Central and Western GOM Planning Areas had the highest sensitivity scores, while the Northern, Central, and Southern California and the Washington/Oregon Planning Areas had the lowest sensitivity scores (see Figure 6-5). The drivers of the sensitivity scores vary from ecoregion to ecoregion.

In addition to strengthening the environmental sensitivity approach, BOEM has obtained updated estimates of marine productivity for this Program. Primary productivity estimates for all 26 planning areas 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 NPP. NPP is highly variable on the OCS, ranging from 30 metric tons of carbon per square kilometer per year (t C km^{-2} yr^{-1}) to more than 400 t C km^{-2} yr^{-1}. Areas with the highest areal rates of NPP are ranked the highest (see Figure 6-6), since a potential impact on primary producers would have the greatest effect on the amount of energy available to higher trophic levels in that area (i.e., the amount of biomass that area could potentially support). The most productive planning area is Cook Inlet, followed by the North Atlantic and Norton Basin. The Arctic planning areas are the least productive, due largely to long periods of low light availability.

There is no clear relationship between environmental sensitivity and NPP (see Table 6-3). Subsequent analyses conducted during the PP phase will explore how these two factors might influence each other and how the two analyses can be assessed to better support decision-making processes.

Figure 6-5: Aggregated Sensitivity Scores for Habitats, Species, and Climate Change

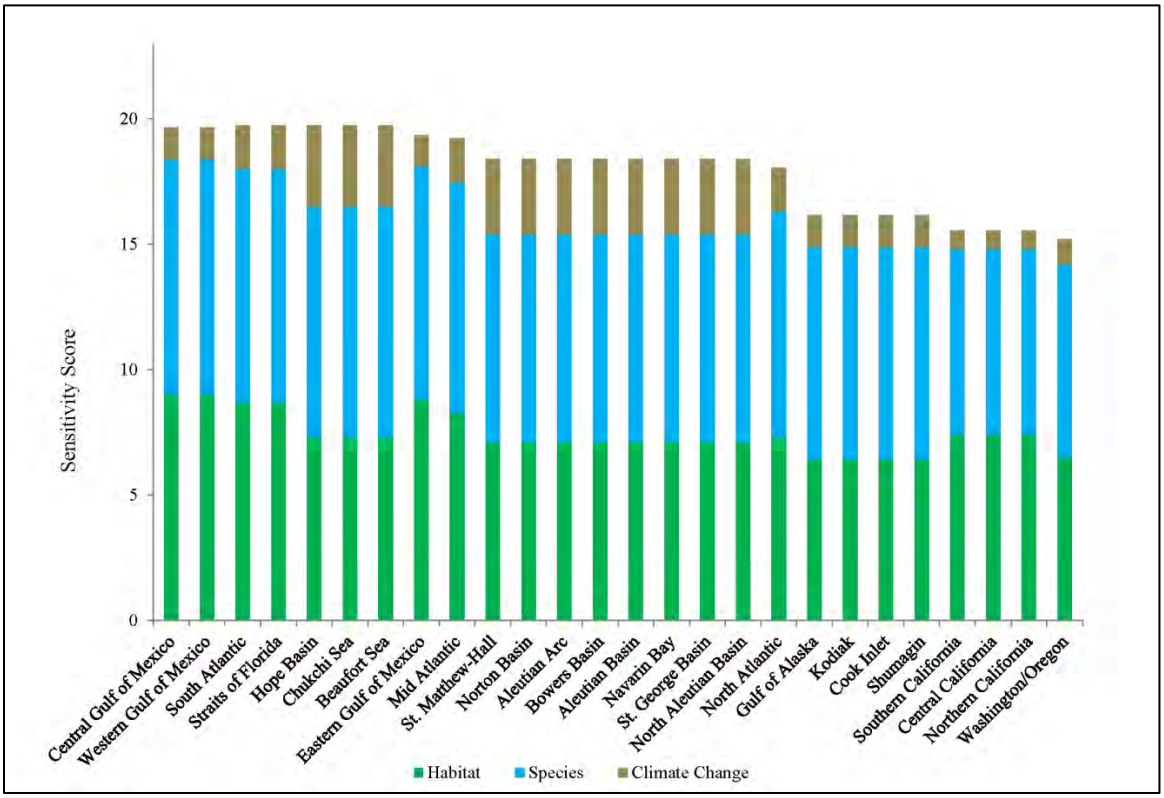
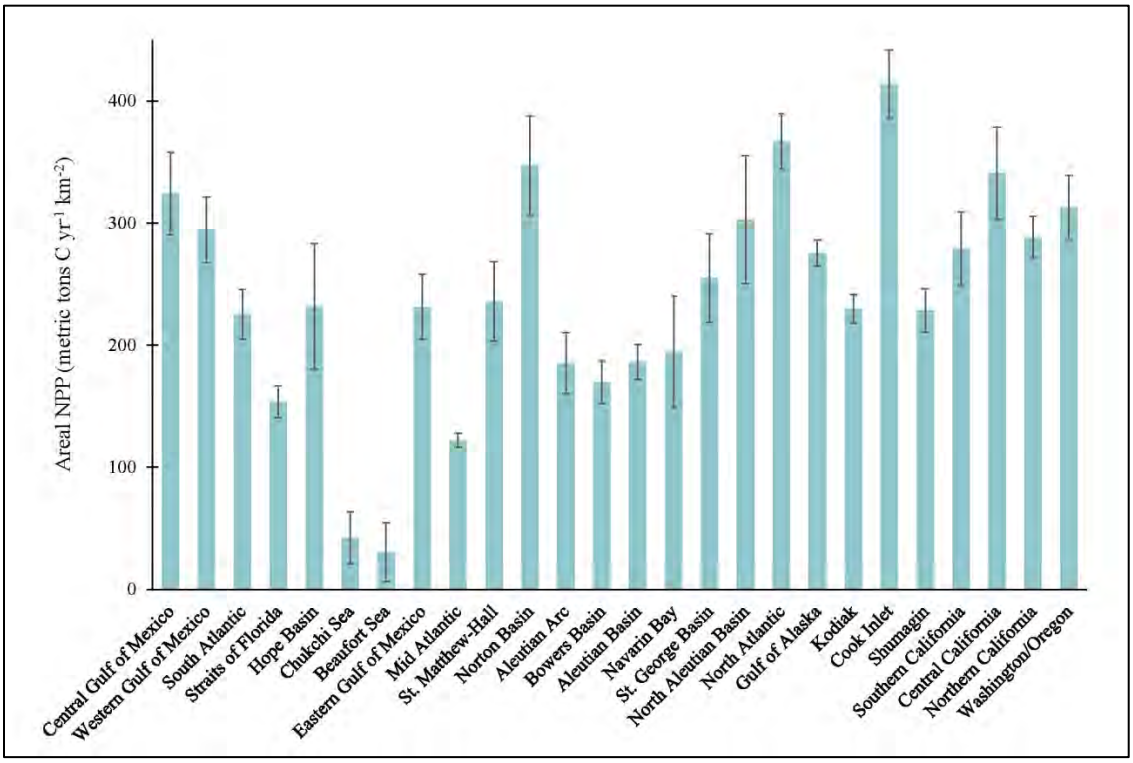


Figure 6-6: Marine Annual Net Primary Productivity



Note: Values represent the mean and the standard deviation of 12 annual values for the 1998–2009 period, standardized per unit area.

Table 6-3: Environmental Sensitivity Scores and Net Primary Productivity Rates

Planning Area	Environmental Sensitivity Score	Areal NPP (metric tons C yr^{-1} km^{-2})
Central GOM	19.8	324.2 ± 34.0
Western GOM	19.8	294.4 ± 27.1
South Atlantic	19.8	225.5 ± 20.2
Straits of Florida	19.8	153.5 ± 13.1
Hope Basin	19.8	231.5 ± 51.5
Chukchi Sea	19.8	42.0 ± 21.4
Beaufort Sea	19.8	30.5 ± 24.1
Eastern GOM	19.5	231.3 ± 26.7
Mid-Atlantic	19.2	122.2 ± 5.7
St. Matthew-Hall	18.4	235.9 ± 32.6
Norton Basin	18.4	347.2 ± 40.8
Aleutian Arc	18.4	185.1 ± 24.9
Bowers Basin	18.4	169.5 ± 17.5
Aleutian Basin	18.4	186.1 ± 14.3
Navarin Basin	18.4	194.3 ± 45.5
St. George Basin	18.4	254.7 ± 36.3
North Aleutian Basin	18.4	302.5 ± 52.5
North Atlantic	18.1	366.7 ± 22.8
Gulf of Alaska	16.1	275.5 ± 10.6
Kodiak	16.1	229.7 ± 11.6
Cook Inlet	16.1	413.5 ± 28.1
Shumagin	16.1	228.2 ± 17.6
Southern California	15.6	279.0 ± 30.4
Central California	15.6	340.7 ± 37.9
Northern California	15.6	288.3 ± 17.3
Washington/Oregon	15.2	312.8 ± 25.9

Key: Metric tons C yr^{-1} km^{-2}=metric tons of carbon per year per squared kilometer, NPP=net primary productivity.

6.2.2 Relative Environmental Sensitivity

6.2.2.1 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 NOAA's 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: (1) coastal habitats, (2) marine habitats, (3) marine fauna, and (4) marine primary productivity.

Building upon this expanded analysis, the approach outlined here incorporates not only the sensitivity of the OCS but also accounts for its "resilience," which is the ability of the habitats and species of the OCS 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.

6.2.2.2 Methods

This analysis of relative environmental sensitivity builds upon earlier methods. This approach 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. This 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 it weighs all species and habitats equally. It also allows unbiased comparison of geographic areas of differing size. See Niedoroda et al. (2013) for a full description of the methodology.

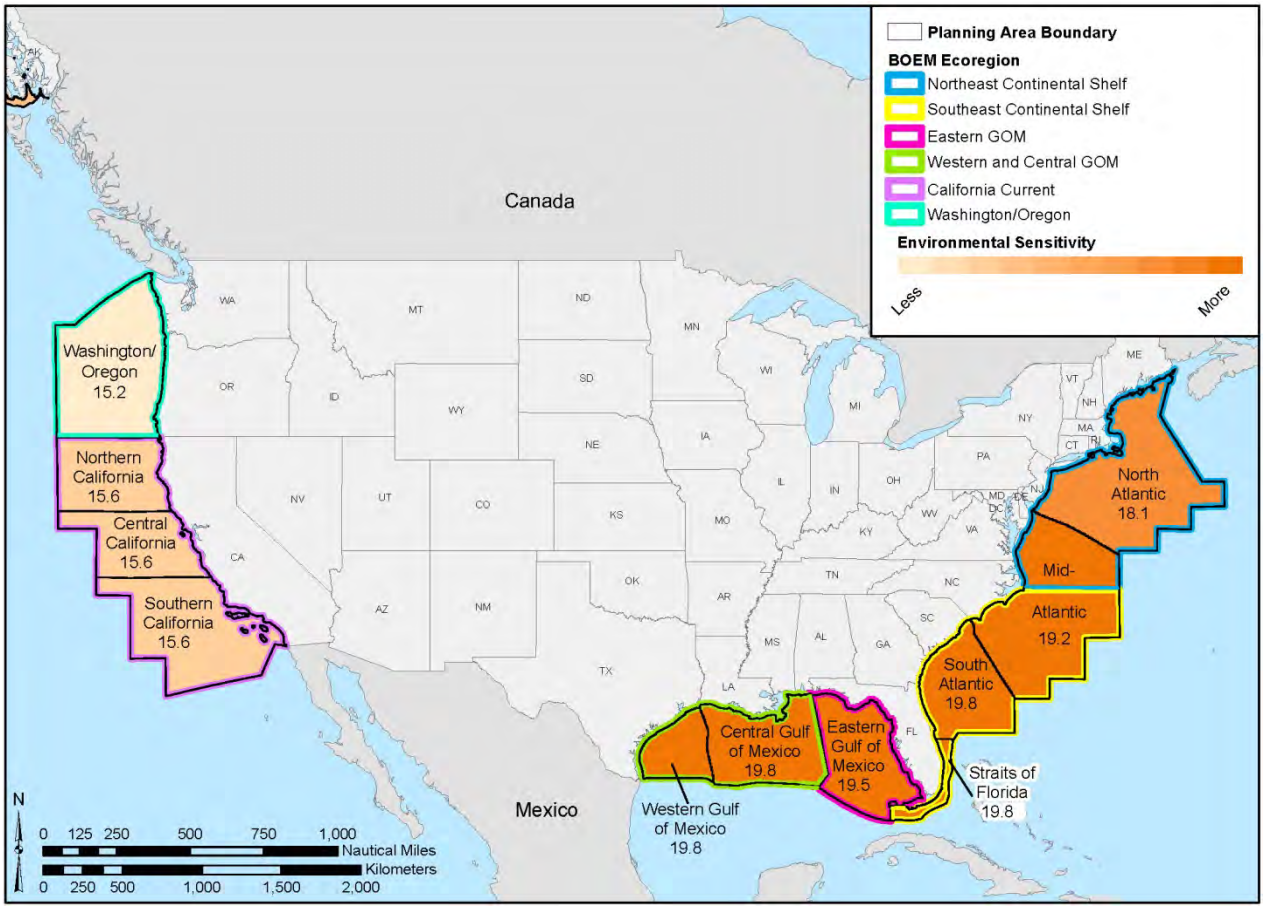
Geographic Scope

BOEM's planning areas are administratively constructed designations that do not necessarily correspond to ecosystem boundaries. For the analysis of environmental sensitivity, an ecosystem-based approach was used. The OCS was divided into nine regions, referred to here as BOEM ecoregions, which incorporate BOEM's 26 planning areas (see Figure 6-7 and Figure 6-8). The boundary designations of 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 the species composition, and oceanographic features (Spalding et al. 2007, Wilkinson et al. 2009). LME boundaries are based on bathymetry, hydrography, productivity, and trophic relationships. BOEM ecoregions of this analysis account for the distinct physical and ecological characteristics of the various OCS regions while simultaneously meeting BOEM's mission needs.

The seaward extent of the BOEM ecoregions used in this analysis is largely governed by the U.S. EEZ and BOEM planning 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. (2013) 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 (Wilkinson et al. 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. The majority of the BOEM ecoregions encompass more than one planning area (see Figure 6-7 and Figure 6-8). It is assumed that planning areas within the same BOEM ecoregion share the same

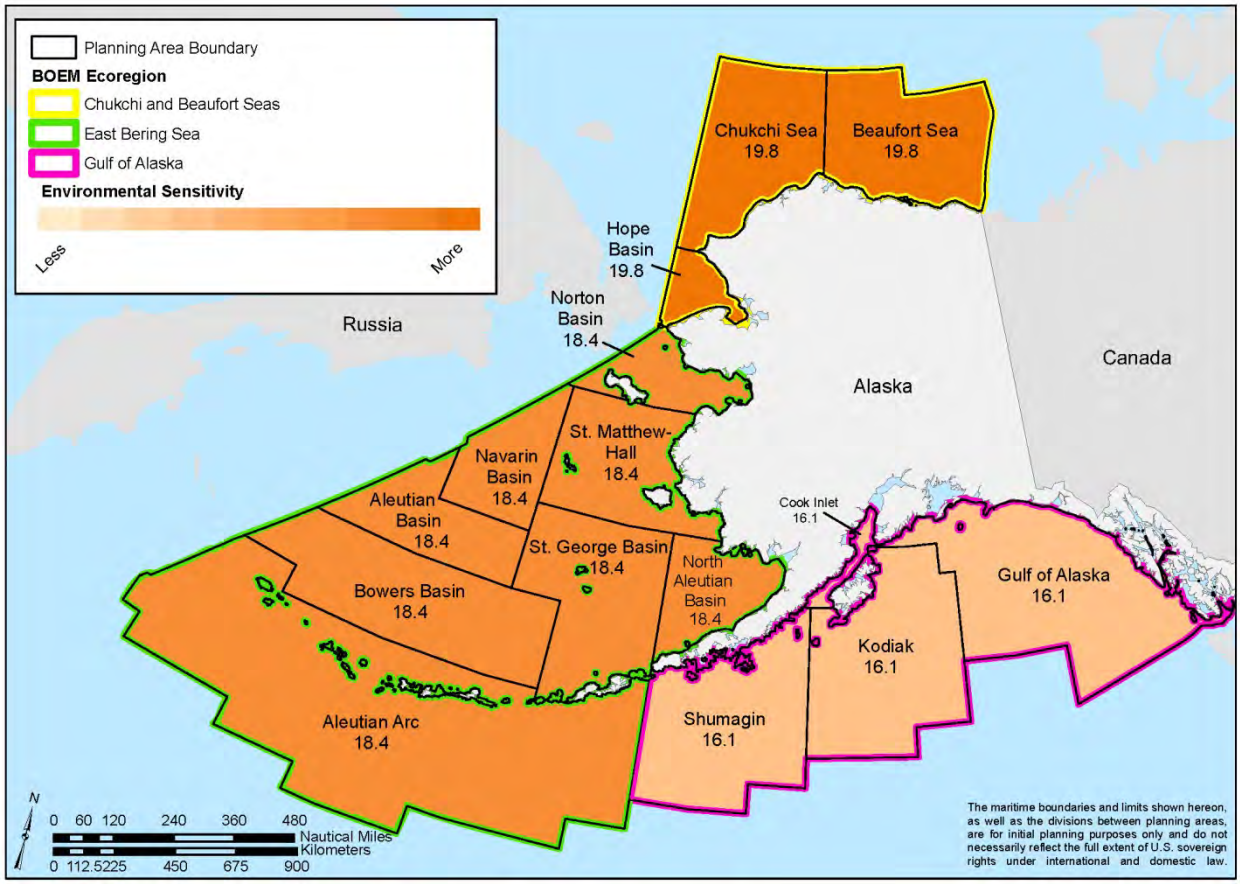
environmental vulnerability and resilience to potential impacts from oil and gas exploration and development. Thus, the same sensitivity score was assigned to all planning areas within each BOEM ecoregion. The one exception was the Mid-Atlantic planning area, which was divided across two BOEM Ecoregions (the Southeast Continental Shelf and Northeast Continental Shelf). The Mid-Atlantic's score was calculated as the area-weighted average of these two ecoregions (see below for details).

Figure 6-7: Relative Environmental Sensitivity Scores of Lower 48 States Planning Areas



Note: The Mid-Atlantic is split between two BOEM ecoregions: the Southeast and Northeast Continental Shelf ecoregions.

Figure 6-8: Relative Environmental Sensitivity Scores of the Alaska Planning Areas



While analysis of each planning area is possible within the ecoregions analysis, the model relies upon available data for each BOEM ecoregion. It is difficult to assess ecological distinctions between neighboring planning areas, as the range of organisms and habitats is not defined by planning area boundaries. Scientific studies typically are not designed around BOEM's planning areas. Rather, the bulk of the scientific information available for this analysis was ecosystem-based or focused on individual faunal groups and their ecologies. For example, the annual migration of humpback whales typically traverses thousands of miles and therefore crosses multiple planning area borders. Moreover, the model relies upon existing data. Some areas of the OCS are more extensively studied than others, and therefore an imbalance exists in the amount and spatial scale of available data. Thus, few regions of the OCS have data available on a planning area scale. 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 with areas that allowed for sufficient data availability for model input.

The sensitivity scores of this analysis are based on the vulnerability and sensitivity of the species and habitats within each unit of analysis. 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. As BOEM progresses with formulation of the 2017–2022 Program, the

areas included for analysis will be re-examined for consistency with the composition of their associated regions under consideration during the various phases of program development. The selection of species and habitats within these areas of analysis also will be re-evaluated at later program stages. 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-Artic climate and considerable ice cover throughout most of the year. This ecoregion spans two LMEs: the Chukchi Sea and the Beaufort Sea. The Chukchi Sea covers a broad shelf, and water depths are mostly 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 (Wilkinson et al. 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 the 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 ecoregions are roughly equivalent for the model's purposes and were therefore analyzed together. For more environmental information on BOEM's planning areas, see Section 6.1.

The East Bering Sea BOEM ecoregion is comprised of the portion of the East Bering Sea LME that lies within the United States. The ecoregion has a broad shelf and seasonal ice cover. The Eastern Bering Sea LME supports the world's largest pollock fishery. Other commercially valuable species include halibut, herring, capelin, Pacific cod, skate, flounder, Greenland turbot, sole, and crab (The Encyclopedia of Earth 2014, NOAA 2014a, NOAA 2014d). This region is nourished by nutrient-rich deep bottom water that originated in the Antarctic Ocean, which flows along the seafloor the length of the Pacific Ocean to the continental shelf seaward of the Aleutian Island chain. From there it flows up onto the Bering Sea continental shelf via a series of submarine canyons, making it a very productive benthic marine ecosystem.

The Gulf of Alaska BOEM ecoregion lies entirely within the U.S. waters of the Gulf of Alaska LME. The Alaska Peninsula bisects the East Bering Sea LME and the Gulf of Alaska BOEM ecoregion. The Alaska Current flows from east to west along this portion of the OCS. This sub-Arctic LME typically has little to no ice cover, as the Alaskan Peninsula separates the Gulf of Alaska from the influence of the cold Arctic currents. The Gulf of Alaska LME supports several commercially important fisheries, such as crab, shrimp, pollock, Pacific cod, mackerel, sockeye salmon, pink salmon, and halibut (NOAA 2014b, NOAA 2014f). Seasonal inhabitants of this BOEM ecoregion include many species of seabirds, whales, fur seals, and the Steller sea lion (NOAA 2014d).

The U.S. west coast is divided into two BOEM ecoregions: the California Current and Washington/Oregon. These two ecoregions comprise the California Current LME, a temperate LME characterized by coastal upwelling. This upwelling brings nutrient-rich bottom waters to the surface and supports many productive fisheries, as well as large marine mammal and seabird populations (NOAA 2014b). The major commercial fish species are Pacific salmon, sardine, anchovy, mackerel, herring, and halibut (NOAA 2014b). This LME is named after the current of the same name that moves southward along the western coast of North America from British Columbia to Baja, California.

The Washington/Oregon BOEM ecoregion was considered separately from the rest of the California Current BOEM ecoregion due to biological and physical differences. The Washington/Oregon ecoregion lies on the Juan de Fuca tectonic plate. This area north of the Mendocino Escarpment is shallower than the seafloor of the Pacific plate to the south. The seafloor has multiple seamounts that support a large number of unique species and habitats, such as hydrothermal vents. Submarine canyons in this ecoregion establish upwelling conditions that drive high levels of biologic productivity. The Washington/Oregon BOEM ecoregion is part of the Columbian Pacific ecoregion, which houses the greatest oyster and clam production in North America, as well as resident populations of the endangered killer whale (Wilkinson et al. 2009).

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 analysis, the GOM was divided into the Eastern GOM and the Western and Central GOM along the Eastern and Central GOM Planning Area boundary. This boundary is not only administrative; there are several physical and biological justifications for this division. The line between these two ecoregions follows the De Soto Canyon off the coast of Alabama and traces the eastern edge of the Loop Current, which effectively divides the GOM. The northern edge of the boundary marks the westward edge of the West Florida Escarpment (part of the wide continental shelf along the eastern boundary of the GOM). Although the two GOM BOEM ecoregions share similar habitat and species assemblages, there are some key differences. The western BOEM ecoregion of the GOM contains the Flower Garden Banks NMS. While the Flower Garden Banks NMS is the only sanctuary site in the GOM (NOAA 2014c), the outer edge of the western and central GOM continental shelf is dotted with numerous topographic features. Each region hosts distinct shrimp populations; brown and white shrimp are more abundant in the western GOM, while royal red shrimp are more abundant in the eastern GOM (NOAA 2014a, NOAA 2014b, NOAA 2014d, NOAA 2014e). The western GOM is home to some of the most important nesting sites for the endangered Kemp's ridley sea turtle. Eastern GOM includes habitat of the Florida manatee, whose U.S. range is primarily centered in coastal Florida (Marine Mammal Commission 2014).

The Mid-Atlantic Planning Area is divided into two BOEM ecoregions, the Northeast Continental Shelf and the Southeast Continental Shelf. These two BOEM ecoregions are based primarily on the two LMEs of the same name. The location of this division is based on the physical oceanographic distinctions, with the primary feature being the two major surface currents of the western Atlantic Ocean: the Gulf Stream and the Labrador Current. The warm Gulf Stream flows along the east coast of the United States from Florida to North Carolina, where it bends northeastward towards deeper water until Newfoundland, Canada. The colder Labrador Current flows southward from the Labrador Sea along the Canadian coast and terminates off the coast of North Carolina (Wilkinson et al. 2009). The Southeast Continental Shelf LME supports a high percentage of commercial fisheries, including shrimp, herring, sardines, anchovies, blue crab, and oysters (NMFS 2009, NOAA 2014a). The Northeast Continental Shelf is a highly productive, temperate LME. It supports a number of commercial fisheries, including groundfish, flounder, mackerel, herring, haddock, lobster, and scallop. The sensitivity score of the Mid-Atlantic Planning Area was calculated by averaging the scores of the

Northeast and Southeast Continental Shelf BOEM ecoregions and weighted by the percentage of the Mid-Atlantic Planning Area in each ecoregion. Using geographic information system (GIS) software, this percentage was calculated as 68.7 percent within the Southeast Continental Shelf ecoregion and 31.3 percent within the Northeast Continental Shelf ecoregion.

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 to 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.

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. 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 species in each of the categories was determined according to a balance between providing adequate representation while maintaining a practical level of effect in sensitivity assessments and impact scoring. For details on the selection process for species and the data supporting these selections, see Niedoroda et al. (2013).

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. 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.

The environmental sensitivity of the selected species and habitats was assessed with respect to impacts of BOEM-regulated activities occurring on the OCS. This assessment was based on the quantification of the species' and habitats' vulnerability and resilience to BOEM-regulated 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.

Impact-independent Modifiers

The model was designed to accommodate the consideration of impact-independent modifiers (e.g., climate change, productivity, and unregulated impacts). These modifiers were included as scaling factors, which were applied to the final sensitivity scores. A climate change vulnerability score was included as an additive impact-independent modifier. Using a similar approach for the 2017–2022 Program, 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, coastal erosion and land loss, 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 6-4). 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 0-4. This scale was chosen to allow an appropriate weight for impact-independent factors in the final environmental sensitivity score. This inclusion of climate change impacts is similar to the approach used in Niedoroda et al. (2013) but scores potential impacts slightly differently based on additional factors identified as significant by BOEM through review of relevant literature.

Relative environmental sensitivity scores were calculated for each habitat and species selected for each of the nine BOEM ecoregions. 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 (see Figure 6-9). No theoretical maximum sensitivity score is possible for an 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 6-4: Anticipated Climate Change Effects on Environmental Sensitivity for BOEM Ecoregions

Ecoregion	Increased Ocean Temperature	Sea Ice Melt & Freshwater Influx	Permafrost Thaw	Ocean Acidification/ Upwelling Effects	Sea Level Rise & Saltwater Intrusion	Increased Storm Activity	Coastal Erosion & Land Loss	Changes in Species Composition	Total*
Chukchi/Beaufort Sea	2	2	2	2	1	1	2	1	13
East Bering Sea	2	2	2	2	0	1	2	1	12
Gulf of Alaska	1	1	0	1	0	1	0	1	5
Washington/Oregon	1	0	0	1	1	0	0	1	4
California Current	1	0	0	1	0	0	0	1	3
Western and Central GOM	1	0	0	0	1	1	1	1	5
Eastern GOM	1	0	0	0	1	1	1	1	5
Northeast U.S. Continental Shelf	1	0	0	1	2	1	1	1	7
Southeast U.S. Continental Shelf	1	0	0	1	2	1	1	1	7

*Total climate change score prior to conversion to a climate change index with maximum score of four.

Note: Scores were assigned based on a scale of 0–2 and then summed for all anticipated effects. A score of 0 was given to ecoregions in which little to no effect was expected, a score of 1 to 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.

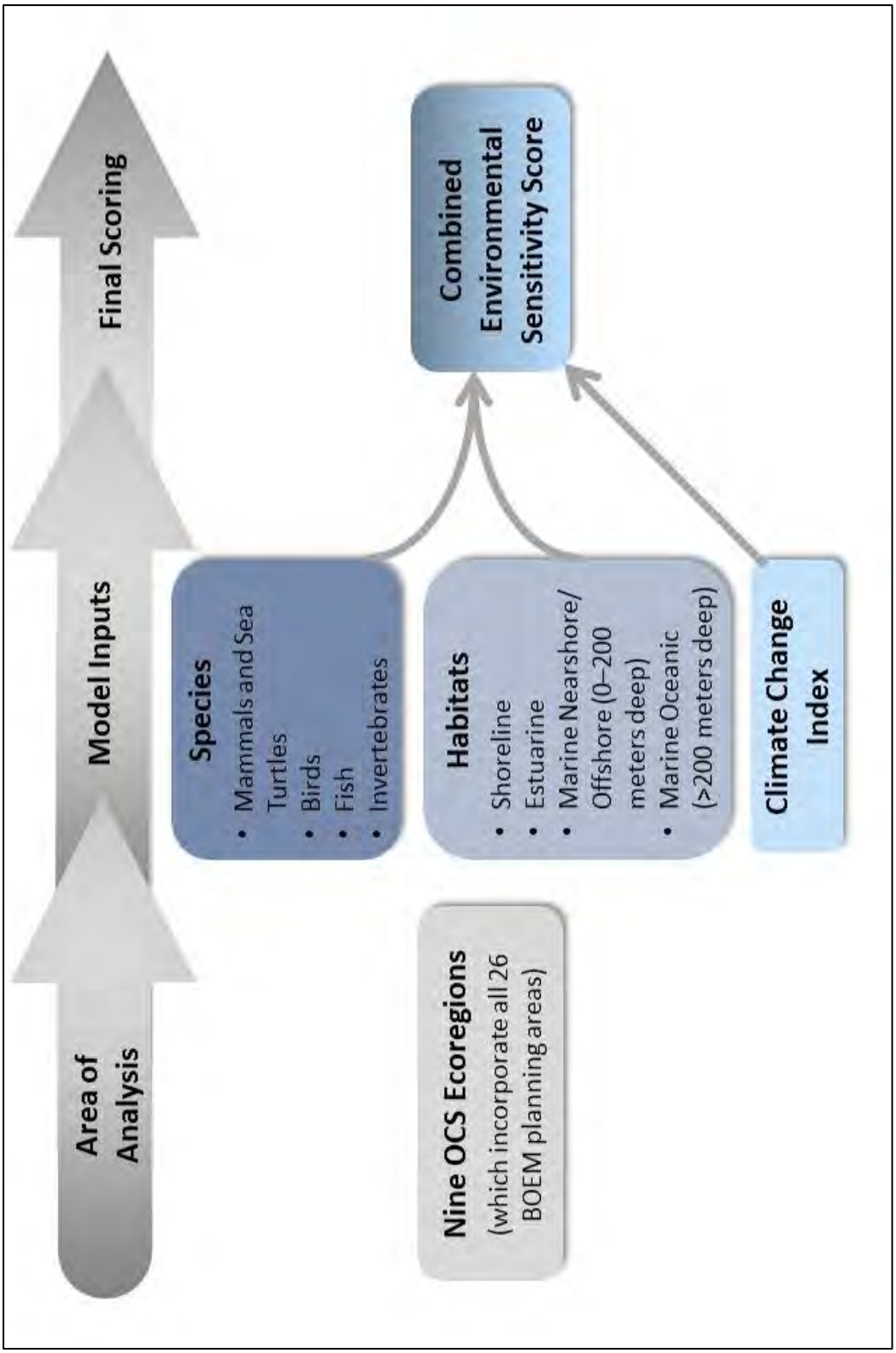


Figure 6-9: Environmental Sensitivity Index Methodology

6.2.2.3 Results and Discussion

The environmental sensitivity scores range from 15.2 to 19.8 (see Figure 6-7 and Figure 6-8). These scores are unitless and serve as an index of environmental sensitivity. The planning areas with the highest sensitivity scores are within the Western and Central GOM and Southeast Continental Shelf ecoregions. The lowest scoring regions are within the California Current and the Washington/Oregon ecoregions.

The small range in sensitivity scoring demonstrates that all planning areas are sensitive to oil and gas activities—some are just more so than others. What drives this sensitivity differs from ecoregion to ecoregion based on varying species and habitat sensitivities. For example, both GOM ecoregions have the highest habitat scores of all the ecoregions. This high score is primarily driven by the high sensitivities of the benthic marine habitats, which contain deep-water coral and seep habitats that are extremely sensitive to disturbance (Roberts et al. 2006, Ramirez-Llodra et al. 2011). The high species scores also contributed to the overall higher sensitivity of the GOM planning areas. Both of the GOM ecoregions had higher than average scores for birds, fish, mammals, and sea turtles.

BOEM ecoregions with higher environmental sensitivity scores include the Chukchi and Beaufort Seas and Southeast Continental Shelf ecoregions. The Chukchi and Beaufort Seas ecoregion had the highest bird and invertebrate scores, which, in addition to its high climate change index, drove the high sensitivity scores in these planning areas. The Southeast Continental Shelf ecoregion also had a comparatively higher sensitivity score. This ecoregion had the highest species score for mammals and turtles, as well as a fish score that was above the ecoregions' average. This ecoregion houses several highly sensitive species, including the endangered Florida manatee, which has slow reproductive rates, and the endangered Atlantic Sturgeon, which has endemic subpopulations in the ecoregion.

The Gulf of Alaska and Washington/Oregon ecoregions had the lowest habitat scores. The Gulf of Alaska had the lowest ESI, and all other habitat scores for the Gulf of Alaska, and the marine habitats of the Washington/Oregon ecoregion had lower than average scores. The California Current had the lowest species scores of all the ecoregions. This ecoregion had the lowest scores in the mammals and turtles category, as well as below average scores for fish and invertebrates. The low climate change indices of the Washington/Oregon and California Current ecoregions also contributed to their relatively low sensitivity scores.

The relatively small differences in environmental sensitivity suggest that differentiation among the 26 planning areas 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 the OCS. This sensitivity analysis highlights many aspects of environmental sensitivity for the habitats and species under BOEM's jurisdiction. This model is driven by the best-available scientific information at the 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. Regions should be treated independently with a full understanding of the species present, their distributions, their habitat needs, and therefore, the individual sensitivity to potential oil and gas activities.

BOEM will continue to refine the methodology, habitat and species selection criteria, and analysis given stakeholder input and as additional information becomes available.

6.2.3 Marine Productivity

6.2.3.1 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 thus 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, and it 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.

6.2.3.2 Methods

In 1991, BOEM (then MMS), by way of Continental Shelf Associates, 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 here, 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 planning 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 (e.g., within ocean gyres) down to several meters (e.g., within eutrophic coastal waters). For more a more detailed discussion of methods, see Balcom et al. (2011).

6.2.3.3 Results and Discussion

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). Productivity ranged from 30.5 (Beaufort Sea) to 413.5 (Cook Inlet) t C km^{-2} yr^{-1} (see Figure 6-6). Regional trends are detailed below:

- **Alaska Region:** High NPP variability existed in the Alaska Region, which housed both the highest and the lowest rates of NPP on the OCS. 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. For example, the presence of turbid coastal waters may adversely affect remote sensing measurements (i.e., chlorophyll-a concentrations can be significantly overestimated [>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).

- **Pacific Region:** In general, the Pacific Region exhibited the highest annual primary productivity per acre: > 300 t C km^{-2} yr^{-1} for all four planning areas. Within the region, the highest annual NPP was evident in the Central California Planning Area; the lowest NPP was found in the Southern California Planning Area.

- **GOM Region:** The GOM exhibited high annual primary productivity per acre: 283 t C km^{-2} yr^{-1} for all three planning areas. The highest annual NPP was evident in the Central GOM; lowest NPP was found in the Eastern GOM Planning Area.

- **Atlantic Region:** The NPP within the Atlantic region was highly variable, with an average NPP of 217 t C km^{-2} yr^{-1}. The North Atlantic Planning Area housed the highest annual NPP, while the Mid-Atlantic, South Atlantic, and Straits of Florida Planning Areas were much lower.

While calculations are based on the VGPM model, and there are various studies showing the validity of this model in assessing primary productivity in marginal seas and upwelling systems, some degree of uncertainty is expected from the model as applied to all 26 OCS planning areas.

Substantial interannual variability in primary productivity is found in several of the planning areas, with the highest interannual variability evident in the Alaska Region. Ten of the 15 Alaska planning areas exhibited interannual variability greater than 10 percent, all of which are located in high latitudes (i.e., variability due to light limitation). In contrast, most of the

remaining planning areas from the other three regions show low interannual variability (< 10 percent). Low-latitude areas are less sensitive to cloudiness, as long as the cloud cover is not persistent over time.

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 natural 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, and 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 literature-based determinations; 22 of the 26 OCS planning areas exhibited similar productivity estimates, based on minimal-maximal ranges. Given the completely different assessment and, therefore, independent methods between the two periods, this similarity provides strong support to the argument that model results (based on satellite data) provide excellent estimates of primary productivity.

Within the 1998–2009 primary productivity dataset, significant variability in primary productivity determinations was evident, particularly in the Alaska Region. 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, including the overestimation of chlorophyll-a concentration from satellite measurements (particularly in the Alaska Region) due to algorithm artifacts in the atmospheric correction and bio-optical inversion; seasonal solar insolation effects are evident (i.e., predominantly in the Alaska Region); and uniform application of the NPP model may be slightly problematic for marginal seas and areas of upwelling.

6.3 Potential Impacts on Environmental Resources

A discussion of the general impact-producing factors (stressors) that may result from oil and gas activities is provided in Chapter 4 of the 2012–2017 Final PEIS (BOEM 2012a). These stressors have the potential to affect the environmental resources (receptors) discussed in Section 6.1. These impacts may range in severity and depend upon numerous factors, including the stressor, receptor, location, time of year, and presence of stressors unassociated with the oil and gas program. Table 6-5 provides a synopsis of the overlap between stressors and receptors in space

and time for each OCS regional area. This relationship between stressor and receptor is applicable to all planning areas within each OCS region.

Table 6-5: Overlap of Potential Stressor–Receptor Relationships

Resource	Region	Noise	Vessel Traffic	Drilling Debris & Discharge	Habitat Disturbance	Air Emissions	Explosives	Infrastructure	Space-use Conflict	Accidental Spills
Air Quality	AK		■			■				■
	PA		■			■				■
	GOM		■			■				■
	ATL		■			■				■
Water Quality	AK		■	■	■		■			■
	PA		■	■	■		■			■
	GOM		■	■	■		■			■
	ATL		■	■	■		■			■
Protected Areas	AK		■						■	■
	PA		■						■	■
	GOM		■						■	■
	ATL		■						■	■
Human Uses	AK	■	■					■	■	■
	PA		■					■	■	■
	GOM		■					■	■	■
	ATL		■					■	■	■
Fish & Fisheries	AK	■	■	■	■		■	■	■	■
	PA	■	■	■	■		■	■	■	■
	GOM	■	■	■	■		■	■	■	■
	ATL	■	■	■	■		■	■	■	■
Coastal and Estuarine Habitats	AK				■					■
	PA				■					■
	GOM				■					■
	ATL				■					■
Marine Benthic Habitats	AK				■		■			■
	PA				■		■			■
	GOM				■		■			■
	ATL				■		■			■
Marine Pelagic Habitats	AK						■	■		■
	PA						■	■		■
	GOM						■	■		■
	ATL						■	■		■

Table 6-6: Overlap of Potential Stressor–Receptor Relationships (Continued)

Invertebrates	AK	■			■			■		■
	PA	■			■			■		■
	GOM	■			■			■		■
	ATL	■			■			■		■
Marine Mammals	AK	■	■	■			■			■
	PA	■	■	■			■			■
	GOM	■	■	■			■			■
	ATL	■	■	■			■			■
Birds	AK	■			■			■		■
	PA	■			■			■		■
	GOM	■			■			■		■
	ATL	■			■			■		■
Sea Turtles	AK									
	PA	■	■	■			■			■
	GOM	■	■	■			■			■
	ATL	■	■	■			■			■

Key: AK=Alaska, PA=Pacific, GOM=Gulf of Mexico, ATL=Atlantic.

The discussion of impacts here is focused largely on the decision to lease certain OCS areas for oil and gas exploration and development. However, a decision to lease or not to lease does not equate to impact or no impact. Environmental impacts may occur from any activity on the OCS, including the placement of renewable energy structures or the transport of internationally sourced oil and gas via tanker to U.S. ports. The decision to lease under the 2017–2022 Program also does not alter existing oil and gas activities on the OCS or the environmental impacts from those activities. Additional analysis of the leasing decision options, including a no action alternative, and their potential environmental impacts will be carried out in the PEIS for this Program (see Section 6.4).

The potential for impacts varies throughout the planning areas. Impacts may be realized in several ways. There may be a direct physical result, such as drilling a hole in the seafloor or a vessel striking a sea turtle. There may be indirect physical results, such as changes over time in the composition of habitats on the seafloor or in the ability of an animal to gather food. There may be impacts that are not easily detected; these can include changes in animal behavior, such as avoiding an area or decreased reproductive capacity within a population. Some impacts occur immediately while others may manifest long after a receptor is exposed to a stressor. Impacts also may vary depending on the environment, both natural and human. For example, the GOM has high levels of existing oil and gas activity from leases issued under previous programs. Living organisms and habitats in this area are exposed to multiple stressors, including oil and gas development, and have been for many years. The ability of these communities to cope with a new stressor may be affected by the presence of existing or multiple (cumulative) stressors.

Impacts may be more evident where there is a higher coastal population density. Air emissions are more likely to be of concern where greater numbers of people could be affected by reduced

air quality, as well as where the higher population density contributes to diminished air quality due to the presence of emission sources not related to the oil and gas program. For example, as of July 2014, the majority of coastal counties adjacent to the North Atlantic Planning Area do not meet the National Ambient Air Quality Standards (NAAQS) for at least one type of pollutant. In the GOM, the counties surrounding major metropolitan areas such as Houston, Texas and New Orleans, Louisiana also were not in compliance with the NAAQS as of July 2014. On the U.S. west coast, coastal counties adjacent to all planning areas except Northern California were out of compliance with the NAAQS as of July 2014. In the Southern and Central California Planning Areas, counties were non-compliant for up to three pollutants; in the Washington/Oregon Planning Area, counties were non-compliant for up to two pollutants. The current state of air quality in the areas adjacent to the planning areas does not alter the level of emissions that may occur from oil and gas leasing activities; that level depends on the type and extent of activity. Rather, it is relevant to the overall impact that the incremental contribution of emissions from oil and gas activities may have on receptors in the area.

The level of impacts depends also on the level of activities proposed for any given planning area under the proposed oil and gas leasing program. In areas such as the GOM Region, the significant magnitude of ongoing oil and gas activities means that the incremental contribution of impacts from the 2017–2022 Program will contribute less to the overall level of impacts from oil and gas activities than in areas such as the Atlantic planning areas, where oil and gas drilling has not occurred since 1982. Additionally, the U.S. west coast has relatively low levels of oil and gas activities with no new leasing since 1984. However, the Atlantic and Pacific areas both have very high levels of human use in other areas, including maritime traffic, commercial fisheries, and recreational activities. In Arctic Alaska, little oil and gas activity is ongoing; however, no recreational fishing or beach visitation occurs in these areas. Local communities partake in subsistence fishing and hunting in the area, and impacts from oil and gas activities may impact these pursuits.

In addition to the level of activity, the impacts of oil and gas activities from the 2017–2022 Program will depend largely on the type of stressor and the presence and sensitivity of receptors. For example, an accidental oil spill has the potential to impact all present receptors, regardless of geographic location. Vessel traffic may impact water quality through wastewater discharge; marine mammals and sea turtles through disturbance or shipstrike; and human use through space-use conflict. However, sea turtles are unlikely to occur in the Alaska planning areas. Some impacts, such as noise, might only impact those receptors that are sensitive to sound in that range. The physical impact of drilling activities might affect only the receptors that are present on the seafloor, such as in benthic habitats. Some stressors might affect only one receptor, whereas others may have more widespread impacts; in addition, the immediate impact on a receptor from a stressor may have subsequent, or cascading, impacts on other portions of the environment. For example, an impact that affects the abundance of schooling fishes may also affect the industries and animals that depend upon those fishes.

Many comments were provided in response to the RFI that expressed concern over potential environmental impacts that could result from oil and gas leasing and subsequent activities. For example, BOEM was urged to consider, specific to the Alaska Arctic, that the impacts of stressors from outside of excluded areas may still reach receptors within the excluded area.

Commenters also urged BOEM to address the potential cumulative impact, including the incremental impact that the 2017–2022 Program may contribute to ongoing oil and gas activities.

The Atlantic state government agencies that provided comments noted concerns over protecting the environmental health of the offshore and coastal areas of their states. Many expressed concern over the detrimental impacts a large oil spill may have on the economy and the resources upon which many state industries depend.

Environmental groups expressed particular concern about the environmental impacts from oil and gas activities, including impacts to coastal communities in Alaska and the Atlantic, to tourism resources in the Mid-Atlantic and South Atlantic Planning Areas, and to subsistence resources in the Arctic. One of these environmental groups expressed concerns about the ability to respond to an oil spill in areas of sea ice in the Arctic. Several groups also expressed concern about the contribution that new oil and gas leasing may have on global climate change.

6.3.1 Catastrophic Oil Spills

A catastrophic discharge event (CDE) is an event that results in a very large discharge of oil (greater than one million barrels) into the environment that may cause long-term and widespread effects on marine and coastal environments. The catastrophic discharge associated with the *Deepwater Horizon* event is estimated to be about five times that amount. The National Oil and Hazardous Substances Pollution Contingency Plan further defines such a CDE as a "spill of national significance," or one that "due to its severity, size, location, actual or potential impact on the public health and welfare or the environment, or the necessary response effort, is so complex that it requires extraordinary coordination of Federal, state, local, and responsible party resources to contain and clean up the discharge" (40 CFR 300, Appendix E). A catastrophic spill is not expected and would be considered well outside the normal range of probability, despite the inherent risks of oil production-related activities expected from the 2017–2022 Program. The *Deepwater Horizon* event produced the only spill in the more than 60-year history of the OCS oil and gas leasing program that involved a discharge amount which met the CDE definition on spill size.

Unexpected and accidental, large spills, including CDEs, may result from OCS exploration and development operations involving drilling rigs, production facilities, tankers, pipelines, and/or support vessels. However, incidents with the greatest potential to result in a CDE are ones that experience a series of events, including loss of well control events. A loss of well control may result in uncontrolled releases of large volumes of oil and/or gas, where primary and secondary barriers fail, and the well does not bridge (bridging occurs when the wellbore collapses and seals the flow path), and the flow is of long duration (Holand 1997).

There is a no standardized approach for characterizing the risk of spill occurrence and consequence across all relevant space and time scales germane to the OCS Leasing Program. This is due to the inherent uncertainties associated with different regional factors and different exploration or production operations (Pritchard and Lacy 2011). The potential for "catastrophe" is not solely a function of the quantity of oil released. The uncontrolled oil release of a certain size at a particular location even within the same program area and at a particular time of year could have greater economic or environmental effects than a release of considerably more barrels under different circumstances relating to precise location and season (BOEM 2014b). In other

words, location, timing, and type of a spill (e.g. spillage from vessels, operational discharges from vessels, leakage from OCS drilling, leakage from pipelines) and characteristics/exposure of the environmental resources are critical risk factors, which are each difficult to predict.

For more information on the possible impacts of catastrophic spills in each OCS planning area, a discussion of the resources that could potentially be affected as a result of a catastrophic spill on the OCS is included in the supporting paper *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (BOEM 2014b). This document describes the resources and activities that could be affected by a CDE in or near each planning area whether from OCS oil and natural gas activities or from tankering of imported oil to U.S. ports. While it is unlikely that a catastrophic spill would destroy all or even most of the value of the resources and activities described, the *Inventory* paper provides information on the different kinds of effects that might occur in or near all 26 planning areas.

Historical data provide the most relevant basis for use in analyzing the likelihood of future oil spills on a programmatic level. BOEM's analyses, which currently rely on an aggregated characterization of historical data, provide a conservative outcome when compared to other methods such as quantitative risk assessment; i.e. the probability of an oil spill is overstated in BOEM's analyses. Table 6-6 provides a quantitative, aggregated characterization of the frequency of loss of well control resulting in oil spills in broad OCS regions between 1964 and 2010.

Table 6-7: Number of Wells and Loss of Well Control Events per OCS Region (1964–2010)

Region	Exploration	Development	Loss of Well Control	Loss of Well Control with Oil Pollution
	Number of Wells/Boreholes		Number of Events	
Alaska	84	6	0	0
Pacific	324	1,372	5	2
GOM	16,889	29,733	278	59
Atlantic	51	0	0	0
Total	**17,348**	**31,111**	**283**	**61**

More recently, Ji et al. (2014) have applied statistical methods to determine the likelihood of very large oil spills occurring in the U.S. OCS, incorporating 49 years (1964–2012) of OCS oil spill data. The expected recurrence interval for a CDE (in this case, a one million barrel CDE was assumed) in OCS areas, is estimated to be once every 165 years (i.e., in any given year the anticipated probability of such an event occurring would be 0.006 percent), with a 95 percent confidence interval between 41 years and more than 500 years. The results of this study could be useful for oil spill risk assessment, contingency planning, and EISs on oil exploration, development, and production.

While there is always the risk of accidents, BSEE and BOEM require numerous safeguards for OCS drilling and production operations, and these have been increased over the last few years. Requirements include additional subsea blow-out preventer testing, additional downhole mechanical barriers, well containment/capture systems, and greater emphasis on operational training and preparation.[33] Safe offshore oil and gas operations require the right technology but

[33] There was no adjustment to the historical data to reflect these improved safeguards.

the human element is the most important. It takes people to operate, interpret, and make critical decisions as they employ technology. People establish the risk management processes used to keep systems and operations safe, and only trained, committed people ensure the integrity of complex processes.

Risk management is the foundation upon which BOEM and BSEE regulate and enforce standards. The risk management strategies employed by BOEM, BSEE, and industry serve as an integral component of a safety culture designed to integrate technological and human elements. This integration is required to ensure safe and environmentally sound OCS operations. Both risk management and BOEM and BSEE regulatory oversight greatly reduce the risk of a CDE.

6.4 PREPARATION OF A PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR THE 2017–2022 PROGRAM

The general discussion of impacts provided above is intended to be an overview of potential stressor-receptor relationships in space and time for the upcoming oil and gas leasing program. Previous program documents have evaluated impacts from past oil and gas leasing programs. These documents provide relevant environmental information on the resources that may be present in program areas, as well as information on the stressors that may impact these resources. These documents may be accessed on BOEM's website at http://www.boem.gov/. Recent relevant environmental resource information for each area can be found in the following documents:

Alaska: *Effects of Oil and Gas Activities in the Arctic Ocean: Supplemental Draft Environmental Impact Statement* (NOAA 2013)

Pacific: *Updated Summary of Knowledge: Selected Areas of the West Coast, Final Report* (Kaplan et al. 2010)

Gulf of Mexico: *Gulf of Mexico OCS Oil and Gas Lease Sales: 2012–2017; Western Planning Area Lease Sales 229, 233, 238, 246, and 248; Central Planning Area Lease Sales 227, 231, 235, 241, and 247, Final Environmental Impact Statement* (BOEM 2012b)

Gulf of Mexico OCS Oil and Gas Lease Sales: 2014 and 2016; Eastern Planning Area Lease Sales 225 and 226, Final Environmental Impact Statement (BOEM 2013)

Atlantic: *Atlantic OCS Proposed Geological and Geophysical Activities: Mid-Atlantic and South Atlantic Planning Areas, Final Programmatic Environmental Impact Statement* (BOEM 2014a)

Atlantic Fleet Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact Statement (DoN 2013)

Literature Synthesis for North and Central Atlantic Ocean (Kaplan 2011)

South Atlantic Information Resources: Data Search and Literature Synthesis (Michel 2013)

Section 1.2 provides a description of the program development process, including the NEPA process followed to develop a PEIS to evaluate the potential environmental impacts of the 2017–2022 Program. The PEIS will be developed concurrent with the decisions made for the Program and will evaluate the environmental impacts that may occur from different alternatives and potential Program activities. The PEIS will also address the issue of climate change at the programmatic level. The PEIS will consider potential geographic exclusions and restrictions on leasing activities for the 2017–2022 Program, and the final decision on the Program may adopt any exclusions or restrictions that BOEM considers necessary for environmental protection and are sufficiently identifiable at that stage.

Chapter 7 Equitable Sharing Considerations

7.1 REQUIREMENTS FOR THE ANALYSIS

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, among a list of other factors, "an equitable sharing of developmental benefits and environmental risks among the various regions." Most of the developmental benefits and many of the environmental risks tend to accrue outside the OCS regions. To assist the Secretary in making decisions, this analysis goes beyond the strict requirements of the OCS Lands Act (as recognized by *California II* [see Section 2.7]), the law requires only that the OCS regions be considered) and considers the sharing of benefits and risks to the U.S. population, particularly in the coastal areas near oil and gas producing and potentially producing regions of the OCS.

Neither Section 18 of the OCS Lands Act nor the courts have set a specific standard of equitable sharing that the Secretary is to achieve. As the court recognized in *California I* and *California II* (see Section 2.7), the degree to which the developmental benefits and environmental risks of a Program are shared among the regions must be considered in light of a number of other factors, many of which are not under the control of the USDOI and some of which greatly affect the leasing options available. Perhaps the largest independent factor is the geographic distribution of oil and gas resources. Many of the developmental benefits and environmental risks will be concentrated around the areas containing the oil and gas resources that will be eventually produced. Similarly, the rate of technological change can affect the distribution of benefits and risks because it can disproportionately affect the extent to which oil and gas resources in one OCS area are economically recoverable or otherwise attractive for investment. Other factors outside the Secretary's control include laws and regulations that may prohibit oil and gas exploration in certain areas or that can discourage companies from timely operation on the OCS. There are laws and policies—such as impact assistance or revenue sharing, discussed below—that are outside the Secretary's control that could contribute to, or detract from, equitable sharing. Given that many of the factors contributing to the regions' development benefits or environmental risks depend on factors outside the Secretary's control, this analysis seeks to provide a general discussion of the way in which relevant impacts and risks of OCS activities are shared.

The variety of size, timing, and location options available to the Secretary at the DPP stage requires this analysis to be based on considerations that, while somewhat general, allow a fairly simple basis for judging the implications of programmatic decisions on equitable sharing of developmental benefits and environmental risks. This analysis discusses the developmental benefits and environmental risks that accrue to areas proximate to the OCS producing region and those that accrue to the entire United States.

Regional sharing of benefits and risks is heavily influenced by the distribution of oil and gas and environmental resources. A key consideration is whether onshore areas are given an equitable opportunity to develop and benefit from nearby resource endowments. That does not mean that

every region must be included in lease sales under the Program; to the contrary, it must be considered that some regions possessing substantial oil and gas resources might also be prone to serious environmental risks, and the law gives the Secretary wide latitude to assess the relative importance of a variety of factors in deciding the size, timing, and location of sales that best meet the Nation's energy needs. Consideration of the sharing of benefits and risks reflects analytical consistency and attention to all relevant factors for every region. Another way to view equitable sharing is that areas of the country that incur environmental risks as the result of OCS oil and gas activities also receive a proportionate share of benefits from those activities.

7.2 REGIONAL BENEFITS AND RISKS

7.2.1 Regional Benefits

There are benefits from the development and production of oil and gas resources that accrue primarily to producing regions and nearby onshore populations. These benefits include the impact on local economies from expenditures associated with production (i.e., labor, land, materials, and equipment). Exploration, development, and production—and many of the industries that support such activities—generally result in employment at higher-than-average pay, and spending on these activities reverberates throughout the economy. Additional benefits to communities proximate to OCS oil and gas activities come from revenue-sharing programs, benefits from producing energy near to where it is consumed, and benefits to recreation and tourism. Oil and gas platforms serve as artificial habitat for communities of encrusting marine organisms, which then serve to aggregate fish that feed on the encrusting organisms, and predatory species that feed on other fish. These areas are popular locations for sport fishing.

7.2.1.1 Employment, Wages, and Contribution to GDP[34]

Benefits from development and production accrue to areas near OCS activity in multiple ways. One of the most important benefits to many local communities is jobs and associated labor income. Employees are needed by industry to conduct oil and gas operations and in many other industries that support oil and gas exploration, development, production, and transportation. The spending of these employees generates multiplier effects throughout the local economy, through the creation of additional income and employment.

An important conceptual detail should be mentioned at this point. The present analysis of regional benefits generally reckons employment and salaries as a benefit. And, indeed, they are for those who are hired. Nevertheless, these workers represent an opportunity cost to society, in that for the most part they could be employed in other jobs if they had not been working on OCS-related activities. For that reason, the national NSV analysis defines OCS-related jobs and wages as costs to society, even though they are obviously viewed privately as benefits by those who are employed and by their local communities. Accordingly, salaries and wages of OCS

[34] Regional benefits include employment and salaries as a benefit. However, for the calculation of NEV and NSV, employment and salaries are included as costs of obtaining the resources, to be excluded from the net benefit, following the standard practice for such analyses. See Section 5.3, Net Social Value.

managers and workers are treated as benefits to local communities but as negative entries in the accounting of national NEV and NSV.

Local firms and entrepreneurs have opportunities to sell goods and services to companies involved in nearby OCS activities, whether directly or indirectly (e.g., as vendors and suppliers). For example, in the GOM where OCS oil and gas activities have been occurring for decades, approximately 250,000 jobs are sustained in adjacent states (i.e., Texas, Louisiana, Alabama, Mississippi, and Florida) by oil and gas industry spending in these states (see below). Continuing Central and Western GOM sales, and even sales for an expanded Eastern GOM Program Area, would allow maintenance of, and perhaps an increase in, benefits for states adjacent to the region. Ongoing activities in Southern California and Alaska also sustain employment and labor income, but on a much smaller scale. Offering one or more lease sales in the Southern California Planning Area would enhance employment opportunities and income in nearby communities. Lease sales and activities in the Beaufort Sea, Chukchi Sea, and Cook Inlet also would enhance benefits received in nearby Alaskan communities. Many of the jobs created by OCS activities in Beaufort and Chukchi would be filled by skilled workers in the Anchorage area or elsewhere in the United States (or world). Offering lease sales in regions where ongoing oil and gas activities are not occurring, such as the Atlantic and portions of the Pacific and Alaska OCS regions, may increase local employment opportunities associated with development and production.

The pattern of employment supporting OCS activities in the Atlantic, the Pacific north of Southern California, and Alaska planning areas other than the Chukchi, Beaufort, and Cook Inlet may result in low immediate local economic benefits for nearby communities. A large proportion of workers during the exploration and development phases are likely to be sourced from other places, and early benefits may be greatly affected by the availability of existing infrastructure that can support the industry. However, major discoveries of oil and gas resources would likely lead to greater local sourcing and resulting employment benefits, such as in the GOM region.

If new OCS areas in Alaska, the Pacific, and the Atlantic become available for oil and gas development, local economies would benefit as higher-wage jobs come into the area along with direct investments in infrastructure. Many of the skilled workers would likely come from the GOM region initially, with local workers gradually increasing in proportion as exploration and development activities increase. Actual economic effects would vary depending on the maturity and composition of the OCS region, but the presence of more high-paying jobs generally means more spending, income, and taxes, and more money for local businesses and municipalities. BOEM (USDOI 2014) estimates that 14.07 jobs are sustained for every $1 million of direct spending[35] on GOM activities.[36] Although it is impossible to precisely locate, geographically, all

[35] Direct spending is the first round of industry spending on each activity, such as drilling an exploratory well. As a result of direct spending, there is indirect spending by suppliers and vendors as well as induced spending of resulting household income.

[36] Many independent groups study the economic benefits associated with the oil and gas industry every year, representing the oil and gas industry, academia, environmental groups, trade associations, economic development associations, and more. The results of these studies are often made available to the public to inform the discussion of continuing or expanding oil and gas operations. The following is a list of some of the studies BOEM has considered during its analysis, grouped by region of interest. None of these studies necessarily represent the official

jobs in an industry with work patterns like those of the OCS oil and gas industry, the best available data clearly show that the majority of jobs sustained by industry spending remain in the areas near the activities. Table 7-1 and Figure 7-1 show the estimated jobs sustained by industry spending based on oil and gas activity in FY 2013. The GOM has an established oil and gas industry; however, these estimates may be representative of the benefits other regions may accrue due to oil and gas leasing activities. Table 7-1 and Figure 7-1 also demonstrate that while the majority of benefits remain in the states nearest to the oil and gas activities in a mature region, there is also a national benefit to regional development. As shown in the discussion of national benefits (see Section 7.3.1), the strong regional benefit prevails whether just industry spending or both industry spending and (more widely distributed) Federal revenue spending is considered.

In addition to simply generating employment in areas adjacent to OCS oil and gas activities, many of the jobs in the oil and gas industry earn a significant wage premium, as shown in Figure 7-2. The wage premium of these jobs means that workers in the mining industry (including oil and gas)[37] have more purchasing power and consume more goods and services, benefitting them by increasing their standard of living and contributing relatively more to the economy.

Table 7-1: FY 2013 Employment Associated with Spending on OCS-Related Activities

State	Estimated Jobs
Alabama	13,000
Florida	16,000
Louisiana	101,000
Mississippi	9,000
Texas	117,000
Rest of U.S.	58,000
Total	**314,000**

Note: Totals may not sum due to rounding.
Source: USDOI 2014

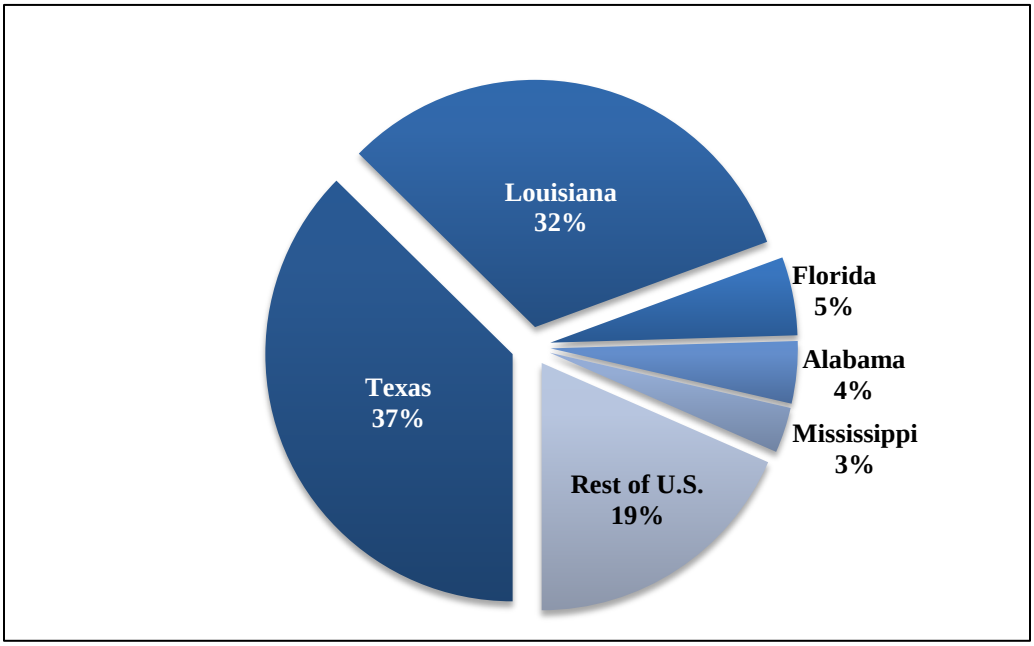
Economic conditions in the United States vary significantly among regions. Average weekly wages in the coastal states along the GOM, with the exception of Texas, are at or below the national average weekly wage. The increased wages of workers in the GOM area directly benefit their local economies through their spending and their property taxes. This is important for helping coastal states with low average wages to improve the welfare of their residents and help coastal states with high average wages maintain the already high standard of living enjoyed

views of BOEM or USDOI, they are included here for information purposes. Alaska: Northern Economics (2009), Conley (2013). Gulf of Mexico: Quest Offshore (2011), IHS Global Insight (2010). Atlantic Ocean: Quest Offshore (2013), Considine (2014), NRDC (2009), The Thomas Jefferson Institute for Public Policy (2014), API (2014).

[37] The Bureau of Labor Statistics does not publish real earnings data for subsets of the "mining and logging" industry.

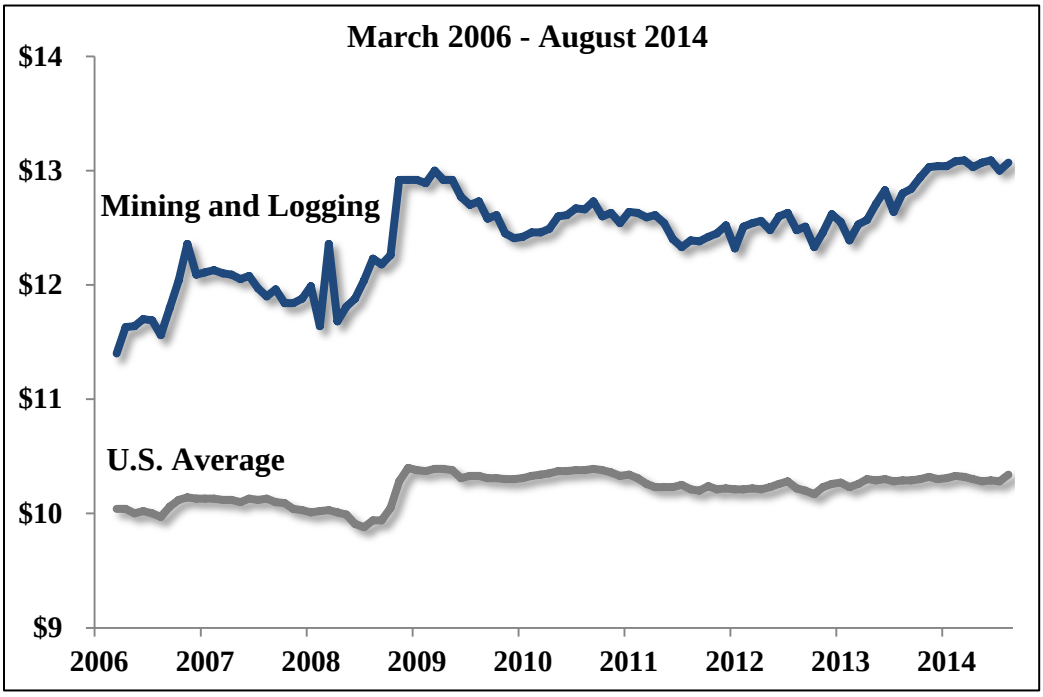
by their residents. Almost 40 percent of the U.S. population lives in counties along coastal shorelines, intensifying these effects.

Figure 7-1: State Employment Shares from FY 2013 Oil and Gas Industry Spending



Source: USDOI 2014.

Figure 7-2: Real Average Hourly Earnings of U.S. Workers, Adjusted for Inflation



Note: The mining and logging industry category contains the oil and gas extraction industry and is the lowest level of real earnings detail available from the Bureau of Labor Statistics.

Source: BLS 2014.

7.2.1.2 Onshore Infrastructure

Offshore oil and gas activities require the construction and development of onshore support infrastructure. In areas where this infrastructure does not exist or would need to be expanded to accommodate increased leasing activities, such as in portions of Alaska, the Pacific, and the Atlantic, 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, etc.). 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.

The importance of tax revenue varies by region. 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 (see Section 7.2.1.2). The GOM has extensive onshore oil and gas infrastructure that contributes to local and state economies. Should frontier areas such as Alaska and the Atlantic become areas of similar long-term development and production, this tax revenue would contribute to state and local economies in these areas, as well.

The extent to which communities near oil and gas activities would benefit from infrastructure development would depend on a number of factors, including the current capacity of infrastructure to support oil and gas activities. For example, the GOM already has a well-developed web of infrastructure and would not require extensive development of new facilities to serve new activity (e.g., from expanded Eastern GOM leasing). The Atlantic Coast has areas with significant general infrastructure (e.g., roads, housing, and medical facilities) to meet some of the needs required due to potential new exploration and development, but new infrastructure would be needed to support production activities. There are numerous construction companies and labor sources in both the Atlantic and Pacific, and these regions should benefit from local infrastructure construction associated with new leasing opportunities in these areas. 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 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 the GOM and Alaska, where local economies—and even state and local treasuries—depend on revenues from continued use of existing infrastructure. A very important example is the TAPS, which still transports large amounts of oil[38] from the Prudhoe Bay area of the Alaskan Arctic and depends on future development of either offshore or additional onshore oil to remain active. The viability of current onshore and state production in northern Alaska—critical to state and local communities that depend heavily on oil-related revenues—could depend on the availability of new OCS production to sustain the TAPS. Communities along the GOM and in southern

[38] As discussed in Chapter 4, while the volume of oil flowing through TAPS has been declining, taxes related to that oil still provide approximately 90 percent of Alaska's general fund unrestricted revenue.

California benefit similarly from continued operation of facilities constructed to service OCS operations, though these areas are not as singularly dependent on the industry as is the Alaskan Arctic.

7.2.1.3 Revenue Sharing

Revenue sharing, a method of providing economic benefit to those regions that bear the environmental risks of proximate OCS oil and gas activities, is one way to affect equitable sharing among regions. Currently, two programs provide Federal OCS oil and gas revenues to the coastal producing states and political subdivisions: Section 8(g) 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-mile 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 resources in state waters by Federal lessees, and compensate them for some of the negative impacts of offshore development. Table 7-2 shows the 8(g) revenue dispersed to the six states sharing 8(g) leasing revenues from OCS production. Because this revenue sharing provision applies only to states that could have production within 3 nm of their seaward boundaries, creation of close-to-shore buffer areas in which leasing is forbidden would eliminate the possibility of any 8(g) revenue sharing for adjacent states.

A second revenue-sharing program began with passage of the GOMESA, which provides the four GOM producing states of Alabama, Mississippi, Louisiana, and Texas with an uncapped 37.5 percent share of OCS revenues from selected areas in the Eastern and Central GOM Planning Areas. More than $43 million of GOMESA funds were disbursed from FY 2009 to FY2013. Sharing of additional GOM oil and gas lease revenues (limited to $500 million annually) begins in 2017 and will include all revenues from applicable GOM leases issued during the 2017–2022 Program.[39] Table 7-2 shows the disbursement of 8(g) and GOMESA revenues for FY 2013.

While the Secretary cannot expand, extend, or otherwise revise revenue-sharing provisions to further the equitable sharing of the developmental benefits and environmental risks during the period covering the next Program, Congress has the authority to do so.

[39] More info on GOMESA and revenue sharing is available from the USDOI Office of Natural Resource Revenue (ONRR) at www.onrr.gov/About/PDFDocs/20091115.pdf.

Table 7-2: FY 2013 GOMESA and 8(g) State Disbursement Summary

State	8(g)	GOMESA
Alabama	$3,703,358	$88,516
Alaska	2,940,962	N/A
California	8,455,415	N/A
Florida	1,389	N/A
Louisiana	24,533,076	95,814
Mississippi	114,066	80,360
Texas	869,341	33,295
Total	**$40,617,607**	**$297,985**

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

Note: Alaska, California, and Florida do not receive GOMESA revenues.
Source: Office of Natural Resource Revenue (ONRR).

7.2.1.4 Other Benefits

Recreation and tourism are important economic activities in coastal areas (see Section 4.7), and OCS development and production may benefit these industries. These regional benefits are discussed in more detail in Appendix B under non-monetized benefits. Oil and gas platforms serve as artificial habitat for communities of encrusting marine organisms, which then then serve to aggregate fish that feed on the encrusting organisms, and predatory species that feed on other fish. These areas are popular locations for sport fishing.

Regional energy needs are also an important consideration (see discussion in Section 4.4). 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. Producing energy close to where it is refined and consumed reduces costs incurred by energy suppliers and improves economic efficiency.

7.2.2 Regional Risks

The discussion of risk associated with oil and gas activities on the OCS varies slightly in scale from the discussion of benefits. Benefits that accrue to the regions proximate to ongoing oil and gas activities are an increase in jobs and wages and the subsequent multiplier effects. This benefit may be smaller at the outset (i.e., in frontier areas where exploration is the primary activity) and grow as development and production allow the industry to become established. In the case of environmental risk, the impacts are often within the waters of the OCS and in the immediate coastal zone. These impacts, particularly ones that may have economic consequences, may be apparent throughout the local and state economies. However, the burden of environmental risk is borne primarily by the marine and coastal areas adjacent to and within which oil and gas activities occur.

Risks to marine and coastal resources generally are the chance that the human, coastal, or marine environment may be harmed as a result of oil and gas leasing activities associated with the

2017–2022 Program. However, a decision not to lease presents risks from activities to obtain and transport energy substitutes. Because avoidance of these risks is a benefit of the program and such risks often would be borne by other regions, they are discussed in Section 7.3.1. A brief discussion of the types of impacts that may occur is provided in Section 6.3.

Generally speaking, environmental risks of OCS activity are greater in areas where there is more oil and gas activity and where reservoir pressures and volumes are the greatest. Environmental risks also vary depending on the physical and biological environment. For example, impacts differ between vegetated, rocky, or sandy shorelines or in areas where sea ice is present during portions of the year (Arctic, Bering Sea, and Cook Inlet Planning Areas). Risk is also associated with the technology and response capability available to contain and/or clean up a spill. In areas of deepwater drilling (e.g., the GOM), it may be more difficult to contain a spill event. However, for oil and gas activities closer to shore, the risks associated with a spill may be higher to the coastal environment.[40] There are certain environmental risks that are more obvious than others, such as the risk of a large oil spill or degraded air quality that can have economic and health impacts on human populations onshore, whereas indirect impacts from disturbance of soft bottom habitat 20 miles offshore would likely not be noticed and may not be measureable.

All of the OCS regions have valuable commercial fisheries. The risk of impacts on fisheries resources may have wide-ranging economic and cascading ecological consequences. The ecological consequences may be very damaging as well. Differences in the level and value of commercial fishing in each region are discussed in more detail in Section 4.7.

Areas such as the Atlantic coast, Pacific coast, and Gulf of Alaska where ecotourism like whale and bird watching is popular may be harmed by changes in marine animal populations or distribution. In Alaska, subsistence hunting and fishing is an extremely important aspect of everyday life; the risks include potential reductions in food availability or timing of traditional hunts. In the GOM, commercial and recreational fishing activities play a large role in the economy of the region. Ecological, subsistence, and recreational impacts are monetized using the OECM and are discussed in more detail in Section 5.3.

The environmental risk of impacts on air quality varies by region. In areas with more oil and gas activity (such as the GOM), emissions will be higher and the overall contribution to air quality impacts, while small, will be greater than in areas with less oil and gas activity (e.g., the Pacific and Atlantic). In addition, the risk associated with degraded air quality depends on the relative contribution of emissions from oil and gas activities. In areas with a sparsely populated coast, such as the Arctic and Bering Sea coasts of Alaska, the relative contribution of emissions from oil and gas activities is higher than in areas with more densely populated coasts, such as the GOM. For example, vehicle traffic and coal-fired power plants are major sources of air pollutants; in areas where there is greater human population with more traffic and industry, there are more emissions from sources other than oil and gas activities. The difference in monetized air quality impacts between regions is also discussed in Section 5.3.

[40] This also is true for imported oil, which may face more close-to-shore hazards, such as those encountered by the Exxon Valdez off Alaska, resulting in a very large oil spill.

Environmental sensitivity and marine productivity were analyzed at the regional and planning area level and are discussed in Section 6.2. The overall range of environmental sensitivity scores for all planning areas was small, indicating that there is similar sensitivity to, and thus risk associated with, oil and gas activities at a general level. However, the nature of these risks varies by planning area or OCS region based on the most sensitive components of the environment according to the sensitivity analysis. For example, the Beaufort and Chukchi Sea Planning Areas rank among the highest for environmental sensitivity, and had the highest sensitivity scores for birds and invertebrates. The high sensitivity scores were also driven by the region's high susceptibility to climate change.

The environmental sensitivity scores for the California planning areas and the Washington/Oregon Planning Area ranked lowest relative to the other planning areas. The Pacific region has relatively low sensitivity scores for marine mammals, sea turtles, fish, and invertebrates. The overall sensitivity score incorporates the relative lack of susceptibility to climate change in these areas. The GOM ranked among the highest environmental sensitivity scores for all planning areas, which is primarily attributed to sensitive seafloor habitats such as deep water coral that do not recover quickly from disturbance. The GOM also had high relative sensitivity scores for birds, fish, marine mammals, and sea turtles. The Mid-Atlantic, South Atlantic, and Straits of Florida Planning Areas ranked among the highest relative environmental sensitivity scores of all the planning areas. The southeast had the highest species scores for marine mammals and sea turtles and above average scores for fish species. The environmental risk associated with activities in each of these areas may differ depending on which resource areas are most sensitive and whether the sensitive resources are the most likely to be impacted.

Marine productivity is also an index that may be used to evaluate environmental risk. The NPP of a system is a measure of the capacity of an area to provide energy for its component species. In evaluating NPP (see Section 6.2), several regional trends were identified. In Alaska, there was high variability between the ecological regions. The highest NPP is in the Cook Inlet; the lowest in the Chukchi Sea Planning Area. Overall, the Pacific region exhibited the highest NPP. The GOM also exhibited high NPP. In the Atlantic, there was also high variability. The North Atlantic Planning Area had the highest NPP for the Atlantic Region. Areas where oil and gas activities impact lower-level organisms such as aquatic plants and algae may be at risk for systemic consequences due to changes in productivity.

7.2.2.1 Risks to the Coastal Zone

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.

A network of onshore support facilities is needed to support offshore oil and gas production. The primary coastal infrastructure that could potentially affect the biological, physical, and socioeconomic resources at the regional level includes the following:

- service bases,
- helicopter hubs,
- construction facilities (platform fabrication yards, shipyards, and pipecoating facilities and yards),
- processing facilities (gas processing plants and refineries),
- terminals (pipeline shore facilities, barge terminals, and tanker port areas),
- disposal and storage facilities for offshore operations (nonhazardous oil-field waste sites and landfills),
- transportation (coastal pipelines, coastal barging, and navigation channels), and
- oil spill response staging areas.

In addition, especially in non-industrialized areas, there may be a need for additional development of general infrastructure, such as higher-capacity roads and more housing, which can impose costs to both the natural and human environments, along with the benefits that may result.

Onshore construction may result in a variety of adverse impacts, including the destruction or alteration of existing habitat, such as wetlands or nesting areas for turtles and birds, permanent or temporary displacement of species that rely on those habitats, and behavioral disruption that may have acute or long-term impacts on individuals and populations. In the GOM, an extensive onshore infrastructure support network is already in place and will not require significant new development or modification, resulting in lower environmental risks from onshore construction activities in that region. In the Atlantic and Pacific, there are areas of importance to sea turtle and bird nesting areas along the coast. However, the level of human use and infrastructure development in these regions are high, and those ecological issues are already a part of the local and regional planning process. Even though some onshore infrastructure systems needed to support new offshore development would be novel to these areas, balancing important environmental issues with human use is not. And, while some Alaska regions have significant infrastructure in place (including those supporting state oil and gas production), or would have significant infrastructure in place with the development of existing leases, others have very little and would require significant development of onshore facilities. Additional risks from onshore construction in Alaska are associated with the potential disruption of subsistence resources.

The permitting agencies for the construction of coastal and onshore infrastructure are the U.S. Army Corps of Engineers and state agencies in the state (or state waters) where the activity occurs; both are likely to only permit construction in areas with lower environmental risks and to require mitigation measures to further reduce those risks. The companies responsible for infrastructure construction and operation are also responsible to the states for any required compensatory mitigation for coastal impacts associated with their activities resulting from an OCS leasing program.[41]

[41] BOEM would not have the necessary site-specific information at the Program, or even the lease-sale, stage regarding specific onshore activities and impacts to derive an appropriate mitigation plan even if it had authority to require such mitigation for indirect onshore impacts. Although BOEM sometimes imposes lease stipulations regarding activities on the OCS, much of the required mitigation of specific nearshore or onshore activities occur as a result of state decisions and actions long after the relevant Program analyses have been completed and decisions made.

Oil spills are another possible risk borne by OCS regions and the coastal areas adjacent to OCS activities. Different OCS regions have different risk factors that affect the probability of oil spills. For example, the principal risk that applies to deep water drilling in the GOM occurs as a result of drilling and containment/response risks associated with the use of drilling technologies at these depths. In the Arctic, the primary risks stem from ice and the ability to drill relief wells. Similarly, different regions would have different impacts from oil spills. In the GOM, it is not necessarily true that a deepwater, large-volume spill would have more environmental consequences than a smaller spill occurring in shallow water. Deep water spills may, in part, impose less risk on highly valued coastal areas because of their distance offshore, which allows for more natural weathering and dispersion. In the Arctic, an ongoing concern is the environmental effects from a large oil spill on sensitive marine and coastal habitats within the land-sea-ice biome that supports a traditional subsistence lifestyle for Alaskan native populations and provides important habitats for migratory and local faunal populations. The ability to respond to and contain a very large discharge event under the extreme climatic conditions and seasonal presence of ice is of particular concern.

7.3 Widely Distributed Benefits and Risks

7.3.1 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 are largest in states with the most oil and gas activity, namely Texas and Louisiana. However, thousands of jobs and millions of dollars in GDP (value added) are supported 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 onshore regions of the United States. In FY 2013, OCS oil and gas leasing provided almost $9 billion in leasing revenues.

The vast majority of leasing revenues are disbursed into the U.S. Treasury General Fund and then appropriated by Congress for various Federal functions. A small percentage of these funds are distributed regionally to states through 8(g) and GOMESA revenue-sharing programs (see Section 7.2.1.3). 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 recently 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). In addition to the leasing revenues collected from OCS activity, oil and gas activities on the OCS contribute a significant amount of tax revenue to the U.S. Treasury.

Taking into account all the industry spending, government revenues, and industry profit generated by OCS leasing activity in FY 2013, BOEM estimates that more than 700,000 jobs are

sustained, and more than $62 billion of value added (representing the contribution to GDP), is generated. 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. Approximately 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 Nation. Table 7-1 and Figure 7-2 show economic impacts from OCS activity (not just that of industry spending), and Table 7-3 and Figure 7-3 show the distribution of total jobs supported for each of the GOM states and the rest of the United States.

As the U.S. economy continues to recover from the 2007–2009 recession and the largest percentage of job loss in the past 60 years, job growth is of particular importance. 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.

In addition to monetary benefits to the Nation from OCS activities, development of the OCS provides other not-as-easily-quantifiable national benefits. One of these benefits is a reduction in the U.S. trade deficit with the 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. The recent increases in tight oil production, added to oil produced by conventional means, are largely responsible for the relatively stable (or declining) oil prices that exist in spite of increased unrest in and near several major oil-producing countries. These national benefits from OCS production are discussed in more detail in Section 4.1.

In addition to receiving the financial and national security benefits that result from OCS oil and gas development, the Nation also is affected by the reduction of use of substitute sources of energy when OCS oil and gas are consumed. In this regard, some substitutes for OCS oil and gas may be characterized as lower environmental cost - higher economic cost, and other substitute sources may be higher environmental cost - lower economic cost. As discussed in Section 5.3, 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 U.S. 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. Overall energy consumption would be reduced only slightly in the absence of any given quantity of OCS oil and gas (presumably resulting in some environmental impacts or greenhouse gas [GHG] emissions for that share). Substitute sources of energy have their own environmental and social costs, which are avoided with OCS production (e.g., air emissions, oil spill risks).[42]

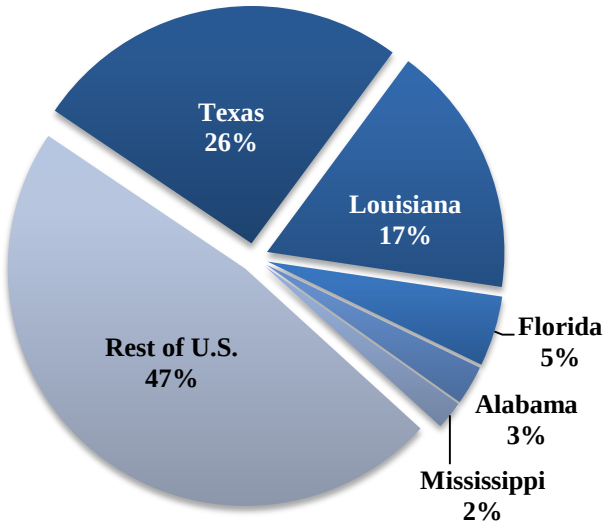
[42] In the case of imports substituting for forgone OCS production, much of the oil would be produced by countries with lower environmental standards and shipped to the United States via supertankers. Another large percentage

Table 7-3: Total Economic Impact from FY 2013 OCS Activity

Area	Total Output ($ billions)	Total Value Added ($ billions)	Total Jobs (thousands)
Alabama	$2.9	$1.5	19
Florida	$5.4	$2.6	34
Louisiana	$17.3	$9.8	121
Mississippi	$2.0	$1.0	14
Texas	$31.1	$19.2	181
Rest of the U.S.	$59.9	$28.6	336
Total	**$118,480**	**$62,623**	**705**

Notes: Includes government spending of OCS revenues, industry profits, and industry spending. Totals may not sum due to rounding. Methodology explained in USDOI 2014. 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).

Figure 7-3: Distribution of Total Jobs Supported by FY 2013 OCS Activity



would be from the Canadian oil sands, which some environmental groups oppose. However, consistent with previous analyses, 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). BOEM is updating its OECM and, for the PP analysis, will analyze not only the environmental and social costs of obtaining the OCS oil and gas likely to result from accepting a specific leasing option but also those likely to be incurred from the energy substitutes in the absence of that leasing-related production. That will allow the Secretary to consider the "incremental" environmental and social cost estimates (costs of OCS leasing minus costs of the energy substitutes incurred in the absence of related OCS oil and gas) likely to result from each major option selection.

In some cases, the areas which have OCS production will also be the same areas where reduced substitutes are needed (e.g., OCS production from the GOM reduces the need for other 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, which could, in the absence of such Alaska OCS production, be borne elsewhere in the country). This analysis of the impacts in the absence of an OCS Leasing Program will be expanded for the PP and PFP analyses, which will consider specific proposals and decision options.

7.3.2 Widely Distributed Risks

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

Human health and well-being is affected by numerous, inter-related and unrelated activities, one of which is 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 both the health and quality of life of humans directly (e.g., increased prevalence of asthma or other respiratory illnesses) and contribute broadly to the effects of global climate change. The well-being aspect comes from a health point of view, but also recognizes that the broad marine and coastal ecosystems that may be impacted by oil and gas activities serve a variety of other functions including food, carbon sequestration, recreation, and aesthetics.

Risks associated with air quality are largely regional. However, the risk is also one of national (and international) scale due to the fact that GHG emissions are one of the causes of climate change. Climate change is a global phenomenon driven by multiple factors including human and natural influences, so predicting climate change impacts requires consideration of large scale or even worldwide GHG emissions, not just local emissions. Climate change predictive capability (modeling) cannot estimate the impact of GHGs from a particular source or sources such as oil and gas activities associated with the Program. What their impact would be, if any, is determined not only by the emissions from the oil and gas activities themselves, but also by the GHG emissions of other sources throughout the world and whether these other emissions are expected to increase or decrease. 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 may extend well beyond the active lifetime of the source or even the Program.

The environmental risk to the environment of a low-probability CDE, such as occurred after 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, any shareholder of BP stock was affected by compensation liabilities associated with the spill. In that case, there was a massive transfer of funds from an international company with widely dispersed operations and stockholders to the Gulf coast for cleanup and compensation. Future

judgments are likely to result in further costs for BP, Transocean, and Halliburton borne by the companies and their widely dispersed shareholders. A less dramatic example would be 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.

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 State of Alaska is bounded by Canada to the east and south; U.S. Arctic and Bering Sea waters are contiguous with Russian waters. These nations may experience environmental impacts from oil and gas leasing activities, especially if a CDE occurs in the vicinity and the physical and environmental conditions (e.g., wind direction, current) are conducive to the spread of oil outside of U.S. waters. These nations may also be conducting their own oil and gas activities that increase the risk to U.S. waters and coasts. Many long-lived marine species such as whales, dolphins, sharks, and tuna may have distributions that cross international boundaries, as well. Impacts on these species or populations originating within U.S. waters may be detectable within the waters of other nations and vice versa.

7.4 CONCLUSION

The Program has a certain innate equity in that the geographic areas bearing the greatest risks also receive a higher share of the benefits, while certain financial aspects of both benefits and risks are shared somewhat widely. In determining whether there is an equitable sharing among the regions, it is necessary to discuss the risks and benefits to each OCS region. In determining a DPP, the Secretary uses the equitable sharing discussion to consider whether the accrual of benefits may be worth the environmental risk. After the Secretary specifies size, timing, and location of lease sales in the DPP as precisely as is reasonable, there will be a more specific equitable sharing analysis conducted, which will be considered at later stages of the Program preparation process. The first such specific analysis will be included in the PP. In addition, the determination of environmental risk will be informed by the development of the PEIS for this Program.

The regional benefits associated with oil and gas activities include increases in employment and wages. This could manifest as a higher standard of living, increased contribution to local economies through spending and investment, and a stable contribution to state and local tax revenues. In frontier areas, this may be slightly delayed. Construction of onshore infrastructure or use of existing infrastructure may increase (Alaska and Atlantic) or maintain (GOM) job creation. Revenue sharing will continue to contribute economic benefits to certain states along the GOM, and, other regions if expanded by Congress.

Regional risks include possible environmental impacts that could negatively affect marine and coastal resources. These risks include impacts on commercial fishery stocks, other uses of the ocean, or 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, or coral reefs.

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. However, 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.

The distribution of benefits associated with factors of production is linked significantly to the location of OCS oil and gas support industries, which currently exist primarily along the GOM, Southern California, and Alaskan coasts[43]. Similarly, the benefits of reducing levels of energy substitutes would depend on production locations and transportation patterns. The Secretary's decision on an OCS leasing schedule for 2017–2022 could expand areas available for leasing, perhaps eventually leading to the development of new OCS-related industries and employment in the adjacent communities. An additional benefit for these communities could result from new Federal impact assistance or revenue-sharing programs similar to those mentioned above, should Congress decide to enact legislation to create or expand such programs.

[43] With the exception of Northstar, which provides both Federal and state production from a project in state waters, there currently are no projects on the Alaska OCS. However, there is significant infrastructure along the coast to support onshore and state offshore production in the Prudhoe Bay and Cook Inlet areas.

Chapter 8 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)). To secure and maintain public trust in utilizing OCS resources, BOEM uses an established set of criteria, described below, that provide adequate returns to the general public for the OCS rights issued. The assurance of FMV is a multi-phase process including national Program-level analysis, lease sale-level analysis, and, finally, analysis done before the issuance of an individual lease following a lease sale.

At the Program development stage, BOEM has adopted screening criteria that recognize the importance of considering the value of waiting to lease in carrying out its FMV responsibilities. BOEM considers the importance of timing using a hurdle price analysis. This analysis, described in detail below, serves as an exclusionary mechanism to filter out program areas where delaying a sale offering may provide greater future economic value from the entire program area. A set of other factors that could affect the value of waiting to lease are discussed qualitatively in Section 8.1.1.

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. The size of a lease sale is determined based on several factors, including FMV considerations, environmental sensitivity, marine productivity, and subsistence use. BOEM considers FMV during preparation and execution of the Program. Further discussion of BOEM's internal analysis is provided in Section 8.3.2.

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 safeguard against OCS leases being awarded for less than their FMV. 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 broadly described herein, and detailed discussion, analysis, and justification are reserved for future stages in the Program development process (i.e., the PP and the PFP).

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 are provided in the *Federal Register* Notice of July 12, 1999 (64 FR 37560). These FMV assessments of the cash bonus bids, also referred to as determinations of bid adequacy, are based on a stochastic analysis of the activities, results, and outcomes anticipated to occur post-sale that are related to exploration, development, and production of the oil and gas resources potentially contained on the applicable tract.

Therefore, the bid adequacy determinations are based on forecasts of future prices, discovery amounts, and production quantities rather than on the actual value of the oil and natural gas eventually discovered and produced. Furthermore, consistent with the formulation of the cash bonus bids, these determinations take into account existing statutory and regulatory conditions imposed on lessees by BOEM, including (but not limited to) drilling requirements that may restrict lessee flexibility in attaining certain timing milestones.

8.1 TIMING OF OCS LEASE SALES AND RELATED ACTIVITIES

Receipt of FMV is one of the factors that must be considered in determining whether to include the entire proposed area in the 2017–2022 DPP or to exclude it from further study. The DPP represents the first in a series of winnowing decisions regarding which areas could ultimately be included in the 2017–2022 Program; therefore, the analysis at this stage is conservative, erring on the side of inclusion, because areas could be excluded in later stages of the lease sale planning and preparation process, but an area not included in any Program development phase cannot be added later without going back to the stage of its removal. So, 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 safety and environmental factors.

The value of the OCS resources and associated leases is affected by the timing of leasing. Because OCS leases have fixed initial lease periods (described in Section 8.3.2) as required by the OCS Lands Act, BOEM presumes that lessees will explore and initiate development on any profitable leases 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 as the initial period is nearing expiration, but it may be socially optimal for the lessee to wait as the value of the resources would be larger. 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 may be privately profitable but not socially optimal (as lessees may have to explore when slightly less profitable because their lease is near the end of the primary term), a hurdle-price screen is employed. The hurdle price screen is conducted at the Program stage to assure that delaying the lease of a planning area until a future Program would not provide greater economic value from all anticipated fields in the program area. In this context, a hurdle price is defined as the oil and gas price above which immediate exploration of at least one undiscovered prospect as identified by BOEM's resource assessment is the most profitable timing option. Further, the hurdle price for the area is compared to actual prices prior to each lease sale held under the Program. The same approach could be used to fine-tune the scope of a sale's offering, such as by water depth or other categorization. Also appropriate at the lease sale stage is examination of fiscal terms for leases and how they might be tailored to improve timing of activities where option value (i.e., the

value of waiting) is found to be significant. Appropriate fiscal terms (e.g., higher minimum bids) can provide a measure of automatic correction by discouraging acquisition, exploration, and development of marginally valued blocks as these terms increase the costs of blocks (Davis and Schantz 2000).

The logic of the argument that the greatest value is associated with optimal timing of leasing extends past the volatility of price to include other areas of uncertainty, is discussed in Section 8.1.1.

8.1.1 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 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 it 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, the present 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.

8.1.1.1 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. Comments made about prior programs, as well as on the development of the 2017–2022 Program, have suggested that USDOI needs to consider the value of options while performing its size, timing and location analysis in order to fulfill the FMV statutory requirement. For the present Program, uncertainty about oil and gas prices and resource amounts is primarily covered by the hurdle price analysis. This section discusses mainly nonmarket factors that are reflected in the option value in a broad sense.

When uncertainties exist, having the option to delay activities creates value as more information can be revealed 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 areas up 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 and costs 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. When choosing whether to undertake oil and gas development or reserve an area for preservation, there can be uncertainties about either the benefits of preservation or the benefits of 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 (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, 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 deferral 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), "It 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 we seek to obtain based on the many uncertainties surrounding offshore oil and gas development and how these uncertainties can be resolved.

8.1.1.2 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 may 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 of OCS oil and gas and how these

uncertainties may 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 NSV analysis discussed in Section 5.3.

The discussion of uncertainties and option value must always consider the pyramidal structure of the Program and Sale Process. The Program development process begins by considering all leasing areas, and the potential areas are winnowed down into what is ultimately the final sale schedule. Planning areas can be removed at any stage of the Program development process, but cannot be added back in once they are removed. Further, USDOI has the flexibility to cancel a sale even after the Program is approved. Given these procedures, to maintain the maximum option value, USDOI should be conservative as to what areas are excluded from the initial stages of the program as it eliminates the possibility that sales could be held in these areas during the next five years, should some of the independent information become available. Theoretically omitting any area from the Program can cause a loss of option value to the government. USDOI retains the greatest flexibility, and therefore option value, by including planning areas in the program, but it is also true that there can be instances where USDOI may be justified in excluding an entire area of 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 five years of the program, or if the estimated developmental value of an area is so marginal that the probability of sufficient information being generated to improve its value is so negligible there is no value to including it in the program. Excluding very marginal areas also reduces administrative and study costs.

If an area with many uncertainties is included in the Program, the Secretary may choose to cancel lease sales if any important informational uncertainties have not been satisfactorily resolved when the time of a particular sale arrives. Further, within the Program, sales may 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).

While it is possible to re-evaluate and cancel sales during the sale planning process, it is important to be aware of the business need for predictability and orderly leasing. An intended benefit of the Program 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 these reasons, 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 planning areas and therefore it is helpful to discuss the nature of OCS oil and gas leasing and the resolution of uncertainty.

In addition to the FMV analysis requirement, 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.

8.1.1.3 Resource Uncertainty

The fundamental uncertainty for offshore oil and gas leasing is called resource endowment. The uncertainty associated with the presence and estimated quantity of oil and gas resources can only be 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 as to the individual and aggregate volumes of oil and gas present on unleased acreage. The Secretary is also uncertain about the extent to which these undiscovered resources are commercially viable and when those resources which are not currently commercially viable may become so, especially in the relatively less mature OCS areas. BOEM's estimates of the available resources are included in Section 5.3, which also discusses the methodology used to estimate the UERR available in each planning area.

An example of how exploration of an OCS province has changed the knowledge of resource potential is provided by the GOM, where estimates of undiscovered oil resources have increased dramatically since the discovery of major deep water oil and natural gas fields. Even with significant oil and gas production since 1975, amounting to nearly 14 BBO and 150 Tcf of natural gas, the estimated GOM UTRR have increased fivefold from 1975 to today and the estimated natural gas resources have more than doubled. 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.

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 more than a factor of 25 to 76.8 Tcf of natural gas in this frontier area. Future exploration in this area will further decrease the uncertainties regarding its oil and gas resource potential.

While drilling is the only way to fully resolve 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.[44] One important consideration for the Atlantic planning areas is the new information that may be available following seismic studies of the Mid-Atlantic and South Atlantic Planning Areas. As noted in Section 8.1.1.1, only by drilling can the volume of oil and gas resources be established, but new seismic data could help to better define play boundaries and/or identify new plays along the margin. BOEM approved the ROD on the *Atlantic OCS Geological and Geophysical (G&G) Activities, Mid-Atlantic and South Atlantic Planning Areas, Final Programmatic Environmental Impact Statement* (Seismic EIS) in 2014. With completion of the Seismic EIS, companies can request authorizations to conduct seismic and other data acquisition activities in these planning areas. While new seismic data may improve the ability to image potential hydrocarbon-bearing traps, this information may not significantly reduce resource uncertainties regarding the presence or volumetric ranges of potential oil and/or gas resources. Significantly, companies have no incentive to conduct seismic and other G&G studies unless there is the likelihood of sales in the Program. The inclusion of any Atlantic planning areas in the Program could provide an incentive for industry to conduct seismic and other data acquisition activities, which will lead to more information that could be utilized to refine future estimates of potential resource endowments.

Because resources form the basis for the NSV 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.

8.1.1.4 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 as much is still unknown about the costs. In the GOM, lessees have had decades of experience and there is generally less cost uncertainty. Costs can never be revealed with a fair degree of certainty in frontier areas until someone begins exploration and development in these areas.

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

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

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 can be expected to impact U.S. OCS capital and operating costs over the next few years as oil and gas opportunities in the southern portion of the GOM increase competition for oil and natural gas investment dollars and will likely drive up demand for skilled workers and rigs.

According to the logic of option value, value can be enhanced by delay of action in a case where costs are deemed high currently, with a probability of decreasing in the future. In the case of OCS oil and gas, there is not a way 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 while drilling a well into a high-temperature/high-pressure reservoir or challenges associated with natural events such as hurricanes can greatly influence project economics. This further demonstrates dependent learning.

Uncertainties surrounding the magnitudes of capital and operating costs also influence the ranking of planning areas by NSV. Because the capital and operating costs are inherent in calculating the NEV (in the second stage of the NSV calculation), changes in costs could alter the ranking order of planning areas. A change in capital and operating cost that affected all planning areas equally (e.g., a general increase in costs given a major increase in world oil prices) likely would not affect the planning area ranking. However, any cost increase that only affected one area (e.g., additional regulatory requirements for Arctic drilling) would have a greater likelihood of changing the planning area rankings.

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 to control the damages of a catastrophic spill through closing the well, capturing the flow, or assisting in clean-up operations. This again illustrates the concept of dependent learning which is an element in the option value calculus but is oftentimes not mentioned in comments received about the importance of taking into account option value concepts in program formulation.

8.1.1.5 Environmental and Social Cost Uncertainty

Regarding the environment, additional information is increasingly available for consideration in the Program. As part of the decision on size, timing, and location, the Secretary can consider the state of available environmental and social cost uncertainties.

All of the environmental or social cost estimates covered 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.

However, in contrast to resource estimates, most environmental impacts can be mitigated, remediated, or compensated for. Thus the decision to drill or produce oil or gas does not necessarily involve a significant irreversible commitment to environmental degradation, although certain impacts may 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, described below.

1. 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.

2. Climate change uncertainties have been modelled through the use of probabilistic methods or thresholds and participatory approaches (IPCC 2007), but some "deep" uncertainties are not readily quantifiable (IPCC 2014). "Deep uncertainty" contains scientific uncertainty, lacks clear solutions, and arises from problems that are not well bounded. Kandlikar et al. (2005) propose a hybrid approach of using quantitative evidence as available with qualitative means to improve communicating problems of uncertainty.

However, studies applying real options concepts to possibly irreversible environmental impacts from oil and gas activities appear to be largely absent, likely from the serious difficulty of assessing these risks. It is not hard to envisage 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. Fisher and Hanemann (1987) acknowledge that dependent learning is less frequent than independent learning, which may be a reason why implementing a multiple-risk optimal timing decision during the Program development is very challenging.

BOEM's Environmental Studies Program Information System (ESPIS) 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 ESPIS is incorporated in environmental analyses conducted by the Agency and builds the foundation for science-based decision making throughout the Program development and leasing stages.

ESPIS recognizes the different needs for information in each of the OCS regions and tailors the studies accordingly. In Alaska, ESPIS focuses on protected species, physical oceanography, wildlife biology, subsistence and traditional knowledge, economic modeling, and Arctic resources. In the GOM, studies focus on oil spill modeling and deepwater oceanographic processes, archeological 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 focus of the studies program has been on visual impacts, space use conflicts, and associated economic effects of renewable energy projects.

BSEE is also actively researching information on environmental issues. For example, the Oil Spill Response Research Program is a long-standing program collecting information on 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 research and testing of oil spill response technologies.

BOEM also 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,[45] and Executive Order 13580 created the Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska to define information needs.

Further, BOEM works with non-Federal entities, such as Alaska Native groups, the scientific community, industry, and state and local governments. Information has also been gained 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: BOEM is coordinating closely with the Interagency Arctic Research Policy Committee and has had a role in developing the Arctic Research Plan for FY 2013–2017, and BOEM scientists are working with the National Science Foundation initiative "Arctic Science, Engineering, and Education for Sustainability" to ensure our science efforts are closely integrated and complementary.

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 will include new scientific information and stakeholder feedback to proactively determine potential conflicts.

While the majority of this research 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 suggestion that needed information about environmental impacts can sometimes be obtained by research separate from drilling. To that extent, there may be option value in waiting to drill while the research is being performed. This was partly the rationale supporting the 2012–2017 Program decision for scheduling Alaska lease sales late in the program while environmental studies are 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

[45] *Evaluation of the Science Needs to Inform Decisions on the Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska*

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. In developing the EIS, BOEM may refine the broad program areas offered for lease after considering EIS analyses regarding environmentally sensitive habitats, subsistence uses, and any other information based on existing scientific study.

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 may become available for consideration in the decisions on size, timing, and location.

Environmental and social costs are the third step in the NSV calculation. As such, the ranking of planning areas could change with new information on the costs of OCS activity. Further, available information in each planning area is discussed in more detail in Chapter 6 and will be expanded further in the PEIS published at the next stage of Program development.

8.1.1.6 Regulatory and Legal Environment

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. Nevertheless, some parts of the existing regulatory program are periodically identified as being either outdated, in need of enhancement, or not sufficiently transparent. The changes that result can adversely affect the underlying profitability of the leases and related investments. Nevertheless, as the offshore program evolves, new regulations may need to be promulgated and old ones revised, and occasionally new statutory requirements and legal precedents are inevitable in the interest of ensuring safe and environmentally sound OCS operations. The goals of BOEM and BSEE are to communicate and coordinate with the industry on the content and rationale of these forthcoming changes in a timely manner, and to encourage feedback, inputs and suggestions for alternatives to the regulatory proposals before they are finalized. The regulatory and legal environment facing lessees after a sale can greatly impact the profitability of their projects.

An example of regulatory changes in the offshore program involves the Alaska Arctic planning areas. The regulatory issues focus on ensuring environmentally sound operations by making existing standards and requirements for Arctic operations more transparent. These initiatives demonstrate the commitment of BOEM and BSEE to ensuring a stable regulatory environment by proposing new regulations that seek to clarify responsibilities required to be complied with by operators in Alaska.

Uncertainty also exists regarding the possibility that renewable energy projects, aquaculture, or other OCS uses may be proposed that could conflict with oil and natural gas development and production. Because OCS drilling rigs and production facilities have small footprints, application of multiple use scenarios is likely to be a viable option in most cases. Alternative uses of the OCS, and the ability of other OCS projects to co-exist with oil and gas activities, are discussed in Section 4.2.

8.1.1.7 Price Uncertainty

While the value promised by a lease sale is strongly related to the resource endowment concentration and composition and the likelihood of drilling a successful well, along with other uncertainties mentioned above, it also is associated with anticipations and forecasts of future oil and natural gas prices. The literature about real options analysis of value relating to price uncertainty and volatility is large. To consider the option value of the resources related to resource price uncertainty and optimal timing decisions, the current program analysis includes a "hurdle" analysis that is intended to show that every area included in the program is expected to convey 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 for each planning area at the program development stage, but will be re-evaluated during the lease sale planning process. The current results are given in the next section.

8.1.2 Hurdle Prices

To formally assess the timeliness of offering program areas at the Program stage, BOEM subjected the assessment of undiscovered fields in each planning area to an appropriate economic analysis to determine an area "hurdle" weighted average (i.e., BOE) price. The hurdle price is equated with the actual market price below which delaying exploration for the largest potential undiscovered field in the sale area is more valuable than immediate exploration.[46] So, at or above the hurdle price, immediate exploration for that largest prospect is optimal, and full value may be realized by leasing that prospect now. Whether full value may be realized from leasing other prospects as well will be determined in future analyses. This approach has the advantage of identifying areas at the DPP stage which show current economic promise of at least one geologic field, while deferring other timing, composition and sale design decisions to later in the Program process or to the lease sale stage.

At later stages in the Program development process, each area included in the Program proposal will be studied in more detail and an updated resource assessment will be made available, providing the Secretary with more information. Once the Program is approved, the lease sale design stage can focus on deciding whether to hold or delay a sale that is included in the Program, which blocks to offer, setting the sale terms, and issuing leases that meet FMV requirements. 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 to including areas in the DPP decision even if their hurdle prices are below current prices. Retaining an area in the DPP is simply an option to further consider it in the next stage.

For the DPP analysis, BOEM calculated the hurdle prices for each of the 15 planning areas with more than 100 million BOE. As discussed in Section 5.2.6, the other 11 planning areas were

[46] All else being equal, the largest field tends to have the highest net value per equivalent barrel of resources, making it the least likely field to benefit from a delay in being offered for lease in anticipation of increasing resource prices.

determined to have negligible resources and/or development potential, therefore, unlikely to have production at any price. Within each planning area, we selected for use in the hurdle price analysis the largest undiscovered field size class (using USGS standards) which was identified by our statistical resource estimating model as containing at least one undiscovered field. This field size was then used for conducting the hurdle price analysis in each planning area in conjunction with cost estimates appropriate for the applicable water depths and field sizes.[47] These factors were input into an in-house dynamic programming model called WEB2 (When Exploration Begins, version 2) to generate the hurdle prices.

The second column in Table 8-1 shows the input field sizes for each area. The next three columns 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[48] 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 the sixth column of Table 8-1, below which delaying exploration of an undiscovered field of the size shown in the second column is more valuable than immediate exploration. The last two columns convert the BOE price to equivalent oil and natural gas prices using the natural gas-oil ratio typical of the area and a natural gas-to-oil value ratio that combines their thermal and market values. More details on the calculation of applicable oil and natural gas prices that derive from the BOE hurdle prices are included in Appendix B.

As discussed, option value is merely one component of FMV analyses and program formulation. Moreover, in this study option value has focused only on uncertainty related to resource prices. Accordingly, in the Program stage, especially at the DPP decision stage, the hurdle price findings should be taken as a guide only on price-based option value, and additional and more robust analysis may be conducted at later Program stages and before a lease sale occurs. This is especially important as new information becomes available following the recently completed Seismic EIS, as discussed in Section 8.1.1.3, in the Mid-Atlantic and South Atlantic Planning 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.

[47] More information on the methodology of defining the largest field size, estimating costs, and calculating the hurdle prices is included in Appendix B.
[48] On a thermal basis, 5.62 mcf of natural gas provides the same heat content as a barrel of oil.

Table 8-1: Hurdle Prices

Planning Area or Location	Largest Undiscovered Field[a] (million BOE)	Natural Gas-Oil Ratio	Portion of Field BOE		Hurdle Price		
			Oil	Natural Gas	BOE	Oil (bbl)	Natural Gas per mcf
Cook Inlet	175	1.19	83%	17%	$14	$15.64	$1.11
Western GOM Shallow	750	13.98	29%	71%	$15	$26.22	$1.87
Gulf of Alaska	177	6.41	47%	53%	$15	$22.05	$1.57
Chukchi Sea	734	*	100%	0%	$18	$18.00	*
Beaufort Sea	883	*	100%	0%	$18	$18.00	*
Central California	170	1.04	84%	16%	$20	$22.06	$1.57
Central GOM Shallow	1,500	13.98	29%	71%	$20	$34.96	$2.49
North Aleutian Basin	115	*	100%	0%	$21	$21.00	*
North Atlantic	360	6.84	45%	55%	$26	$38.77	$2.76
Central GOM Deep	670	2.16	72%	28%	$27	$32.40	$2.31
Western GOM Deep	670	2.16	72%	28%	$27	$32.40	$2.31
Mid-Atlantic	350	9.66	37%	63%	$28	$45.11	$3.21
Central GOM Ultra Deep	690	2.16	72%	28%	$29	$34.80	$2.48
Southern California	180	1.46	79%	21%	$31	$35.37	$2.52
Eastern GOM	700	2.16	72%	28%	$33	$39.60	$2.82
Northern California	45	1.72	77%	23%	$50	$58.18	$4.14
Washington/ Oregon	44	5.70	50%	50%	$51	$73.08	$5.20
South Atlantic	80[b]	3.96	59%	41%	$57	$75.81	$5.40

[a] Average size of the largest field class anticipated to be present in a planning area with at least 1.2 pools. This standardized stipulation produces reasonable extreme values for most program areas. For the Chukchi, Beaufort, and North Aleutian Basin Planning Areas, the resulting field size represents only the oil portion of the largest field given that gas prospects are not projected to be economic. See Appendix B for further elaboration.

[b] The hurdle price for the South Atlantic Planning Area assumes that the two largest fields, amounting to 80 million BOE, will be produced and share the initial infrastructure costs. Two fields are used in the South Atlantic because the fields are in deep water and it would likely be unprofitable for a company to develop only one field.

Note: The asterisks (*) indicate that natural gas transportation cost exceeds the prorata 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. Accordingly, the hurdle price was calculated in these cases assuming only the oil portion would be produced.

8.2 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.

8.2.1 Size of a Lease Sale

One BOEM consideration regarding the size of the lease sale is 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 (Economic Analysis, Inc. 2010).

The 2010 study (hereinafter referred to as "Area-wide Leasing Study") suggests that, regarding government revenues, the increase in 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 may 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 Federal OCS 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 Act plans, environmentally or military-sensitive areas, and subsistence use by making certain determinations from the outset about which blocks within the planning area are most suitable for leasing. As the 2017–2022 Program is developed, 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.

8.2.2 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 annual sales in both the Western and Central GOM, but less frequent sales in other planning areas. More frequent sales may expedite and increase the present value of leasing and tax revenues. Texas and Louisiana have traditionally held state sales for offshore acreage more frequently than annually. More frequent sales would also reduce the time available for companies to update their information and develop improved value estimates for the remaining available tracts. In addition, BOEM would have less time to gather and analyze new information and prepare environmental decision documents.

Less frequent sales provide the opposite results. The present value of leasing and tax revenues would likely be decreased, and BOEM would have more time to prepare and analyze new information. Companies assessing and evaluating prospects would have additional time to analyze and prepare bidding and exploration strategies. While no decision about the timing and frequency of sales is being made at the DPP stage, the Secretary will weigh all of the requirements of the OCS Lands Act when deciding on the frequency of sales scheduled in the Program.

When deciding the frequency of sales to be held in a particular area, an important consideration is the potential for new information to become available between sales. In the GOM region, seismic activity, exploration well drilling, and lease relinquishments are occurring almost continuously. Moreover, leases are being relinquished frequently. 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. So, in these active areas, demand typically is high for newly offered leases. Accordingly, and partly in response to that demand, an efficiently designed sale schedule tends to involve more frequently held sales. In contrast, when there is less such activity and thus less new information available between sales, such as occurs in frontier areas, it is more appropriate to have a sale schedule involving less frequently held sales.

8.3 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 policies and terms to be used for the sale and the fiscal terms of the leases offered. These terms are examined for each sale to ensure the terms provide the public with FMV for the rights conveyed. As part of the lease sale planning process, sales are designed in such a way and with appropriate fiscal terms to assist in the FMV determination. Traditionally, areas with greater prospectivity and proximity to available infrastructure will be offered with more taxing fiscal terms and shorter initial periods. Frontier areas or less prospective areas are offered with less taxing fiscal terms and longer initial periods. After the sale, each bid is evaluated for FMV bid adequacy before acceptance. The bidding

system, fiscal terms, and bid adequacy review together comprise the lease sale components for ensuring receipt of FMV.

8.3.1 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" (Section 1337(b)(1) of the OCS Lands Act). 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 USDOI 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. USDOI 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 a 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 expects to continue using a single round sealed bid auction format with a cash-bonus competitive bidding system, but plans to analyze alternative fiscal terms in conjunction with the current bidding systems. If newly offered areas are included in the 2017–2022 Program, alternative bidding systems may be desirable. BOEM will conduct further analysis as needed during the subsequent Program stages.

8.3.2 Fiscal and Lease Terms

After deciding to hold a sale and the bidding system to be used, the next set of decisions deals 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 being 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 them in recent sales in response to emerging market and resource conditions, competition, and the prospective nature of available OCS acreage. Recent changes are outlined in the relevant sections below.

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* (IHS-CERA 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. One commenter to the RFI discussed the importance of international competition for oil investment and the need for attractive fiscal terms on the OCS to maintain competitive interest. 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 changes implemented on fiscal terms have enhanced bidding and competition for leases and to determine the necessity of additional changes or adjustments. Absent recent changes in fiscal terms, existing sale terms are evaluated periodically and adjusted if market conditions warrant a change. The practice of making incremental adjustments allows BOEM to evaluate the results of a lease sale which 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.

8.3.2.1 Minimum Bid

For many years, the bid variable of the auction has been the bonus bid. This signature bonus is a cash payment about the time the lease is executed. 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 is 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 recently increased the minimum bid in the deepwater GOM to encourage optimal timing of leasing and drilling for low-valued blocks located 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 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 only 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, 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 even increase, since raising the minimum bid level can push low bids to higher levels.

Because bidders develop their bonus bid in consideration of the expected profit, net of other payments, changes in other fiscal terms can affect the revenues collected through bonuses. A higher expected royalty or rent is likely to induce bidders to formulate lower bonus bids, and vice versa.

8.3.2.2 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 implemented escalating rentals recently 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 faster exploration and development of leases, and earlier relinquishment when exploration is unlikely to be undertaken by the current lessee. Escalating rentals also are 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 be drilled to a depth of at least 25,000 feet subsea.

Rental payments serve to discourage lessees from purchasing marginally valued tracts too soon because companies will be hesitant to pay the annual holding cost to keep a low-valued or currently uneconomic lease in their inventory. Rental payments provide an incentive for the lessee to timely drill the lease or to 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.

8.3.2.3 Royalties

The government reserves a royalty interest in all production from the lease. 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 (e.g., 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 royalty rates twice for GOM leases in recent years 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 analysis, including analysis on historical royalty rates and royalty systems, will be conducted in developing the next stages of the Program and when designing the fiscal terms before a lease sale.

8.3.2.4 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. The length of the initial lease period for GOM leases recently has been reduced in water depths of 800 meters to 1,600 meters to reflect the shorter time deemed necessary to explore for economic prospects.

BOEM has received comments on the necessity for longer initial periods in frontier areas and will consider these comments once a more detailed sale schedule has been defined. However, the OCS Lands Act stipulates that the initial period of the lease cannot extend beyond ten years.

8.3.2.5 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 in use since 1983 evaluates high bids in two phases. 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 a 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.

For an average GOM sale, 1 to 3 percent of high bids are rejected. 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 2010, BOEM rejected total high bids of $597 million, but when the blocks were reoffered, they drew subsequent high bids of $1.565 billion, typically within 1 year, for a total net gain of $968 million, or an increase of 162 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.

In a somewhat different class of cases, some tracts receiving bids classified as nonviable subsequently do go into production. That does not necessarily imply any shortcoming in BOEM's tract evaluation methods; instead, this situation reflects the arrival of new information or other factors after lease award, and new information cannot be anticipated. Nevertheless, BOEM periodically examines its bid adequacy procedures seeking possible improvements.

Bid evaluation procedures are dynamic; as conditions change, BOEM looks for opportunities to improve the process. The current form of the bid evaluation 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 changed. The last significant revision to these procedures was published in the *Federal Register* on July 12, 1999 (64 FR 37560). Other minor changes have been made afterwards to the bid adequacy process, such as adjusting the water depth categories used in the analysis. BOEM is considering changes to its bid adequacy procedures by eliminating the Number of Bids Rule as discussed in the *Federal Register* on October 17, 2014 (79 FR 62461). The Number of Bids Rule was used in the first phase of bid adequacy to help determine whether to accept a block's high bid as representative of FMV without requiring the block to undergo a discounted cash flow analysis, and thereby producing a measure of estimated block value. According to BOEM's previous bid adequacy guidelines, certain categories of blocks that received three or more qualified bids and satisfied several other conditions were accepted at this stage of the block evaluation process.

However, BOEM has identified the Number of Bids Rule as having some weaknesses because it precludes the Bureau from independently evaluating certain blocks about which it may have substantial information relating to the block's underlying value, and occasionally that value may turn out to be greater than the high bid. In addition, by eliminating the Number of Bids Rule, BOEM will reduce the incentive for bidders to engage in undesirable forms of bidding practices and strategies to obtain acceptance of their bids without a full-scale block evaluation being conducted by BOEM. BOEM will review comments received on the October 2014 *Federal Register* notice and determine whether or not to revise the bid adequacy procedures.

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 OCS bid adequacy procedures to incorporate knowledge gained from their use, or to accommodate structural changes to the leasing process.

8.4 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 of FMV (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. 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 Proposed Notice of Sale or other notification in the *Federal Register*, typically prior to publication of the Final Notice of Sale

Part III: Lease Sale Options

Chapter 9 Leasing Options and Draft Proposed Program Secretarial Decision

In accordance with the OCS Lands Act, and as discussed throughout this DPP document, the Secretary of the Interior is required to obtain a proper balance among the potentials for environmental damage, the discovery of oil and gas, and adverse impacts on the coastal zone. 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. The DPP analyses, pursuant to Section 18, are contained in the following chapters:

Chapter	Topic
1	OCS Oil and Gas Leasing Program Development Process
2	Section 18 Factors for Consideration and Balancing
3	Background and Leasing History of OCS Planning Areas
4	Planning Area Location Considerations (energy needs and other uses of the OCS)
5	Valuation of Planning Areas (hydrocarbon resource assessment and net social value)
6	Environmental Consideration Factors and Concerns
7	Equitable Sharing Considerations
8	Assurance of Fair Market Value

The following lease sale options have been identified for the Secretary's consideration. Other refinements of these options may be included and analyzed during the PP phase based on public comments and/or results of the scoping and preparation of the Draft PEIS. Any options considered at the PP phase would not be greater in geographic scope or frequency of lease sale offering than the options presented in this chapter. The chosen option(s) for each planning area is indicated by **bold font**.

9.1 Gulf of Mexico Region Options

Options in the Gulf of Mexico Region take into account the mature and active nature of this region. The chosen options also propose a new approach to lease sales in the GOM by proposing two annual sales across the Gulf that would include all available blocks in the GOM not subject to moratoria. Traditionally, BOEM has held separate annual sales in the Western and Central GOM and periodic sales in the area of the Eastern GOM not subject to moratoria. The new region-wide sale approach will balance the workload of the Agency and increase flexibility for industry, including responding to reforms by the Mexican Government.

- **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 all**

available unleased acreage not subject to Congressional moratorium in the combined Western, Central, and Eastern Gulf of Mexico Planning Areas in each sale, as depicted in Figure 9-1.

Option 1 would provide greater flexibility for industry, including responding to changing conditions (including Mexico's new plan to offer offshore licenses every September starting in 2015); would better balance workload within the Agency; would allow more frequent opportunities to bid on rejected, relinquished, or expired blocks; or could allow continuing with separate annual sales in Western and Central Gulf of Mexico Planning Areas if conditions warranted such an approach. In addition, Option 1 could facilitate better planning to explore pools that may straddle the U.S.-Mexico boundary. Advantages of implementing this option would be the potential to prepare one EIS and combined Endangered Species Act consultations (e.g., one biological opinion), which could result in cost savings and a shorter timeline for completion of the process.

- Option 2: Maintain the approach taken in the 2012–2017 Program, which consists of twelve sales in total, including five annual sales beginning in 2017 in the Western Gulf of Mexico offering all available unleased acreage, five annual sales beginning in 2018 in the Central Gulf of Mexico offering all available unleased acreage, and two sales in the Eastern Gulf of Mexico in 2018 and 2020 offering all available unleased acreage, as depicted in Figure 9-1. No Central or Eastern Gulf of Mexico Planning Area blocks are included for leasing consideration that are subject to Congressional moratorium pursuant to GOMESA.

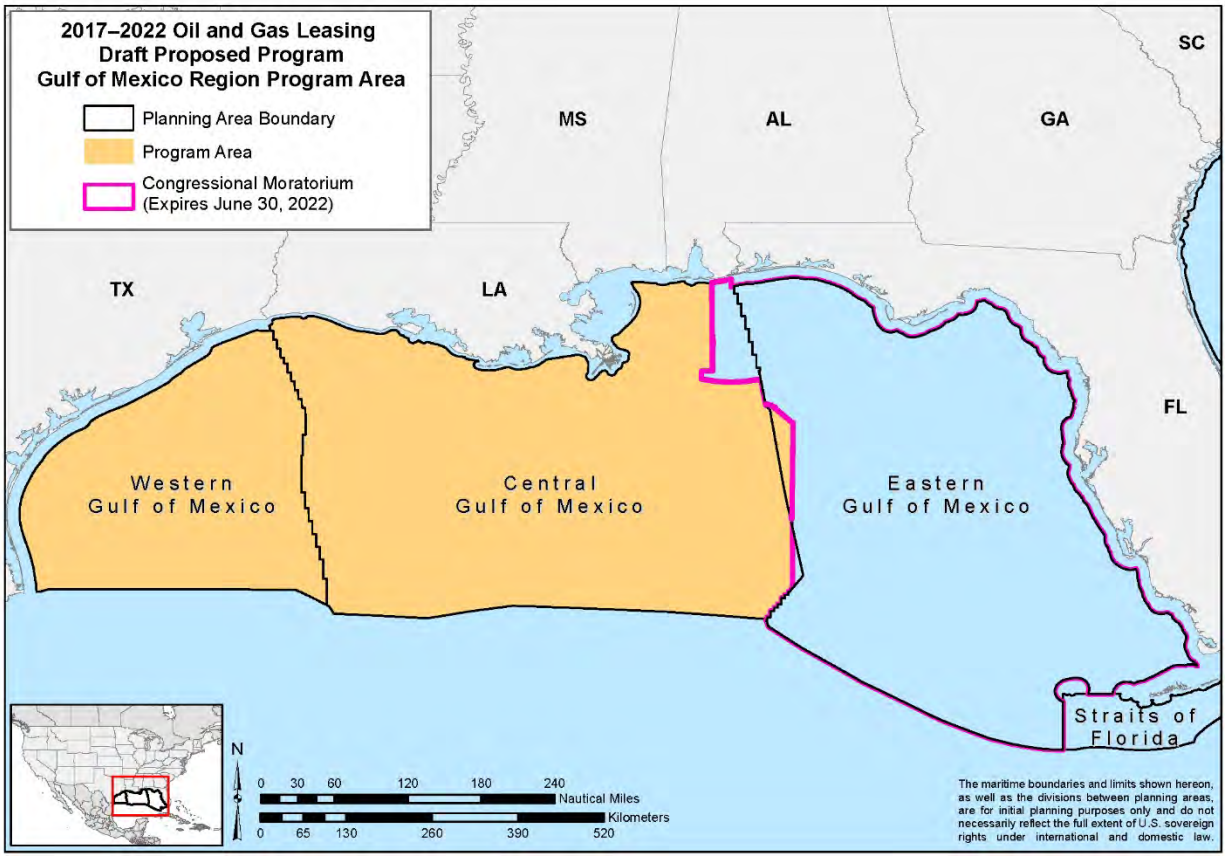
- Option 3: Option 1 or Option 2 with a 15-mile no-leasing buffer south of Baldwin County, Alabama, as requested in the comment letter from the Governor of Alabama.

  Option 3 is more restrictive than necessary to mitigate the visual impacts of concern. It is sufficient to lease subject to the lease sale stipulation that has been in use in Central Gulf of Mexico lease sales for many years. That stipulation requires that there be no new surface structures south and within 15 miles of Baldwin County. The lease stipulation addresses the concerns of the Governor to minimize 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 4: No sale(s).

- Option 5: Other.

Figure 9-1: GOM Region Program Area



9.2 ALASKA REGION OPTIONS

As outlined below, the options take into account a balanced and careful approach to potential leasing in Alaska, including targeted leasing that will consider environmental impacts, subsistence uses, and industry interest. BOEM has developed tools that will facilitate the identification and design of the targeted lease sale strategy for areas offshore Alaska, including ongoing scientific analyses and information gathered through activity on existing leases, during the lease sale planning process, and through consultations and collaborations with other Federal agencies and entities such as the North Pacific Research Board and the Arctic Research Council. Based on this information, the sale planning stage would include a more definitive set of decisions about which blocks to offer, the terms of the sale, and specific lease stipulations and conditions.

The chosen options for the three Alaska areas included in the DPP schedule one potential sale in each area—a Beaufort Sea sale in 2020, a Cook Inlet sale in 2021, and a Chukchi Sea sale in 2022.

For the two Alaska Arctic planning areas included in the DPP, the deferrals will continue from the current Program, including the 25-mile coastal buffer and subsistence deferrals in the Chukchi Sea, and Barrow and Kaktovik whaling deferral areas in the Beaufort Sea. The deferrals for the Beaufort Sea Planning Area were excluded in the current Program as well as the 2007–2012 Program, as these deferrals have long existed around Barrow and Kaktovik at the request of stakeholders, including the North Slope Borough and the Native Village of Kaktovik, respectively. For the Chukchi Sea, a coastal buffer has existed since leasing in that area began. The Chukchi Sea coastal area has been recognized as an important bowhead whale migration corridor, coastal habitat for many bird species, and a protective buffer to offshore subsistence areas and resources for communities along the coast. As such, specific blocks have been deferred through past Programs and lease sales. Other deferrals may be considered in this Program, such as Hanna Shoal, Herald Shoal and Ledyard Bay Critical Habitat Unit in the Chukchi Sea; and Cross Island, Barrow Canyon, Camden Bay, and any other important subsistence areas in the Beaufort Sea. In Cook Inlet, the DPP program area is limited to 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. Deferrals related to the protection of beluga whale and sea otter critical habitat will be considered in subsequent steps.

Options for the Alaska Region take into account the expressed support of the State of Alaska for OCS oil and gas activity in the Arctic areas and Cook Inlet, as well as the conditional support of some of the local Alaska Natives for a targeted leasing strategy, existing leases and/or activity in Federal and/or state waters; significant estimated resources; and substantial industry interest.

The DPP does not include a sale in the North Aleutian Basin. On December 16, 2014, President Obama withdrew the North Aleutian Basin Planning Area from consideration for any oil and gas leasing for a time period without specific expiration. The remaining 11 Alaska planning areas have been excluded because they have negligible estimated resources and/or commercial potential at this time.

9.2.1 Beaufort Sea

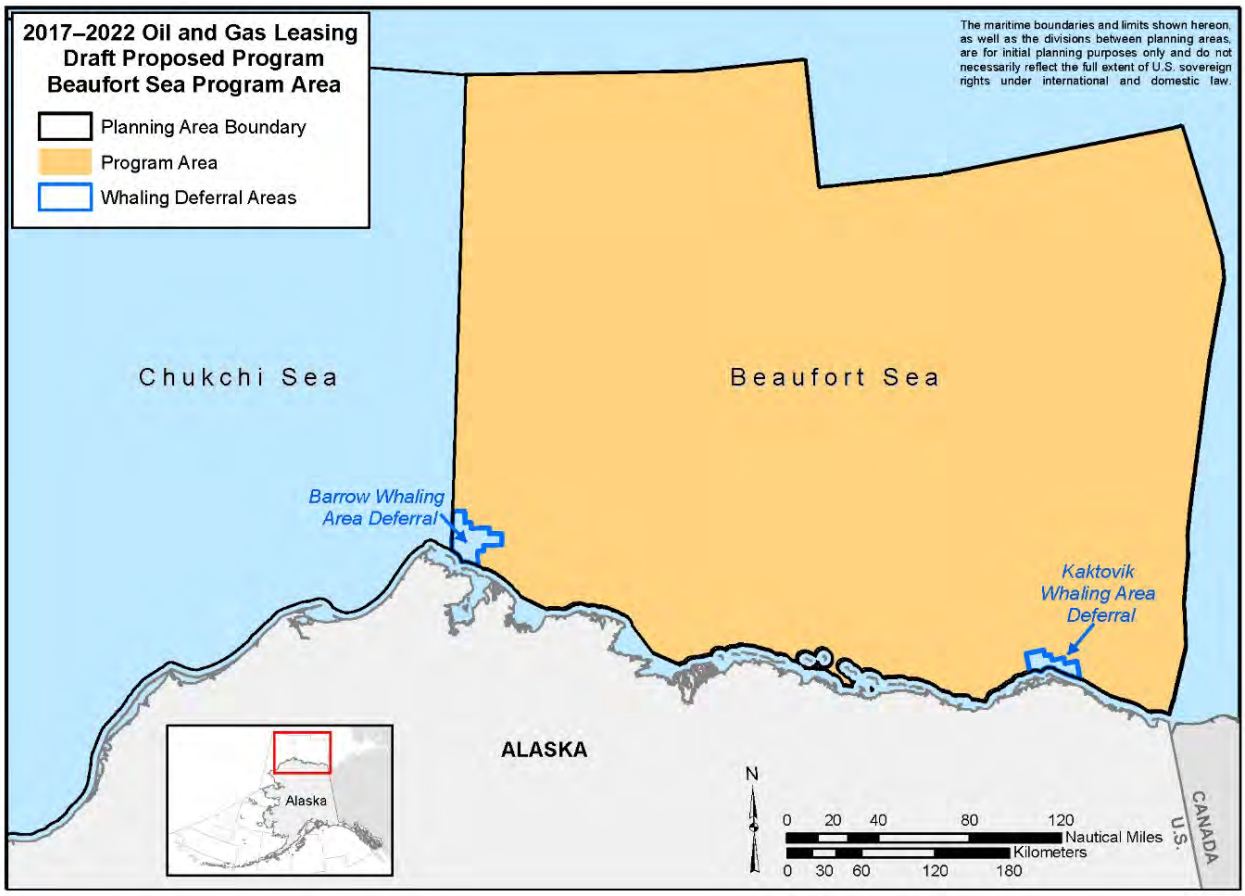
- **Option 1: One sale in 2020, in the entire planning area as depicted in Figure 9-2, with the Barrow and Kaktovik whaling deferral areas excluded as in the 2012–2017 Program.**

  Option 1 provides for a potential Beaufort Sea sale in 2020 in a program area that excludes the Barrow and Kaktovik whaling deferral areas. These deferral areas have long existed around Barrow and Kaktovik at the request of stakeholders, including the North Slope Borough and the Native Village of Kaktovik, respectively.

- Option 2: No sale.

- Option 3: Other

Figure 9-2: Beaufort Sea Program Area



9.2.2 Chukchi Sea

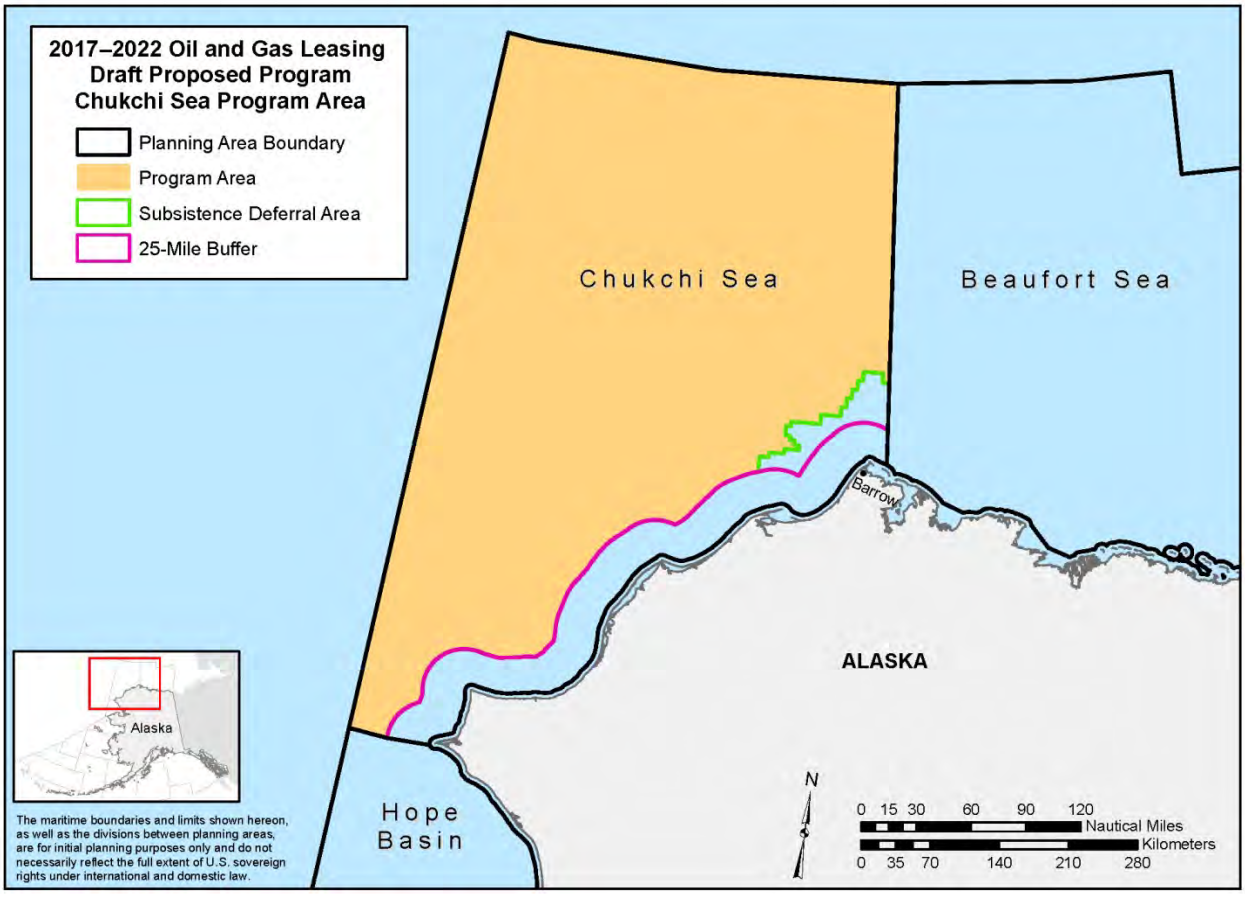
- **Option 1: One sale in 2022, in the entire planning area as depicted in Figure 9-3, with the 25-mile coastal buffer and the subsistence deferral northwest of the City of Barrow as in the 2012–2017 Program.**

  Option 1 provides for a potential Chukchi Sea sale in 2022 in a program area that excludes a 25-mile coastal buffer and the subsistence deferral northwest of Barrow. The buffer and deferral areas are based on BOEM's analysis conducted during the 2007–2012 Program, the current Program, and recent sales and analysis of comments received during the pre-lease process for Arctic lease sales.

- Option 2: No sale.

- Option 3: Other.

Figure 9-3: Chukchi Sea Program Area



9.2.3 Cook Inlet

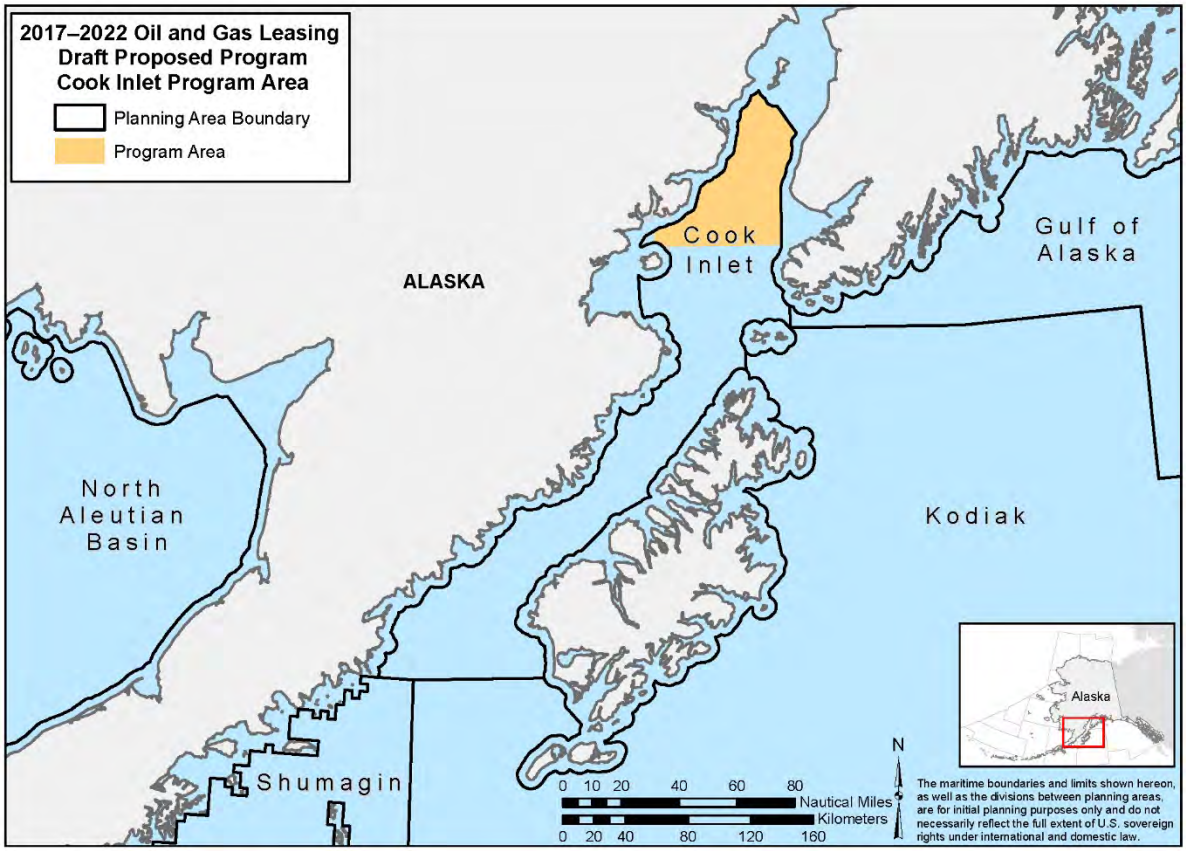
- **Option 1: One sale in 2021, in the northern portion of the planning area as depicted in Figure 9-4.**

  Option 1 provides for a potential Cook Inlet sale scheduled for 2021 in a program area that includes only the northern portion of the Cook Inlet OCS Planning Area. This option balances the protection of endangered species, as identified in 2013 in the Lease Sale 244 Area ID, with the availability for leasing of areas with significant resource potential and industry interest.

- Option 2: No sale.

- Option 3: Other.

Figure 9-4: Cook Inlet Program Area



9.2.4 Alaska Planning Areas Excluded from Further Consideration

The following planning areas are excluded from further consideration: Hope Basin, Norton Basin, Navarin Basin, St. Matthew-Hall, Aleutian Basin, Bowers Basin, Aleutian Arc, St. George Basin, North Aleutian Basin, Shumagin, Kodiak, and the Gulf of Alaska Planning Areas.

- **Option 1: No Sale.**

- Option 2: Other.

9.3 ATLANTIC REGION OPTIONS

Chosen option(s) in the Atlantic will allow for additional analysis of the Mid-Atlantic and South Atlantic area. This targeted approach will allow for consideration of potential resource development and potential impacts. This continues the balanced path forward outlined in the current 2012–2017 Program, which reflects the frontier status of the Atlantic region and the need to increase our understanding of resource potential and to conduct environmental studies, while taking into account a wide array of comments from states, industry, and the public. This type of information will be gathered and analyzed as part of the Section 18 and NEPA process to inform Secretarial decisions at subsequent stages of Program development.

9.3.1 Mid-Atlantic and South Atlantic

- **Option 1: One sale in 2021 in the program area depicted in Figure 9-5, including areas offshore the Commonwealth of Virginia and the States of North Carolina, South Carolina, and Georgia, with a 50-mile, no-leasing buffer from the coastline.**

  Option 1 allows for consideration of areas of promising hydrocarbon resources, while limiting potential impacts to conflicting ocean uses and the environment. Areas offshore the States of Maryland and Delaware were excluded from Option 1 in accordance with the expressed opposition of those States and offshore Florida in deference to the request of the Florida Department of Environmental Protection that primary consideration be given to long-term protection of marine and coastal environments. Excluding the nearer-shore areas will minimize potential impacts on the coastal zone and protected species (including Right Whales, sea turtles, and others) and potential conflicts with renewable energy projects, DOD activities, and other uses of the areas, while not significantly impacting potential resource availability. Scheduling the potential sale late in the Program allows time for additional analysis, including collection of seismic and environmental information, and evaluation of infrastructure needs.

- Option 2: No sale.

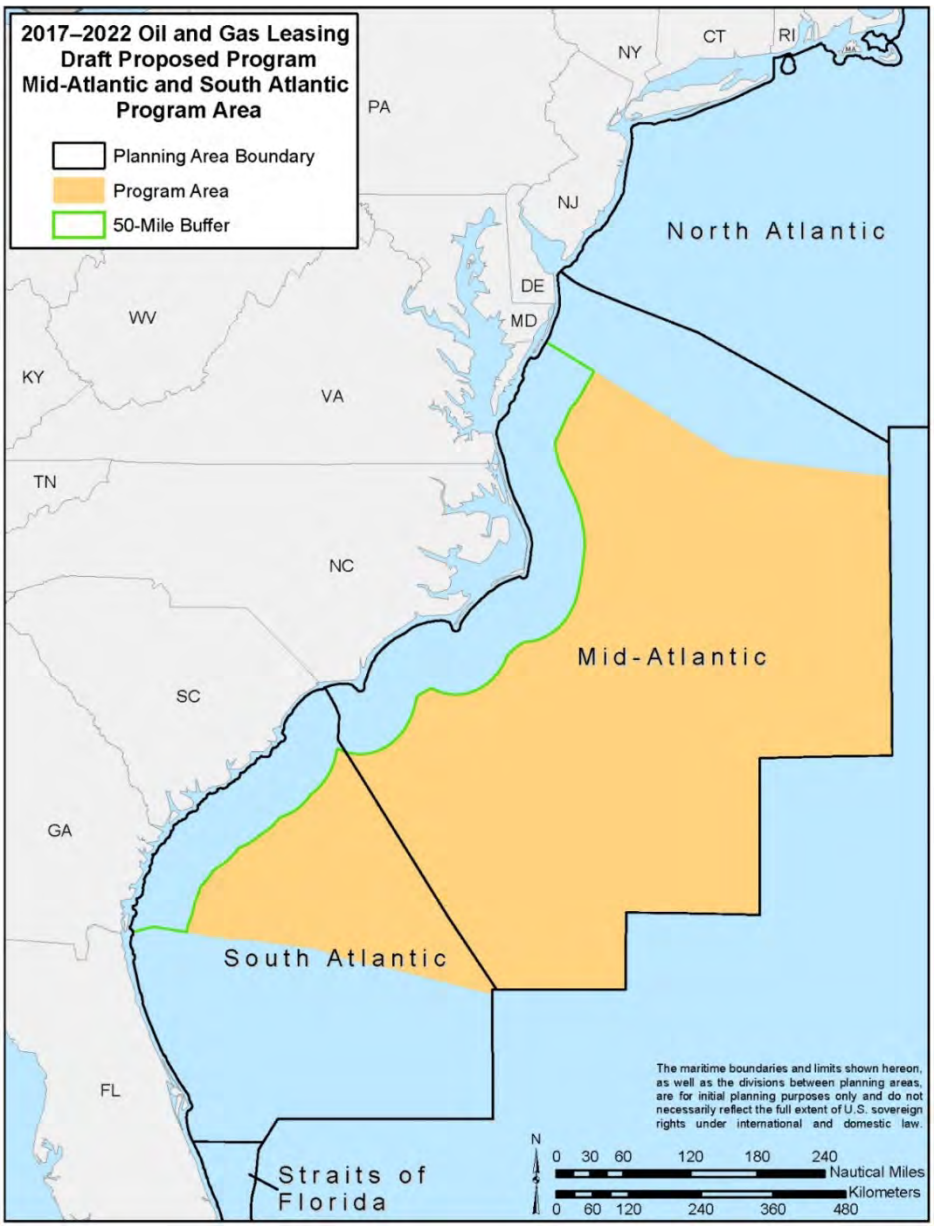
- Option 3: Other.

9.3.2 Atlantic Planning Areas Excluded from Further Consideration

The following planning areas are excluded from further consideration: North Atlantic and Straits of Florida Planning Areas. Based on limited specific industry interest, comments received, and lack of available resource data, the North Atlantic Planning Area is not included in the 2017–2022 Program. The Straits of Florida were excluded from further consideration due to lack of resource potential.

- **Option 1: No sale.**
- Option 2: Other.

Figure 9-5: Mid-Atlantic and South Atlantic Program Area



9.4 PACIFIC REGION OPTIONS

All areas of the Pacific Region are excluded from further leasing consideration for the 2017–2022 Program, in accordance with the expressed opposition of the three coastal States of Washington, Oregon, and California.

9.4.1 Pacific Planning Areas Excluded from Further Consideration

The following planning areas are excluded from further consideration: Washington/Oregon, Northern California, Central California, and Southern California Planning Areas. The exclusion of the Pacific Region is consistent with the long-standing interests of Pacific coast States, as framed in the 2006 West Coast Governors' Agreement on Ocean Health.

- **Option 1: No sale.**
- Option 2: Other.

9.5 SECRETARIAL DRAFT PROPOSED PROGRAM DECISION

The schedule below reflects the lease sale options selected to create the 2017–2022 DPP. Those selections result in a schedule of 14 potential lease sales in 8 OCS planning areas: Ten sales in the three Gulf of Mexico (GOM) planning areas; one sale each in the Chukchi Sea, Beaufort Sea, and Cook Inlet Planning Areas, offshore Alaska; and one sale in a portion of the combined Mid-Atlantic and South Atlantic Planning Areas (see Table 9-1). No lease sales are proposed for the Pacific.

Table 9-1: 2017–2022 Draft Proposed Program Lease Sale Schedule

	Year	Planning Area	Sale Number
1.	2017	Gulf of Mexico Region	249
2.	2018	Gulf of Mexico Region	250
3.	2018	Gulf of Mexico Region	251
4.	2019	Gulf of Mexico Region	252
5.	2019	Gulf of Mexico Region	253
6.	2020	Gulf of Mexico Region	254
7.	2020	Beaufort Sea	255
8.	2020	Gulf of Mexico Region	256
9.	2021	Gulf of Mexico Region	257
10.	2021	Cook Inlet	258
11.	2021	Gulf of Mexico Region	259
12.	2021	Mid-Atlantic and South Atlantic	260
13.	2022	Gulf of Mexico Region	261
14.	2022	Chukchi Sea	262

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 it.

3-D Seismic—A seismic survey where a three-dimensional image of the subsurface can be 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 appropriate NEPA document.

Area-Wide Leasing—All available (unleased and not withdrawn) acreage in the program area will be offered in the sale auction.

Barrel—The standard unit of measure of liquids in the petroleum industry; it contains 42 U.S. standard gallons.

Barrel of Oil Equivalent—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 of the earth's surface into which 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—Bottom dwelling, associated with (in or on) the seafloor.

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 OPD's that are themselves portions of planning areas. Blocks vary in size, but typical ones are 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 Research, Inspections, Offshore Regulatory Programs, Oil Spill Response, and newly formed 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—An event that results in a very large discharge of oil (greater than one million barrels) into the environment that may 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.

Contingency Plan—A plan for possible offshore emergencies prepared and submitted by the oil or gas operator as part of the plan of development and production, and which may be required for part of the plan of exploration.

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 which can drive the migration of resources to a wellbore.

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 (DOI, USDOI)—The Department of the Interior protects America's natural resources and heritage, honors cultures and tribal communities, and supplies the energy to power the future. 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 offshore 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, time 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 250.34.

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); 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 required by NEPA. 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 (EIS) or whether it finds there is no significant impact (i.e., Finding of No Significant Impact).

Environmental Impact Statement (EIS)—A statement required by the NEPA or similar state law in relation to any major action significantly affecting the environment; a NEPA document.

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 baselines 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 Outer Continental Shelf 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 potential hard bottom habitats that should be avoided.

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 exploit the premises for minerals or other products for a specified period of time over a given area. 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 a lease. Oil and gas leases are issued for an initial period of 5 years or not to exceed 10 years where such longer period is necessary to encourage exploration and development in areas because of unusually deep water or other unusually adverse conditions. Once production is reached, the term continues as long as there is production in paying quantities.

Lessee—A person or persons to whom a lease is awarded; the recipient of a lease.

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 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.

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—Quantitative ranking of planning areas based on resources and the economic, environmental, and social costs required to extract those resources.

Net Economic Value—The private 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 costs required to realize the economic value of the resources.

Oil Spill Contingency Plan—A plan submitted by the lease or unit operator along with or prior to a submission of a plan of exploration or a development/production plan that details provisions for fully defined specific actions to be taken following discovery and notification of an oil spill occurrence.

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 3 nm into the Atlantic Ocean, the Pacific Ocean, the Arctic Ocean, 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 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.

Option Value—The value of waiting to make an irreversible investment until critical new information arrives.

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 offshore 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, by any means, of the removal of minerals, including such removal, 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 (PP)—The second of three proposals to be issued for public review before a new Program may be approved. The PP takes into account the comments received concerning the DPP, as well as events and actions that may have occurred between the publishing of the DPP and the PP.

Proposed Final Program (PFP)—The third in a series of 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 PP, transmittal letters to Federal agencies and state Governors, and responses to recommendations from the Governors.

Production—The phase of oil and gas operations that deals with bringing the well fluids to the surface and separating them, storing them, gauging them, and otherwise preparing the products for shipment.

Quasi-Option Value—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.

Record of Decision (ROD)—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, local and tribal governments, Native American and Native Alaskan 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 is seeking a wide array of information including, but not limited to, 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. The royalty rate may be an established minimum, a sliding-scale, or a step-scale.

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 Surveys—A method of geophysical prospecting using the generation, reflection, refraction, detection, and analysis of elastic waves in the Earth. Seismic surveys use sound waves which 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.

Tract—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 lease is granted for a tract. 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.

Undiscovered Conventionally Recoverable Resources—That portion of the hydrocarbon potential that is producible, using present or foreseeable technology without consideration of economic feasibility.

Trap—A geologic feature that permits the accumulation and prevents the escape of accumulated fluids (hydrocarbons) from the reservoir.

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.

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.

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CHAPTER 9

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Appendix A: Summaries of Public Comments by Commenter Category

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Appendix A. Summaries of Public Comments by Commenter Category

A.1 Request for Information and Comments

On June 16, 2014, BOEM published in the *Federal Register* (79 FR 34349) a Request for Information and Comments (RFI) regarding the preparation of a new National OCS Oil and Gas Leasing Five-Year Program for 2017–2022 (2017–2022 Program), to commence July 2017, just prior to the expiration of the 2012–2017 Program on August 26, 2017. BOEM also sent letters to the state Governors and the heads of interested Federal agencies requesting their input. The initial comment deadline of July 31, 2014, was extended to August 15, 2014, after requests from some states for additional time to comment (79 FR 44861, August 1, 2014). A summary of comments received is provided below.

A.2 Summary of Comments Received

BOEM has received more than 500,000 comments in response to the June 16, 2014 RFI. Comments were received from Governors, Federal agencies, state agencies, local agencies, energy and non-energy industry, tribal government, non-governmental organizations including environmental advocacy groups, and the general public (see Table A-1). Of the 22 coastal states, Governors from 6 states requested exclusion from the 2017–2022 Program (Washington, Oregon, California, Maryland, Delaware and Massachusetts), and 9 states requested inclusion in the DPP (Alaska, Texas, Louisiana, Mississippi, Alabama, Georgia, South Carolina, North Carolina, and Virginia). The remaining 7 states either did not provide a response to the RFI (New Jersey, Connecticut, New Hampshire, and Maine) or did not state a position regarding the Program (Florida, New York, and Rhode Island).

Several form letter campaigns were supportive of expanded OCS leasing while several were opposed. Support of or opposition to expanded OCS leasing is influenced by current political, environmental, and socioeconomic trends and is therefore fluid and can be difficult to predict.

Table A-1: Comments Received by Commenter Type

Commenter Type	Number of Comments Received
State Governors and State Agencies	19
Local Governments	26
Environmental and Other Public Interest Groups	40
Federal Agencies	6
Energy Industry and Associations	23
Non-energy Industry and Associations	46
State-level Elected Officials	50
Members of Congress	15
Tribes and Tribal Organizations	5
General Public	499,900
Total	**500,130**

A.2.1 State Governors and State Agencies

A.2.1.1 Outer Continental Shelf (OCS) Governors Coalition

OCS Governors Coalition, comprised of eight Governors from North Carolina, Alaska, Louisiana, Texas, Mississippi, Virginia, Alabama, and South Carolina, urges BOEM to include all unleased areas of the United States OCS in its Draft Proposed Program (DPP), including all three Atlantic planning areas; the Western, Central, and Eastern Gulf of Mexico Planning Areas; and the Beaufort and Chukchi Seas Planning Areas off the coast of Alaska. Access to these areas will allow other states and coastal communities to benefit from new industry, supply jobs, and spur economic activity. The OCS Governors Coalition urges the Obama Administration to support legislation that would expand revenue sharing to all participating coastal states and modify the existing revenue-sharing structure for the Gulf States to ensure a more equitable system.

A.2.1.2 Alaska Region

Alaska Department of Natural Resources (DNR), on behalf of the state, favors an area-wide approach instead of a regionally tailored, targeted leasing strategy in the 2017–2022 Program. Targeting specific areas for future lease sales does not reflect what is known about the resource potential in the U.S. Arctic. The State of Alaska urges BOEM to hold more frequent sales under an area-wide approach. The state's offshore oil and gas leasing program uses an area-wide approach that allows all non-withdrawn tracts to be offered at the same time. This approach is consistent with both BOEM's approach in the Gulf of Mexico and for meeting the purpose of the OCS Lands Act. Alaska DNR suggests that the Chukchi Sea Planning Area is the most prospective of all Alaska OCS areas. Alaska encourages BOEM to avoid delaying OCS leasing in the four Alaska planning areas (Beaufort and Chukchi Seas, North Aleutian Basin, and Cook Inlet). Sufficient information is available about these planning areas to proceed with activities that comply with defined mitigation and environmental stipulations designed to reduce adverse impacts. Alaska also maintains its objection to the moratorium imposed in the Northern Aleutian Basin. Leasing, exploring, and developing leased Beaufort Sea lands would capitalize on the existing oil and gas infrastructure and the capacity available in the Trans-Alaska Pipeline System (TAPS). Alaska DNR offers its Agency experts with significant expertise to coordinate with BOEM as a cooperating Agency during the NEPA review process.

Alaska Lieutenant Governor Treadwell urges BOEM to include all 26 U.S. OCS planning areas in its DPP. The Lieutenant Governor suggests that access to offshore energy resources, like the Beaufort and Chukchi Seas, will assist with job creation and government revenue. In addition, the Lieutenant Governor suggests that offshore development will support TAPS.

A.2.1.3 Pacific Region

California Governor Brown, Oregon Governor Kitzhaber, and Washington Governor Insleeco signed a letter expressing opposition to the inclusion of any new proposed oil and gas lease sales in the Pacific Region in the DPP. The Governors note the importance of ocean-dependent industries on their region's economy and cite the 1969 Santa Barbara oil spill as an

example of the potential consequences of an oil spill along the coast. The Governors reference their joint clean energy development efforts with British Columbia and the Pacific Coast Action Plan on Climate and Energy, which addresses climate change and promotes a clean energy economy.

California Coastal Commission opposes any new lease sales in the frontier areas of the OCS off California, citing historical experience that frontier development requires new platforms, offshore and onshore pipelines, and other support infrastructure that threaten the health of California's coastal environment. The Commission expresses concern about the adverse impacts that high-intensity geophysical seismic surveys, oil and gas operations, increased ship traffic, production of greenhouse gases, and other leasing-related activities will pose to the environment and other resources of the area. The Commission states that development of the OCS areas off California would be inconsistent with the missions of the Coastal Zone Management (CZM) Act and the Marine Life Protection Act. Additionally, the Commission expresses support for a Federal energy policy that transitions from fossil fuel development to renewable energy, greater fuel efficiency and economy standards, conservation, and public transit.

A.2.1.4 Gulf of Mexico Region

Alabama Governor Bentley expresses support for including all leasing options in the DPP, contingent upon all U.S. OCS activities in waters adjoining Alabama's coast being carried out in full compliance with relevant Alabama laws, rules, and regulations and in a manner that is fully compliant and consistent with Alabama's CZM Program. The Governor also requests that BOEM provide protection to sensitive environments in the Gulf of Mexico off the state's coast, including live-bottom areas, pinnacle reefs, and chemosynthetic communities. The Governor opposes offering blocks for lease south of and within 15 miles of the Baldwin County coast in an effort to reduce the visual impact of new oil or natural gas structures. The Governor states that measures need to be taken to prevent another *Deepwater Horizon* disaster. Lastly, the Governor requests that new legislation be passed that will increase revenue sharing with affected states.

A.2.1.5 Atlantic Region

Delaware Department of Natural Resources and Environmental Control's (DNREC) comments reiterate previous opposition and concerns regarding oil and gas exploration in the Mid-Atlantic, and outline pertinent regulatory requirements of the State of Delaware. DNREC states that no documentation of scientific justification exists in support of short-term benefits of oil and gas exploration in the Mid-Atlantic and expresses concern that further risks to the environment and public health would exist. Permitting oil and gas leases anywhere within the Mid-Atlantic OCS will significantly impact DNREC's ability to work with other states to develop a comprehensive alternative energy strategy. The commenter suggests that before potential threats of OCS exploration can be evaluated, a baseline assessment of the epifauna, marine mammal, and sea turtle populations is necessary. Unlike the Gulf of Mexico or Alaska planning areas, the Mid-Atlantic lacks the existing onshore infrastructure to support offshore oil and gas production. Therefore, environmental impacts will not be limited to OCS leased areas because significant development will need to occur on land to support the offshore facilities. The impact of large-scale seismic surveys on the safety of coastal animals and habitats is another

concern. The risks to Delaware's environmental resources and tourism industry are disproportionate to any potential economic gain from oil and gas leasing in the Mid-Atlantic. DNREC reminds BOEM that applicants for Federal permits must be wholly consistent with the policies enforced by Delaware's Coastal Zone Act. This legislation could have potential impact on the transport of resources via pipeline from the OCS region. Finally, Delaware promulgated regulations in 2010 pertaining to air quality impacts of offshore activities.

Florida Department of Environmental Protection (DEP) urges BOEM to proceed cautiously when determining which OCS planning areas to include in the DPP. Primary consideration should be given to the long-term protection of Florida's sensitive coastal and marine resources. As seen with the *Deepwater Horizon* oil spill, accidental spills resulting from OCS oil and gas activities in the Gulf of Mexico can affect Florida's resources, and they have caused negative impacts on Florida's environmental resources, fisheries, tourism, and economy. It is imperative that safety and environmental protection be paramount in conducting OCS oil and gas activities. Florida DEP also enclosed letters from the Florida Departments of State, Florida Department of Agriculture and Consumer Services (DACS), Treasure Coast Regional Planning Council, and Division of Historic Resources, all of which reviewed the DPP to identify issues for possible concerns regarding impact on historic properties listed, or eligible for listing, in the National Register of Historic Places. Should the moratoria areas offshore Florida be opened in the future for leasing and exploration, Florida would have concerns about potential adverse impacts on significant archaeological resources. However, if requirements are in place for historic resources surveys to locate and evaluate historic sites and properties, and measures are undertaken for the avoidance of adverse impacts on significant resources, then Florida believes that historic resource concerns will be addressed adequately. The DACS is responsible for managing Florida's shellfish harvesting areas. Their review indicates that although the exact boundaries of the planning areas are indistinct, 37 shellfish harvesting areas have the potential to be impacted. The DACS outlines several risks to the seafood and tourism industry, including potential pollution at sea, the impacts of a spill, and the risks from hurricanes, among others, and notes that if the environmental impact statement (EIS) considers these points, they would not result in the reclassification or closure of shellfish harvesting areas in Florida.

Georgia Department of Natural Resources, on behalf of the Governor, supports environmentally sound efforts to increase the domestic oil and gas reserves of the United States. Georgia's concerns over the impacts of oil and gas exploration and production fall within three broad categories: 1) the physical environment, 2) the biological environment, and 3) the socioeconomic environment of the state. Regarding the physical environment, Georgia is concerned with potential impacts on groundwater (particularly the Floridian aquifer), offshore hard grounds, and other mineral resources on the continental shelf. Georgia's coastal and offshore waters are sustained by an estuarine system that accounts for approximately one-third of the salt marsh remaining on the Atlantic seaboard. These waters and the state's unique series of undeveloped barrier islands and beaches also provide critical feeding and nesting habitats for several protected, threatened, and rare or endangered species. Socioeconomic concerns include potential impacts on Georgia's historical and cultural resources, as well as on present-day industries and initiatives that include tourism, fisheries, and port traffic. Future wind energy initiatives proposed for the adjacent continental shelf are also of interest to Georgia. Georgia supports the DPP, provided that all relevant environmental and societal issues are fully addressed.

Maryland Governor O'Malley writes to oppose oil and gas exploration and development activities in the Mid-Atlantic OCS. The Governor suggests that oil and gas leasing would put sensitive coastal and marine areas at risk, increase conflicts with existing ocean uses, and consequently jeopardize recreational, tourist, fishing, maritime, and renewable energy industries. The Governor suggests that the Mid-Atlantic OCS should focus on the development of safer and cleaner energy sources.

Massachusetts Governor Patrick opposes oil and gas exploration and development in the North Atlantic Planning Area because these activities are inconsistent with Massachusetts' policy to reduce greenhouse gas emissions and to address climate change and the risk of oil spills to marine ecosystems and habitat. The Governor supports the development of wind energy, as well as marine ecosystem protection policy. The Governor recommends BOEM focus on committing national leadership to a sustainable energy future.

New York State Department of State urges BOEM to take a cautious approach as it proceeds with the DPP. The OCS supports a diversity of offshore uses and resources important to New York State's coastal and statewide economy. The Department requests that BOEM recognize and consider the significant investments New York has made in catalyzing renewable energy generation, reducing greenhouse gas emissions, and developing an energy system that is resilient to future change as it proceeds with development of the DPP. The Department recommends that BOEM consult the 2013 Offshore Atlantic Ocean Study, including associated supplemental studies, and the Department's Geographic Information Gateway for a review of the known and predicted areas that support existing offshore uses and resources important to New York. Activities associated with any new OCS oil and gas exploration and production would have reasonably foreseeable effects on New York's offshore uses and natural resources, and should be evaluated carefully. Such effects may be irreversible should oil and gas exploration and production proceed in the North Atlantic Planning Area, which includes New York. BOEM also should analyze the potential effects that oil and gas development activities in areas of the OCS outside of the North Atlantic Planning Area might have on uses and resources important to New York. BOEM should consider the cumulative effects of oil and gas activities in relation to existing uses and future changes in the offshore environment.

North Carolina Governor McCrory states that it is prudent to include all leasing options in the DPP. The leasing options can provide North Carolina with additional jobs and revenues; however, the Governor is committed to protecting the state's environment through environmentally responsible energy production. The Governor discusses legal and policy considerations as they relate to U.S. OCS energy development and domestic energy. The State asks that the North Carolina Environmental Policy Act and other state laws and policies be considered in regard to ocean energy activities. The state has passed legislation to direct funds from offshore revenue to offshore emergency management funds. The Governor requests that a revenue-sharing plan be developed to benefit states. The Governor also discusses the need to protect coastal and ocean resources as they contribute to the economic and cultural well-being of North Carolina.

North Carolina Lieutenant Governor Forest supports U.S. OCS exploration and urges BOEM to include leasing and exploration of OCS acreage off of North Carolina. North Carolina aims to identify and responsibly utilize available domestic sources of energy, including natural gas.

Including OCS acreage off of North Carolina will assist the Nation in becoming energy independent and will boost the state's economy by creating jobs.

North Carolina Department of Environment and Natural Resources supports including Mid-Atlantic areas off its coast in the potential lease sales scheduled in the 2017–2022 Program. The Department also requests the comment period be extended until August 30, 2014.

Rhode Island Department of Environmental Management is interested in the potential impact of oil and gas exploration on marine fisheries resources, and the industries they support, in the North Atlantic Planning Area. The Department also is in the process of determining whether the Mid-Atlantic Planning Area relates geographically to waters and submerged lands that are important to Rhode Island's commercial fishing interests. The Department expresses interest in scheduling a meeting in Rhode Island to allow BOEM officials to brief the Rhode Island community on the leasing program.

South Carolina Governor Haley supports the ongoing investigations and potential future exploration of oil and gas off the coast of South Carolina; however, the Governor states that South Carolina's willingness to participate in this process "should not be construed as unconditional or unconcerned." The Governor provides additional requests, such as the inclusion of statewide input on exploration buffer zones, to balance industry needs against preservation of South Carolina's coastal aesthetic. Further, the Governor states that the current revenue-sharing structure is inadequate for states, particularly for South Carolina, where much of the state's economic activity is on its coast.

Virginia Governor McAuliffe urges BOEM to open the Virginia portion of the Mid-Atlantic Planning Area, including areas 50 miles beyond Virginia's coastline, for leasing and drilling. The Governor states that Virginia is capable and prepared to support the potential new energy industry in the Mid-Atlantic Planning Area. The Governor adds that Virginia is developing a plan to address OCS conflicts-of-use, and that a Virginia Offshore Energy Emergency Response Fund was created for use during any emergency preparation, response, or mitigation that may be associated with offshore oil spills.

Virginia Department of Mines, Minerals and Energy urges BOEM to include at least the portion of the Mid-Atlantic Planning Area south of the Virginia-Maryland border and beyond 50 miles from Virginia's coastline in BOEM's 2017–2022 Program. Development of these oil and gas resources that is protective of Virginia's coastal environment and its broad economic and ecologic base is critical. BOEM also should consider the economic benefits of offshore energy development to coastal states and communities. The DPP's inclusion of as wide an area as reasonably possible is critical because new Atlantic seismic data will not be available before decisions are made. Virginia currently is developing a plan to ensure that the development of offshore renewable energy does not pose a serious conflict with military activities. Virginia also has enacted legislation to direct the first $50 million in royalties the Commonwealth receives from offshore natural gas and oil production for use in emergency preparation, response, and mitigation associated with offshore oil spills.

A.2.2 Local Governments

Alaska's North Slope Borough Mayor Brower agrees that offshore exploration in the Arctic must be conducted in a safe and responsible manner that is respectful of Alaska Native communities that depend on the ocean for subsistence. The Borough residents depend on subsistence resources for physical and cultural health. If subsistence use is reduced, increases in obesity and diabetes potentially could occur. A threat to subsistence resources is a threat to the viability of communities and the Iñupiat culture. The Mayor discusses concerns related to oil spills, spill response, and associated impacts on arctic marine ecosystems, subsistence activities, human health, and Iñupiat well-being. The Mayor also expresses concern about industrial noise and air and water quality issues that affect marine resources, subsistence, and human health.

The Mayor offers three alternatives to ensure that sufficient information is available to inform decisions regarding offshore authorizations: (1) seek to have all relevant information in hand before any decisions are made; (2) seek to require that responsible agencies have the broadest region-wide ecological information available when leasing decisions are made and that lease sales be the impetus for more focused studies to inform later decisions; and (3) within areas identified as important for caribou, waterfowl, or fish resources, lessees must conduct multi-year, pre-activity, site-specific studies before they are authorized to conduct operations.

The Mayor seeks deferrals of the Cross Island area in the Beaufort Sea and Hannah Shoal in the Chukchi Sea in addition to the currently granted Kaktovik and Barrow deferrals. The commenter states it is important to evaluate new data available on surface currents, and referenced summaries from the University of Alaska, Fairbanks. Lastly, the commenter stresses the importance of consulting with local communities throughout the Five-Year Program process and asks that all potential lessees be required to consult with the Alaska Eskimo Whaling Commission with the goal that they sign a Conflict Avoidance Agreement.

Alaska's Northwest Arctic Borough Mayor Naylor encourages BOEM to retain the areas currently deferred from leasing in the 2017–2022 Program. The Mayor discusses the impacts of offshore oil and gas activities on the Borough's social, economic, and environmental values and its residents. The Mayor points to the Borough's Resolution 11-28 that discusses the following policy issues: (1) better baseline science; (2) improved regulation of oil and gas activities; (3) protection of air and water quality; (4) improved oil spill prevention and response technologies; (5) detailed consideration of cumulative impacts; (6) improved Coast Guard presence; (7) compulsory marine pilotage; and (8) revenue sharing. The Mayor recommends BOEM continue with the current Alaska OCS approach, including a targeted leasing strategy that aims at protecting sensitive habitats and areas of cultural significance, and subsistence hunting and fishing. The Borough will complete a three-year subsistence mapping program in May 2015, which will provide information about subsistence resources and uses for seven coastal communities.

California's Santa Barbara County urges BOEM to exclude any offshore oil and gas lease sales in the Northern, Central, and Southern California OCS Planning Areas as it drafts the 2017–2022 Program. Offshore drilling causes environmental damage and can lead to oil spills. The commenter states that new leases don't need to be offered to energy companies because they

are not producing oil and gas on the vast majority of tracts that they already hold in offshore leases.

California's Ventura County urges BOEM to exclude any offshore oil and gas lease sales in the Northern, Central, and Southern California OCS Planning Areas as the Agency drafts the 2017–2022 Program. The commenter opposes Federal efforts that reduce the role or authority of state and local governments in the siting and approval of offshore energy facilities, or that diminish the public and environmental review process. The commenter opposes time extensions of existing undeveloped offshore oil and gas leases and supports an approach of ensuring that existing leases are developed rather than offering new leases. The commenter states that additional offshore energy exploration and production will negatively impact the environment and could lead to an oil spill.

Florida's Coconut Creek Mayor Blasi expresses extreme concern for the potential adverse effects that oil and gas exploration and drilling could have on coastal ecosystems and tourism, which are important economic drivers for Coconut Creek. The City and its Commission therefore oppose oil and gas exploration off the Atlantic Coast of Florida. The commenter reiterates concerns regarding the negative impacts airgun testing could have on ecosystems as well as whale watching and commercial and recreational fishing, and the resulting impact on local economies if tourism is affected. The commenter also iterates concerns related to oil spills and the risk offshore drilling can have on the environment and economy. Coconut Creek takes pride in its attempts to focus on green building techniques, alternative transportation options, and the preservation of green space, and suggests that with improved fuel economy standards and the development of alternative energy sources, there is no reason to open new areas for drilling in the 2017–2022 Program.

Florida's Edgewood Mayor Bagshaw supports the addition of the Mid-Atlantic and South Atlantic Planning Areas to the upcoming 2017–2022 Program. This expansion would provide a foundation for the development of offshore resources that would create thousands of lucrative jobs for Floridians and bring in a steady stream of revenue for important land reclamation and infrastructure projects.

Florida's Kure Beach Mayor Lambeth expresses full support for including the Mid-Atlantic and South Atlantic Planning Areas in the 2017–2022 Program. The Mayor expresses confidence that the best environmental practices should and will be used to identify any potential resources. The Mayor cites economic benefits and jobs creation as potential benefits of oil and gas drilling in the Atlantic OCS planning areas.

Florida's Martin County Board of County Commissioners opposes oil and gas exploration off the Atlantic Coast of Florida. The Board expresses concern about the possible effects of oil and gas exploration and subsequent deepwater drilling on the ecosystem, tourism, and economy of communities along the Atlantic coast. The commenter expresses specific concerns about proposed use of airgun testing due to the potentially harmful effects the process has on marine life, possible adverse effects on activities such as commercial and recreational fishing, and potential economic effects from a drop in regional tourism.

Florida's Pinellas County opposes the leasing of any portion of the Eastern Gulf of Mexico for oil and gas exploration and recovery due to the potential for local environmental degradation and

consequent economic loss associated with impacts on commercial and recreational fishing, tourism, and related activities. The commenter provides several sources of technical data and reports to document the local, regional, and national value of the Gulf and its dependent habitats and species as a recreational, environmental, and economic asset.

Florida's Port St. Joe Mayor Magidson supports the addition of the Mid-Atlantic and South Atlantic Planning Areas in the upcoming 2017–2022 Program. Their inclusion will boost state and national economy and improve U.S. energy independence. If revenue sharing is allowed, the funds generated will go towards critical infrastructure and land reclamation projects. The Mayor notes that because seismic data in the Atlantic is decades-old, the Government should quickly issue permits to collect new seismic survey data in the Atlantic. The Mayor is confident that industry best practices, standards, and regulations will be used to safely develop offshore oil and gas resources.

Florida's St. Johns County Board of County Commissioners requests that BOEM not include the Atlantic planning areas in the 2017–2022 Program, and that BOEM deny the G&G survey applications and any application for oil or gas drilling in the Atlantic Ocean in or near the shoreline of St. Johns County. The commenter expresses concerns about oil spills that could affect the local economy, which is largely based on tourism and on recreational and commercial fishing. The commenter includes a 2012 letter containing their comments in opposition to the Draft G&G PEIS, describing and evaluating the potential environmental impacts of G&G survey activities in Federal waters of the Mid-Atlantic and South Atlantic OCS and adjacent state waters for the 2012–2020 time period for three program areas: (1) oil and gas, (2) renewable energy, and (3) marine minerals.

Florida's Sunny Isles Beach Mayor Edelcup strongly encourages BOEM to include the Eastern Gulf of Mexico and the Mid-Atlantic and South Atlantic Planning Areas in the 2017–2022 Program. The development of offshore resources could benefit states and the Nation by providing jobs, increasing domestic energy security, and generating new revenue for counties, states, and the Nation. The Mayor supports allowing research that uses proven environmentally safe methods in the Eastern Gulf of Mexico and the Mid-Atlantic and South Atlantic Planning Areas so informed decisions can be made about potentially developing offshore resources.

Florida's City of Tallahassee strongly opposes oil and gas drilling and seismic testing off the Atlantic Coast of Florida, citing concerns about incompatibility of drilling with Florida's coastal economy, space industry, military bases, and marine ecosystems. The commenter also urges BOEM to finalize the Department's rule on updating safety standards for blowout preventers and other well controls before considering offering up new areas for oil and gas production.

Indiana's Delaware Township Trustee urges BOEM to open areas of the U.S. OCS to allow the United States to continue as a global leader in environmentally responsible energy production. Developing offshore resources will create jobs, generate revenue for infrastructure projects if revenue sharing is allowed, and place downward pressure on energy prices. The commenter is confident that corporations will utilize best practices, standards, and regulations to safely develop offshore resources.

Indiana's Indianapolis City-County Council member asks for oil and natural gas exploration on OCS areas off Alaska, the Atlantic, and the Gulf of Mexico. The exploration would provide

greater energy independence for the United States and for residents of Indianapolis, create jobs, and create downward pressure on the price of oil. Techniques used for exploration of energy are safer than they were just a few years ago.

Indiana's Rushville Mayor Pavey urges BOEM to include additional coastal areas in the 2017–2022 Program. Expanding areas for exploration would increase U.S. energy independence from OPEC and other sources, protect the United States from price spikes in the world market, create hundreds of thousands of jobs in the oil and natural gas industry, and keep energy prices low. The commenter believes that new exploration is safe and clean and that regulatory and industry have made considerable safety improvements.

Louisiana's Greater Lafourche Port Commission strongly supports including all 26 OCS planning areas in the development of the DPP. Excluding any regions at the outset of this process without critical environmental analysis could unnecessarily limit the Nation's potential for responsible, local energy production and future security and prosperity. In addition to economic benefits and jobs creation, the Commission states that offshore oil and gas development will provide critical funds for environmental and coastal restoration and protection projects that are essential to the sustainability of coastal Louisiana.

Montana's Yellowstone County Commissioner supports the development of offshore resources in such as the Mid-Atlantic and South Atlantic Planning Areas, citing energy security and economic growth as rationale. The commenter urges BOEM to include other currently unavailable offshore areas, such as in the Atlantic, Gulf of Mexico, and Alaska in the upcoming 2017–2022 Program.

New Hampshire's Concord Mayor St. Hilaire supports the addition of the Mid-Atlantic and South Atlantic Planning Areas to the upcoming 2017–2022 Program to boost the state's—and the Nation's—economic and energy security.

North Carolina's Craven County Commissioner Allen supports the addition of the Mid-Atlantic and South Atlantic Planning Areas to the 2017–2022 Program, citing a potential boost to national and state economic and energy security. The commenter recommends issuance of permits to collect new data to ascertain the best way to safely explore and extract both oil and natural gas to ensure the safety of marine life and environment.

North Carolina's Horry County School Board member supports the inclusion of the Mid-Atlantic and South Atlantic, Gulf of Mexico, and Alaska planning areas in the 2017–2022 Program. The commenter suggests that the offshore development would create much needed jobs in the areas and enhance energy and national security. Specifically, the commenter notes the need for new job opportunities so that students remain in the local area after graduation. A second member strongly supports inclusion of the South and Mid-Atlantic OCS in the 2017–2022 Program, citing local jobs creation as a basis for support, in order to diversify the local economy that is currently based on tourism and agriculture. The commenter also supports utilization of advanced technology, like seismic surveys, to better ensure precision and accuracy in the development of the OCS.

North Carolina's Kinston Mayor Murphy supports the addition of the Mid-Atlantic and South Atlantic Planning Areas to the upcoming 2017–2022 Program, asserting that the addition of

offshore drilling would boost economic and energy security. Further, development of offshore resources would generate revenue for infrastructure projects if revenue sharing is allowed. The Mayor also applauds the passing of the bill "Lowering Gasoline Prices to Fuel an America That Works Act" that included Atlantic offshore oil and gas development.

North Carolina's New Hanover County Commissioner supports the addition of the Mid-Atlantic and South Atlantic Planning Areas to the 2017–2022 Program. The support is predicated on less dependence on foreign oil, reduction of deficit on trade balances, jobs creation, and economic stimulation.

South Carolina's City of Myrtle Beach supports inclusion of the Mid-Atlantic and South Atlantic OCS in the 2017–2022 Program and authorization of permits to conduct seismic surveys to determine the feasibility of natural gas extraction. The commenter notes that the benefits oil and gas projects could bring to the Atlantic region include potential economic opportunity and jobs creation. The commenter states that safety processes for extraction has improved and that offshore energy exploration and tourism can co-exist.

South Carolina's Surfside Beach Councilman Childs supports inclusion of the Mid-Atlantic and South Atlantic OCS in the 2017–2022 Program. Oil and gas development would benefit the community by providing job creation and increased revenues. Job creation would encourage residents to remain in Surfside Beach instead of relocating to other cities. Revenue generated by oil and gas production would fund critical infrastructure projects like beach re-nourishment and ocean outfalls that will preserve the city's tourism industry. The Councilman states that offshore development is safer than it has been in the past and that natural gas production is less risky than oil.

Virginia's Virginia Beach City Council supports exploration of oil and gas resources off the coast of Virginia with royalty payments to the Atlantic coast states, principally Virginia. The benefits of offshore development include creation of jobs and production of millions of dollars of revenue to state and local governments. The commenter reaffirms its endorsement of the exploration of oil and natural gas off the coast of Virginia in Lease Sale 220 area, as long as the development takes place more than 50 miles from the coast of Virginia Beach. The commenter suggests that for royalty area determinations, state boundary extensions to the east be used. Lastly, the commenter states that oil and gas exploration and potential development should not impede on any Department of Defense operations off the coast of Virginia.

A.2.3 Environmental and Other Public Interest Organizations

Alaska Eskimo Whaling Commission (AEWC) strongly believes that offshore exploration in the Arctic must occur in a way that is safe, responsible, and respectful of the Alaska Native communities that depend on the ocean for subsistence. AEWC requests that BOEM take advantage of the Open Water Season Conflict Avoidance Agreement (CAA) Process in this new Five-Year Program to provide coordinated stakeholder input for purposes of BOEM's targeted leasing decision-making. AEWC also strongly encourages BOEM to implement a requirement that lessees engage in the annual CAA Process with the AEWC. Mandating participation in the CAA Process would help to ensure that new entrants into the Arctic are exposed to the highly educational discussions and pragmatic problem-solving techniques through which successful

measures to balance offshore development with bowhead whale subsistence hunting are developed. In addition, AEWC strongly encourages BOEM to incorporate certain longstanding, proven provisions of the CAA into the 2017–2022 Program. These provisions include restrictions on discharges in the Beaufort Sea, where food is taken and eaten directly from the water; incorporation of a coastal buffer zone along the Chukchi Sea; vessel transit guidelines; and a Cross Island Deferral Area. Incorporation of the CAA Process would not intrude on BOEM's decision-making authority, nor would it require the Agency to enforce the terms of the ultimate agreement or become a party to the CAA. Oil and gas leasing in the Beaufort and Chukchi Seas poses environmental justice concerns for the Iñupiat people of the North Slope of Alaska, who are dependent upon the Arctic Ocean for their food security and subsistence traditions.

Alaska Wilderness League submitted a petition signed by 13,087 individuals expressing opposition to the inclusion of the Arctic Ocean in the 2017–2022 Program. The commenters recommend that a BOEM plan should protect special areas and local communities, account for climate change, and disallow dangerous drilling.

Alaska Wilderness League, Blue Frontier Campaign, Center for Biological Diversity, Center for International Environmental Law, Clean Ocean Action, Defenders of Wildlife, Earthjustice, Environment America, Friends of the Sea Otter, Green for All, Greenpeace USA, League of Conservation Voters, Marine Conservation Institute, National Audubon Society, Natural Resources Defense Council, Ocean Conservation Research, Ocean Foundation, Oceana, Sierra Club, Southern Environmental Law Center, and Surfrider Foundation urge BOEM not to include Bristol Bay; Atlantic, Pacific, and Arctic Oceans; or Eastern Gulf of Mexico in the 2017–2022 Program, citing threats to coastal economies, damage to coastal ecosystems from pollution and spills, and acceleration of global climate disruption. Further, the organizations ask that the Administration cancel any existing leases in the Chukchi and Beaufort Seas and that drilling plans from Shell not be approved. They also argue that despite post-*Deepwater Horizon* reforms, new exploration and development may still result in pollution and spills.

Alaska Wilderness League, Center for Biological Diversity, Defenders of Wildlife, Northern Alaska Environmental Center, Pacific Environment, Sierra Club, and Wilderness Society urge the Department of the Interior to exclude the Beaufort Sea, especially those areas offshore the Arctic National Wildlife Refuge, from consideration in the 2017–2022 OCS Program. The commenters express concern about coastal lagoons and islands that blur the marine and terrestrial line for many animals, asserting that these areas are highly susceptible to impacts from oil spills and chronic pollution from offshore oil and gas activities. They have specific concerns about the polar bear and porcupine caribou populations in the area. The commenters ask for analysis of the potential impacts of offshore oil and gas leasing in the Beaufort Sea Federal waters on core wildlife, human, and wilderness values.

Alaska Wilderness League, Center for Biological Diversity, Defenders of Wildlife, Earthjustice, Friends of the Earth, International Fund for Animal Welfare, Natural Resources Defense Council, Ocean Conservancy, Ocean Conservation Research, Oceana, Pacific Environment Sierra Club, and Wilderness Society urge BOEM not to schedule future Arctic Ocean OCS lease sales, in consideration of the climate consequences of Arctic offshore

drilling, combined with the risks of oil drilling and the Arctic Ocean environment. They specifically request that Alaska areas, including Hope and Norton Basins, continue to be excluded. The commenters ask that the Department of the Interior analyze fully the climate costs of drilling in the Arctic Ocean, including the costs of burning any oil and gas produced and the black carbon consequences of exploring for, developing, and producing oil from Arctic waters. The commenters cite additional concerns about impacts on the region's wildlife and people and the risk of oil spills. They request that the Department work in cooperation with other agencies to use available authorities to protect areas known to have particular ecological or subsistence values from the full array of threats posed by an increase in human activity in the Arctic Ocean.

American Energy Alliance members ask BOEM to start leasing in the Atlantic, Pacific, and off the coast of Alaska, in order to provide more access to affordable energy resources, increase job creation, and increase national security.

Center for Regulatory Effectiveness responds to Oceana's comments regarding Alaska OCS development, arguing that Oceana's advocacy for the exclusion of Arctic areas from oil and gas development does not align with the President's energy policy. Excluding this region is impractical and detracts from national energy security. The Center expresses concern about the compliance of Oceana data with Office of Management and Budget guidelines and urges BOEM not to prematurely omit any areas from leasing and development.

Center for a Sustainable Coast, in comments that supplement those made by the Southern Environmental Law Center, expresses concern regarding the cumulative consequences of greenhouse gas emissions related to oil and gas development. The commenter suggests that documentation from the Clean Power Plan EIS would be relevant to the potential adverse impacts that could occur from offshore oil and gas resources. The Center recommends a systemic, long-term assessment of the implications of the proposed offshore leasing program.

Coastal Coordination Program of The Ocean Foundation opposes the 2017–2022 Program. In addition to oil spill risks, insufficient safety culture, and incident response concerns, the commenter suggests that BOEM would be in violation of the "critical balancing" requirements of the OCS Lands Act unless steps have been taken to prevent or mitigate future incidents, if "sensitive coastal waters in any OCS planning area" are included in the new program. The commenter also discusses several other concerns, including use of Federal OCS royalties as an incentive for coastal states to accept offshore leasing; inequality of seaward boundaries; opposition to proceeding with OCS exploration and development without environmental baseline information; consideration of studies on damage of fisheries and marine life caused by airgun impact prior to allowing leasing permits and contracts for seismic activities; inclusion of a comprehensive NEPA process; protection of the Eastern Gulf of Mexico to preserve mission-critical military space use and the coastal-dependent economy on Florida's Gulf Coast and Panhandle; failure to address impacts of ocean loop currents in the Gulf of Mexico; recommendation to consult with other Federal agencies regarding the impact of hydrocarbon exploration and development activities on Arctic wildlife and habitats; consideration of buffer zones around sensitive marine habitats to restrict leasing within 50 miles of national parks or reserves; addition of a lease stipulation to preclude the discharge of any drilling material; providing a statement to Congress that BOEM and the U.S. Coast Guard have provided for

adequate oil spill cleanup capacity; placing a hold on Alaskan waters; and avoiding the North Aleutian Basin, Chukchi and Beaufort Seas, and Lower Cook Inlet/Shelikof Strait in any new OCS program.

Conservation's Northern Voice submitted 93 signatures from Alaskans requesting that no new leasing and drilling be allowed in the Arctic Ocean. They express concerns regarding impacts to wildlife and subsistence fishing.

Consumer Energy Alliance supports the inclusion of all 26 OCS planning areas in the 2017–2022 DPP, including the Atlantic, Eastern Gulf of Mexico, and Chukchi Sea and Beaufort Sea Planning Areas. Future environmental analyses can be used to inform which areas will ultimately be excluded from leasing. Recent increases in the development of oil and natural gas has helped lower energy prices across the country. The Alliance notes that the potential resources available for development in the Atlantic, Eastern Gulf of Mexico, and Beaufort and Chukchi Seas Planning Areas could provide needed employment and government revenue to the areas.

Consumer Energy Alliance members submitted 100,000 comments in support of leasing opportunities in all unleased areas, including the Atlantic, off Alaska, and in all three Gulf of Mexico planning areas. The commenters cite the potential fuel resources available in the area, requesting that these be considered in the overall U.S. energy policy. The commenters assert that energy exploration in the Chukchi and Beaufort Seas will advance scientific understanding of the Arctic and advance U.S. geopolitical interests in the region. A second petition signed by 4,043 individuals expresses support for the expansion of offshore access in the 2017–2022 Program. Commenters state that other countries like Russia, China, and Cuba can access oil and natural gas off their shores.

CREDO Action submitted a petition signed by 83,771 individuals expressing opposition to the inclusion of the Arctic Ocean in the new Five-Year Program. The commenters express concern for the potential of oil and gas drilling to undermine the commitment to fight climate change. Concern is also expressed regarding the possibility of an oil spill that would be difficult to clean up and would risk countless wildlife species.

Earthjustice submitted a statement signed by 45,381 individuals opposing oil drilling and development in the Arctic OCS. The commenters cite concerns related to subsistence, wildlife habitat, noise, traffic, pollution, and oil spills. They request that BOEM not include any new oil and gas lease sales in Arctic waters in this upcoming Five-Year Program; not hold lease sales in the Beaufort and Chukchi Seas in 2017 and 2016, respectively; engage in meaningful reconsideration of the decision to offer oil leases in the Chukchi Sea; and not allow Shell Oil to return to drilling in the Chukchi Sea. The commenters suggest that allowing oil drilling in the Arctic Ocean would move efforts away from alternative, clean energy options.

Environmental Defense Center opposes inclusion of the Pacific OCS planning areas in BOEM's 2017–2022 Program. Excluding this region, including off the State of California, would be consistent with Federal and state actions that protect its sensitive ecological areas. Oil and gas development in the Pacific OCS Region would result in unacceptable risks to the unique and rare bio-regions of the area. Further, additional development of oil and gas would exacerbate global climate change and would undermine the state's goals to meet legal mandates

and adhere to California's Global Warming Solutions Act of 2006. The Center concludes that the United States should foster alternative and renewable energy sources.

Friends of the Earth members, totaling 326, express their opposition to opening any leasing and drilling activities on the OCS during the 2017–2022 Program. The commenters express concern with threats to the health and quality of climate, coastlines, marine wildlife, and coastal communities. The commenters call for a moratorium on all OCS leasing and drilling for the following reasons: increased carbon emissions; adverse impacts on marine wildlife from seismic surveys; lack of adequate oil-spill contingency plans; and damage to coastal communities due to offshore drilling, including a reduction in tourism. Further, the commenters state that the development of the Atlantic planning areas would not have a significant impact on consumer prices and or reduce dependence on foreign oil.

Get Oil Out! urges BOEM to continue the exclusion of the Pacific OCS Region in the 2017–2022 Program. The commenter notes that the 43 existing producing leases in the Pacific OCS should be completed prior to considering new leases. Additional leasing may increase the risk of offshore oil spills, and will increase greenhouse gas emissions. Further, the Pacific OCS Region contains marine sanctuaries, national parks and monuments, and Federal and state marine protected areas that are ecologically sensitive. Alternative energy sources should be developed before any new OCS leases are allowed in the Pacific OCS Region.

National Audubon Society, Oceana, Ocean Conservancy, The Pew Charitable Trusts, and World Wildlife Fund urge BOEM to exclude any Arctic planning areas in the 2012–2022 Program, including the Chukchi and Beaufort Seas. Reasons for exclusion include lack of Arctic-specific regulations to improve safety and prevent accidents; lack of evidence that responders could effectively clean up a major oil spill in the Arctic; lack of infrastructure in the Arctic to support additional oil and gas operations, and data gaps regarding Arctic marine ecosystems. If portions of the Chukchi Sea and Beaufort Sea Planning Areas are included in the 2017–2022 Program, the organizations recommend exclusion of the following Chukchi and Beaufort Seas marine areas from the final and future programs: Barrow Canyon Complex, Harrison Bay, Central U.S. Beaufort, Eastern U.S. Beaufort, Chukchi Corridor, Barrow Canyon Complex, Hanna Shoal Region, and Herald Shoal. The organizations have found these marine areas to have significant ecological or cultural importance. Although the organizations do not support offshore oil and gas operations in the Arctic OCS, they agree with BOEM's targeted leasing strategy in the Arctic planning areas. They suggest that if Arctic planning areas are included in the 2017–2022 Program, the Agency continue to apply the targeted strategy in the Arctic and exclude the Chukchi and Beaufort Seas areas listed above. The exclusion of these additional marine areas is consistent with Integrated Arctic Management and the National Strategy for the Arctic Region. The organizations note that because data gaps exist, other areas of great ecological value may be identified in the future. BOEM should consider additional factors and protections, such as potential for cross-boundary effects from disturbances originating outside exclusion areas; potential cumulative impacts of additional oil and gas activity in the U.S. Arctic that could flow from inclusion of Arctic waters in the leasing program; requiring compliance with Arctic-specific standards like the Alaska Eskimo Whaling Commission Conflict Avoidance Agreement and other region-specific requirements; and providing monitoring and mitigation measures that are Arctic-specific. Providing consulting opportunities for local communities and organizations and methods to share information and

feedback is vital. Similarly, the organizations ask that BOEM make efforts to maintain ecosystem resilience in the Arctic areas. The organizations provided data and maps of the Chukchi and Beaufort Seas and summarized data collection methods and values of marine areas that are recommended for exclusion.

Natural Resources Defense Council urges BOEM to exclude the following areas from the 2017–2022 Program: Atlantic and Pacific OCS Regions, Bristol Bay (North Aleutian Basin); Arctic OCS areas, Cook Inlet, and certain areas in the Central, Western, and Eastern Gulf of Mexico (DeSoto Canyon, Mississippi Canyon, and coastal bottlenose dolphin habitat). The Council states that pollution from drilling, leasing, and oil spills would harm the coastal economies and fragile ecosystems, noting that exploration and development safety recommendations and improvements in the wake of *Deepwater Horizon* event have not yet been implemented. Further, seismic surveys and noises from oil and gas drilling will be disruptive to wildlife. Also, the impacts of oil and gas exploration on climate change should be taken into consideration. The Council offers that offshore energy development should focus on renewable energy over oil and gas exploration. The Council argues that increasing offshore oil and gas drilling would not meet national energy needs. Rather, cleaner alternatives, fuel efficiency, carbon emissions standards, and other supply reductions should be considered.

Northeast Regional Ocean Council supports the rights of their individual state members to express their positions on the matter of BOEM's 2017–2022 Program, and therefore is not submitting a response to BOEM's RFI.

NO to Off Shore Oil Drilling in North Carolina's waters! does not support increased drilling in the OCS generally, and opposes all drilling in the Atlantic. Many of the 2011 National Oil Spill Commission's recommendations to improve offshore drilling safety have not been implemented, meaning that drilling offshore continues to be unsafe for the environment and for the oil rig workers. The commenter believes that going forward with OCS drilling, given these failures, is irresponsible. Additionally, burning the oil and gas that is available in the OCS would release billions of tons of CO_2 into the atmosphere, which will lead to more climate change. Committing to another four decades of carbon-intensive energy production will also delay a switch to sustainable, low-carbon energy. Nearly three-quarters of already-leased offshore areas are sitting unused, meaning that it does not make sense to open more planning areas, particularly in places that have never hosted commercial drilling operations before.

Oceana requests that BOEM exclude planning areas in the Arctic and off the Atlantic and Pacific coasts from the 2017–2022 Program. The commenter expresses concern for the adverse impacts that seismic surveys, oil spills, and other oil and gas exploration activities will have on coastal and marine environments, local economies, and global climate. Oceana asserts that BOEM must use relevant economic data to determine resource availability and must also establish an accurate baseline to analyze environmental impacts. BOEM must avoid adverse impacts to protected species, including the North Atlantic Right Whale. The commenter states that, in the RFI, BOEM did not use a relevant statistic for projecting the value of recoverable resources, and it should use economically recoverable resources for oil and gas estimates, rather than technically recoverable resources, when making decisions for the new Five-Year Program. BOEM should conduct thorough research to determine the ecological baseline of areas under consideration to adequately assess the potential impacts of resource development. The

commenter asks BOEM to consider coastal opposition and local resolutions opposing or expressing concern with seismic activity and the further exploration and development of oil and gas resources.

Oceana submitted a statement signed by 31,323 individuals urging exclusion of the Arctic Ocean and Pacific and Atlantic coasts from leasing during the 2017–2022 Program. They suggest that new offshore lease sales in these areas are unnecessary and will slow efforts to address climate change. The commenters express concerns about impacts on communities and wildlife from oil spills, asserting that there is no proven technology capable of responding to a spill in icy Arctic conditions. They express further concerns about the impacts on environmental and coastal resources and businesses in the Pacific and Atlantic areas.

Ocean Conservancy submitted 52,656 responses that express concern about the potential impacts of oil and gas drilling in the Arctic Ocean and urge BOEM to exclude new oil and gas lease sales in Arctic waters in the new Five-Year Program. The wildlife habitat is vital to coastal communities for subsistence. Noting the demonstrated effects of the *Deepwater Horizon* event on the Gulf of Mexico, the commenters state that the risk of a spill could devastate Arctic ecosystems, people, and wildlife. The Ocean Conservancy responses also reference Shell Oil's drilling campaign in 2012 and lack of Alaska-specific drilling and air quality regulations.

South Eastern Wildlife and Environment Education (SEWEE) Association opposes the inclusion and consideration of the East coast OCS in the proposed Five-Year Program. SEWEE's concerns include potential damage to the wildlife refuges on the coast of South Carolina and on the commercial and recreational fishing and tourism industries. SEWEE also references the continuing negative impacts from the BP oil spill in the Gulf.

Southeast Alaska Conservation Council opposes inclusion of the Alaska OCS in the 2017–2022 Program and all future leasing actions. The Council states that drilling in the Alaska OCS presents unique risks due to the lack of scientific data about the areas, the harsh climate, and contributions to climate change. The Council states that the lease sale areas in Cook Inlet, North Aleutian Basin, and Chukchi Sea are critical to fishery stocks, marine mammals, and the communities that depend on the fishing industry. Further, Kenai National Wildlife Refuge, Redoubt Bay Critical Habitat, and Trading Bay State Game Refuge are close to areas critical for wildlife habitat, fishing, and tourism industries. Also, the Chukchi Sea provides high-oxygen, cold-water habitat that supports a highly biodiverse group of species. Commercial fishing and tourism contribute significantly to the Alaskan economy. Additionally, many remote communities are completely dependent on local harvests for food security. These communities depend on the subsistence harvest for their nutrition as well as the maintenance of traditional and cultural practices and community identity. The Council suggests that the continental shelf be developed for wave-action and tidal generation and platform wind generators.

Sierra Club submitted a statement signed by 44,040 individuals urging BOEM to exclude new leasing or drilling operations in Bristol Bay; Atlantic, Pacific, and Arctic Oceans, and Eastern Gulf of Mexico from the 2017–2022 Program. The commenters state that additional offshore leasing would threaten and damage coastal economies and ecosystems and noted that the damage from *Deepwater Horizon* and *Exxon Valdez* events still exists. Finally, Sierra Club members ask

that the Administration cancel existing leases in the Chukchi and Beaufort Seas and reject drilling plans submitted by Shell.

Sierra Club, South Carolina Chapter, urges BOEM to oppose seismic air gun/sonic cannon blasting for purposes of oil and natural gas exploration off the South Atlantic coast. The commenter cites analysis concluding that Atlantic oil and gas reserves would have little impact on consumer prices and foreign energy dependency. Further, the South Carolina Board of Economic Advisors ranks the South Atlantic coastline as having the highest relative environmental sensitivity to spilled oil. Tourism and outdoor industries would be impacted with sonic cannons. Finally, the commenter states its preference for the pursuit of sustainable energy independence, such as solar and renewables, over oil and gas.

Sierra Club, Virginia Chapter, opposes the 2017–2022 Program. The commenter specifically argues to exclude the Atlantic OCS because of Virginia's susceptibility to sea level rise induced by climate change and land subsidence; impacts that oil spills or drilling activities may have on the operation of the tourism and fishing industries; and the inability to respond to an oil spill. Further, the commenter expresses general concerns related to fossil fuel exploration undermining efforts to cut greenhouse gas emissions and jeopardizing the health and safety of people in Virginia, along with its natural heritage, environment, and national security.

South Bay 350 Climate Action Group, Los Angeles, California, opposes all future oil and gas leases because of the emergency situation the climate is now in with CO_2 levels having passed 400 parts per million.

Southern Alliance for Clean Energy submitted a petition signed by 445 individuals expressing opposition to the opening of the Mid-Atlantic and South Atlantic coasts to offshore oil and gas exploration, leasing, and drilling. The commenters state that there is an abundance of natural gas resources and planning areas are still unused, and that there is an imbalance in costs of opening the areas in comparison to the benefits from the action.

Southern Environmental Law Center, on behalf of Virginia League of Conservation Voters, Virginia Conservation Network, Virginia Chapter of the Sierra Club, Environment Virginia, Surfrider Foundation Virginia Beach Chapter, North Carolina Conservation Network, North Carolina Coastal Federation, North Carolina Wildlife Federation, Environment North Carolina, South Carolina Wildlife Federation, South Carolina Coastal Conservation League, Savannah Riverkeeper, Winyah Rivers Foundation, Charleston Waterkeeper, Conservation Voters of South Carolina, Center for a Sustainable Coast, One Hundred Miles, Satilla Riverkeeper, St. Marys EarthKeepers, Southern Alliance for Clean Energy, Defenders of Wildlife, Center for Biological Diversity, Friends of the Earth, Oceana, Marine Conservation Institute, Coastal Coordination Program of The Ocean Foundation, and Ocean Conservation Research, urges BOEM not to include the Mid-Atlantic and South Atlantic Planning Areas in the new Five-Year Program. The Center states that the organizations' members in Virginia, North Carolina, South Carolina, and Georgia, would experience negative impacts from exploration and development in the Mid-Atlantic and South Atlantic Planning Areas and cites the *Deepwater Horizon* blowout as a demonstration that there is no safe offshore drilling, that spill cleanups are neither quick nor easy, and that the impacts on the environment, tourism, and economy remain for years. Further, the Atlantic coast lacks

infrastructure to manage an oil spill. The predominance of sensitive wildlife habitats and protected species in the Mid-Atlantic and South Atlantic coast makes it exceptionally vulnerable to such impacts. Air quality impacts and noise from industrial-scale operations have the potential to degrade coastal wetlands, barrier islands, and tidal marshes. Instead, the Center advocates encouraging renewable energy development instead of oil and gas development.

St. August Green objects to carving up the Atlantic Ocean for unneeded oil development. The natural beauty, history, and culture in St. Augustine, Florida, would be destroyed by offshore oil drilling. The use of sound as loud as a howitzer would destroy endangered and protected ocean creatures.

Surfrider Foundation, Charlotte, North Carolina Chapter, says that seismic airgun testing will cause catastrophic impacts to the marine ecosystem, including injury or death to hundreds of thousands of whales and dolphins, and also will set the stage for offshore drilling off the Atlantic coast, a dirty and dangerous practice that threatens the health of the oceans and coastal communities. Surfrider Foundation, including the 25 local chapters from Maine to Florida, is deeply dismayed by the Federal Government's decision and will continue to fight the expansion of drilling off the Atlantic coast.

Surfrider Foundation, Florida Chapters, oppose inclusion of the Atlantic coast, Pacific coast, Eastern Gulf of Mexico, and Alaska in any lease sales in the 2017–2022 Program. The commenters express concern for risks to Florida's beaches, fisheries, economy, and environment from seismic testing and expanded oil and gas exploration. They ask that development of the Five-Year Program include a comprehensive review and analysis of potential impacts to both the environment and coastal communities from drilling operations and large oil spills. Commenters ask that a robust analysis adequately consider the cumulative impacts to both the environment and coastal communities from drilling operations and large oil spills and consider alternatives to offshore drilling. The commenters request that the 2017–2022 Program substantively consider the role that renewable energy and conservation can play in meeting future energy needs.

Surfrider Foundation, Miami, Florida Chapter, submitted a letter it sent to the Governor of Florida, requesting that the Governor urge BOEM to reject any permit applications for seismic surveys for oil and gas in the South Atlantic Planning Area and to exclude the South Atlantic and Eastern Gulf of Mexico Planning Areas from the 2017–2022 Program. Surfrider expresses concern over findings that seismic exploration could be harmful to marine wildlife and the ecosystem, and concern over the potential adverse impacts on coastal industries.

Texas Conservative Coalition Research Institute expresses support for including all 26 OCS planning areas in the 2017–2022 Program. With estimates indicating considerable oil and gas resources in the U.S. OCS, the Institute argues that offshore development is crucial for U.S. energy independence and the continued growth of the domestic energy sector. The Institute urges BOEM to include all offshore planning areas in its initial assessment phase in order to ensure that accurate resource assessment information is available to decision makers.

The Nature Conservancy recommends BOEM apply the principles of the full mitigation hierarchy when determining which planning areas to include in the proposed Five-Year Program. The 2017–2022 Program offers BOEM the opportunity to show leadership in implementing the mitigation approach, applying the best management practices, directives, and principles of

Executive Order 13604, the May 2013 Presidential Memorandum on "Modernizing Federal Infrastructure Review and Permitting Regulations, Policies, and Procedures," and USDOI's Secretarial Order Number 3330. The Nature Conservancy states that the inclusion of the Mid-Atlantic and South Atlantic Planning Areas should be delayed until an assessment of costs and benefits and risks of leasing these areas is better understood and G&G activities are gathered and results analyzed. Additionally, it recommends that BOEM use the new coral predictive model and the South Atlantic Fishery Management Council's designation of deep water coral Habitat Areas of Particular Concern in its consideration of Atlantic OCS planning areas; conduct additional regional baseline studies of marine mammals and live benthic habitats in Atlantic OCS planning areas; conduct a comprehensive risk assessment of the Atlantic OCS planning areas; and take advantage of the stakeholder engagement opportunities that are established in the region.

The Wilderness Society provides a list of legislative and regulatory/guidance changes that it believes should be addressed before additional leasing occurs, especially in the Arctic Ocean. These changes were recommended by the investigative bodies following the BP *Deepwater Horizon* spill in April 2010. The Wilderness Society notes that there have been no Federal legislative changes covering drilling operations since the 2010 BP spill, and identifies numerous specific legislative, regulatory, or guidance actions that remain to be taken. A second comment submission also opposes the inclusion of Arctic Ocean areas in the 2017–2022 Program, and that including these areas would be "premature and dangerous." The commenter expresses concerns related to climate change impacts to the region, Alaska Native communities, and marine mammals. Specifically, the commenter asserts that the Chukchi and Beaufort Seas are the most sensitive areas and at higher risk of destruction in the event of a major oil spill. Further, the commenter states that Arctic-specific safety regulations for offshore drilling are not yet in place.

World Wildlife Fund expresses concern about inclusion of the Arctic areas in the 2017–2022 Program. The Fund states that it considers the Arctic area to be a global priority for conservation, as it supports wildlife habitat for migrating birds, whales, and other marine life. The Arctic Ocean ecosystem is linked to other systems around the planet by oceans, air currents, and animal species. The Fund urges BOEM to coordinate closely with the U.S. State Department, international organizations, and others to understand the full impacts of oil and gas leasing in the Arctic planning areas, including the Chukchi and eastern Beaufort Seas. The Fund expresses concern for major oil spills in the Arctic and notes that the three primary oil spill response methods are not effective in Arctic conditions. The Fund also states that expanding petroleum production offshore increases the impacts of climate change. Finally, the commenter states that the same considerations that led to the exclusion of the North Aleutian Basin from the 2012–2017 Program should be applied to support exclusion of this area from the 2017–2022 Program.

A.2.4 Federal Agencies

Department of Commerce, Under Secretary for Oceans and Atmosphere, provides several recommendations to BOEM, including the following: revisiting open ocean environmental sensitivity in consultation with NOAA; considering updated environmental sensitivity index maps and pending updates; coordinating with NOAA and *Deepwater Horizon* co-trustees to ensure leasing areas do not conflict with restoration plans; considering availability of baseline

information on the geographical, geological, and ecological characteristics of OCS regions; assessing response and logistical capabilities in proposed leasing areas; considering impacts along transportation routes; continuing to work with the states relative to the CZM Act and National Marine Sanctuaries Act to ensure BOEM is aware of the states' views and to consider their public input into these processes; increasing access to environmental study data collected in support of oil and gas leasing; considering regional interests and efforts, including the priorities outlined by the regional Governors' alliances on ocean issues and the Regional Planning Bodies set up under the auspices of the National Ocean Policy; and considering a requirement that offshore oil or gas production rigs have installations of high frequency radar, acoustic Doppler current profilers, and dissolved oxygen sensors. NOAA will provide BOEM with science-based guidance for the development of mitigation measures necessary to minimize impacts on marine resources and those dependent on them. The commenter also provides information sources and data on several protected species listed as threatened or endangered in the North Atlantic and Mid-Atlantic Planning Areas; habitat characterization and research on deepwater habitats in the Atlantic, Pacific, and Alaska OCS planning areas; and critical habitats for several species. The commenter emphasizes that BOEM must consult with NOAA on any future action authorized, funded, or carried out under the Five-Year Program that may affect a listed species in the North or Mid-Atlantic Planning Area, and the commenter encourages BOEM to meet with the Greater Atlantic Regional Fisheries Office to discuss BOEM's anticipated activities as soon as possible. The commenter states that, under the Marine Mammal Protection Act (MMPA), any environmental documentation prepared for future leasing, exploration, or development under the Five-Year Program in all planning areas should fully examine all potential impacts to species protected under the MMPA, as well as their habitats and subsistence uses of marine mammals by Native Alaskans. The commenter recommends that BOEM and any potential lessee discuss permitting needs with NMFS' Office of Protected Resources Permits and Conservation Division to ensure that environmental documentation prepared for future leasing, exploration, or development under the Five-Year Program in all planning areas examines all potential impacts to species protected under the MMPA. The Office of Oceanic and Atmospheric Research suggests that the next Five-Year Program include language to address the need for rapid and accurate information on oil-well blowout flow rates.

Department of Defense, Office of the Assistant Secretary, expresses concern about the potential compatibility of military activities with offshore oil and gas development under the 2017–2022 Program. The Department will conduct a comprehensive analysis of mission compatibility with offshore oil and gas development in the planning areas that will be included in the 2017–2022 DPP. The commenter points out that the 1983 Memorandum of Agreement on Joint Use of the Outer Continental Shelf provides the framework for the Departments of the Interior and Defense to work collaboratively, and the commenter looks forward to continued collaboration regarding the 2017–2022 Program.

Department of Transportation has no specific comments at this time on the 2017–2022 Program. However, a point-of-contact was identified and common interests expressed between the U.S. Department of Interior and the U.S. Department of Transportation to ensure pipeline safety and the safety of various users sharing water and air space of the OCS.

Environmental Protection Agency expresses its intent to work closely with BOEM as the 2017–2022 Program is prepared. The Agency offers to facilitate and coordinate with regional and program offices and with the draft PEIS.

Marine Mammal Commission requests that BOEM limit oil and gas development in the Arctic by omitting the Chukchi and Beaufort Seas Planning Areas from the 2017–2022 Program. The Commission recommends that if BOEM considers including the Eastern Gulf of Mexico in the next leasing program, that it exclude Bryde's whale habitat from the lease blocks offered for sale. The Commission does not anticipate inclusion of the Pacific OCS planning areas in the 2017–2022 Program. It also recommends that BOEM omit the Cook Inlet Planning Area from the program until causes for the decline of the Cook Inlet beluga whale population are identified and addressed and progress in recovery of this species has been demonstrated. In addition to the area-specific recommendations above, the Commission provides the following recommendations: collect baseline physical and biological data and information on subsistence use patterns in other Alaska planning areas; provide broader access to seismic data that has been collected in the Atlantic; use a geographically targeted task force approach in the Atlantic to reduce interaction with marine mammals and minimize conflicts with other human uses of the marine environment; and comprehensively analyze the economic and ecological effects of area-wide leasing versus an industry or alternative lease block nomination process in the Gulf of Mexico planning areas. Further, the Commission suggests that BOEM collaborate with other government agencies, oil and gas industry, and other organizations. Lastly, the Commission suggests BOEM make use of the BOEM OCS Scientific Committee or establish a separate independent scientific body to: (1) advise BOEM on the pooling and distribution of funds contributed under 43 U.S.C. 1473 [acceptance of contributions by the Secretary] or other statutory authorities, and (2) ensure that any funded research or monitoring program is subject to the highest scientific and technical standards and does not create a conflict or the appearance of a conflict of interest between BOEM and its regulated entities.

National Aeronautics and Space Administration (NASA) Wallops Flight Facility expresses concerns about the Mid-Atlantic Planning Area, explaining that the presence of either temporary or fixed structures at or below the sea surface, within the facility's hazard areas, would have significant detrimental effects on NASA's ability to conduct aerospace test activities. The Facility expresses strong interest in serving as a Cooperating Agency during preparation of the Five-Year Program PEIS.

A.2.5 Energy Industry and Associations

Alaska Oil and Gas Association supports the inclusion of all 26 OCS planning areas in the development of the 2017–2022 Program and states that excluding these areas would be premature. Expanding access to the OCS planning areas would allow for energy independence and stability, and other economic benefits. Cancellations of four Chukchi and Beaufort Seas lease sales in the 2007–2012 Program has created uncertainty regarding whether lease sales planned for 2016 and 2017 in the Chukchi and Beaufort Seas will proceed as originally anticipated. Given these concerns, the Association encourages BOEM to proceed with area-wide lease sales for the Beaufort and Chukchi Seas. Supporting development of the Arctic OCS advances U.S. interests in developing this strategically critical area and increases the prospect of establishing Arctic port and emergency response capabilities associated with international

activity in the area. Additionally, developing the Arctic OCS increases the likelihood that TAPS is sustainable in the long-term. The Association asks that BOEM create "arctic specific" lease terms, allowing for longer than the current ten-year fixed leases to account for sea ice and other environmental limitations in Arctic exploration. The Association also recommends that BOEM provide for the development of the Cook Inlet Panning Area, as the majority of Alaskans depend of the natural gas produced in the Cook Inlet region for their energy needs.

Alyeska Pipeline Service Company supports a full analysis of the Chukchi and Beaufort Seas as part of the 2017–2022 Program. The commenter adds that although TAPS has been successful, the throughput has declined dramatically since its peak in 1988. The long-term solution to continued and safe operation of the pipeline is for more oil to be delivered into TAPS from the North Slope of Alaska. The commenter urges BOEM to provide for a schedule of regular sales in the Beaufort and Chukchi Seas.

American Association of Petroleum Landsmen's OCS Advisory Board expresses support for maintaining access to existing planning areas, opening access to additional planning areas, and extending lease terms in frontier environments using a predictable area-wide leasing process. They express support for access to all available areas of the OCS, including Atlantic and Pacific planning areas, Eastern Gulf of Mexico, and Alaska coast that are not otherwise limited from being leased for oil and gas exploration and development. The Board supports inclusion of area-wide lease sales for the areas that have not been available for leasing recently, such as Atlantic, Pacific and Alaska areas. The Board also urges BOEM to expand the areas available for leasing by completing advance environmental assessments and analyses covering areas now prohibited from exploration.

American Petroleum Institute, National Ocean Industries Association, Independent Petroleum Association of America, U.S. Oil and Gas Association, American Exploration & Production Council, America's Natural Gas Alliance, Natural Gas Suppliers Association, International Association of Geophysical Contractors, Petroleum Equipment Suppliers Association, Energy Equipment and Infrastructure Alliance, and Alaska Oil and Gas Association jointly support the inclusion of all OCS areas in the DPP, including areas in the Atlantic, Eastern Gulf of Mexico, and Pacific. The organizations ask that BOEM continue offering regular lease sales in the Gulf of Mexico and in the Chukchi and Beaufort Seas, as these areas will aid in supporting TAPS. The organizations also state that: (1) Energy efficiency improvements and alternative energy sources are insufficient to meet U.S. and global energy demand. In order to increase energy production resources, frontier areas will be needed. (2) Since the Macondo [*Deepwater Horizon]* incident, offshore safety measures and operations have been improved and industry standards are being revised. (3) Opening Atlantic planning areas to leasing would provide the economic incentive for companies to collect new seismic survey data and determine resource potential. (4) Other industry activities are compatible with ocean uses such as the examples of Military Warning Areas and Water Test Areas in the Gulf of Mexico and a "drilling window" program. (5) If BOEM changes the existing fiscal policy framework in the Gulf of Mexico, there could be other unanticipated consequences. (6) Do not increase the average minimum bid on lease terms or create shorter lease terms. (7) Fiscal terms for each planning area for lease outside the Gulf of Mexico should encourage broad participation, active lease exploration and development programs, and production growth. (8) Crude oil exports

should not impact decisions on the size, timing, or location of future lease sales nor should exportation of liquefied natural gas.

American Public Gas Association urges BOEM to expand access to all areas in the Gulf of Mexico, offshore Alaska, and Pacific coast. Further, the commenter requests that G&G activities begin in all areas under congressional moratoria. The commenter predicts that supplies from the Mid-Atlantic will be critical to supporting the increased domestic energy demands and on-going movement to natural gas over the next few decades.

Apache Corporation supports expanding exploration and development opportunities in new planning areas in an effort to address energy needs and economic development across the Nation. Apache requests that the 2017–2022 Program include all new areas where the resource potential is unknown, including the Mid-Atlantic and South Atlantic. Additionally, Apache supports "scoping and contingent leasing" for the Eastern Gulf of Mexico if the moratorium is lifted before the 2022 expiration.

Arkansas Independent Producers Royalty Owners Association supports including all 26 OCS planning areas in the development of the DPP. The Association asserts that future environmental studies will inform BOEM which specific areas may need to be excluded for environmental or other reasons, and it advocates for access to previously unleased areas in order to ensure the Nation's long-term energy needs are met.

Chevron U.S.A. states that as an owner of over 600 leases in Federal jurisdictional waters in the United States, and a lessee of both producing and non-producing leases, it is very interested in the continuation of the offshore leasing program. Benefits of offshore oil and gas leasing and development include a healthy economy and a reliable domestic energy source for the growing hydrocarbon-related energy needs that the population and economy demand. The commenter urges BOEM to act quickly in opening areas of the U.S. EEZ and under- and unexplored areas of the OCS, so the lengthy process of evaluation and development can begin. The commenter provides the following general comments in response to BOEM's RFI: (1) offshore oil and gas drilling in the U.S. OCS will help meet the growing demand for energy in the United States; (2) without access, it is difficult to estimate the resource potential of the 87 percent of Federal offshore areas that are currently off-limits; (3) without expanded access to off-limit areas, benefits of offshore oil and gas development, such as economic stimulus and job growth for coastal communities, will not be seen; (4) coastal population centers should bear their proportionate share of their energy burden; (5) co-existing relationships between marine transportation, fishing, military testing, and scientific research can continue as other energy industries are created or expanded into the OCS; (6) the oil and gas industry is willing to develop technology and resources to address another loss of well control and has the technical capacity and safety procedures in place to minimize adverse impacts on the environment; and (7) the oil and gas industry has contributed greatly to data gathering and sharing, and discoveries in areas that they are allowed to operate. Regarding methods for evaluating bids, the commenter suggests that if more than three unrelated bidders submit bids on the same block, the highest bidder should automatically receive the award. Further, BOEM should reconsider the regulation and policy regarding the restricted bidders list, as it is no longer needed or justified. The commenter also comments on changes to lease terms, recommending that BOEM reverse the current policy regarding the 7+3-year leases and issue new deepwater leases located in water depths from 1,600

to 2,000 meters, with a primary term of 10 years. Amendments to the OCS Lands Act that would provide USDOI with more authority to offer different lease terms when justified should be considered. Frontier areas should have larger blocks for longer primary terms. Fifteen year lease terms would be preferred for frontier leases with larger lease blocks (20,000 acres). The commenter states that the current USDOI process for consultation and leasing procedures is inclusive, comprehensive, and transparent. Through the NEPA process, BOEM will analyze the impacts that oil and gas activities have on new planning areas. Potential exports of liquefied natural gas should not affect decisions as to the size, timing, and location of future oil and gas leasing. Chevron provides information about planning areas of interest and the number and timing of lease sales in the 2017–2022 period for each planning area. Lastly, assuming that no lawsuits halt development and that necessary permits are reasonably obtained, the commenter estimates that the lead time to production in areas that are not currently part of the 2012–2017 Program, or currently have infrastructure or production, would be approximately 12 years.

Cobalt International Energy supports the inclusion of all U.S. OCS planning areas in the Five-Year Program. Access to these areas will result in greater energy security and will bring needed employment opportunities to these areas. The Five-Year Program should include areas already open to leasing, as well as offshore areas in the Mid-Atlantic, South Atlantic, and Eastern Gulf of Mexico, should the current moratorium on the latter be lifted prior to the statutory 2022 expiration.

Columbia Gas of Virginia supports oil and gas development in the designated areas, including areas off the Virginia coast. Accessing resources available off the coast of Virginia would support the creation of a robust and reliable energy supply for the United States and help improve the Virginia economy and the well-being of Virginia residents. A balance between protection of marine environments and increased energy supplies can be achieved through science and technology. Further, Columbia Gas requests that BOEM consider the cost of not developing these resources, or other leases that may be considered in the future.

ConocoPhillips supports maintaining the current area-wide planning areas and supports new entry or expanded access to planning areas in the following order of preference: Eastern Gulf of Mexico, North Atlantic, Mid-Atlantic, and South Atlantic, Alaska, and Pacific. In order to create more jobs, the potential for more tax and royalty revenues, increased consumer spending, and improved energy security, ConocoPhillips requests that BOEM hold at least one lease sale in each of the additional planning areas while maintaining a similar schedule in the current planning areas. ConocoPhillips recommends that Atlantic coastal states be offered the same type of revenue-sharing agreements in effect for Gulf of Mexico coastal states. Exploration and production from the Chukchi and Beaufort Seas could mitigate the effects of declining throughput in TAPS. In turn, this would support production from the existing onshore field on the North Slope of Alaska and provide a strategic asset to the United States. Because Arctic exploration has different environmental and climate limitations, requiring longer lead times to contract for equipment and facilities, more preparation time, and higher exploration costs, ConocoPhillips suggests that BOEM extend terms beyond the normal 10 years in the Arctic. The commenter advocates continued use of area-wide leasing for both the planning areas that are currently active and additional planning areas. Further, the commenter asks that BOEM account for timely processing and granting permits for seismic monitoring activities in any additional planning areas made available for leasing.

ExxonMobil Exploration Company urges BOEM to include all 26 OCS areas in the DPP. Further, ExxonMobil suggests that BOEM consider all 26 planning areas early on in the development process and resist eliminating any new areas from consideration, as new areas excluded during any stage of the development process will be categorically disqualified from consideration. ExxonMobil requests that in addition to all acreage currently covered by the 2012–2017 Program, Atlantic and Eastern Gulf of Mexico planning areas should be included. ExxonMobil states that Atlantic OCS data will be important in determining fair market value for these frontier areas. Regarding lease terms and structure, ExxonMobil urges BOEM to adopt a minimum 10-year lease term for all new OCS leases and consider regular lease sales to allow companies the ability to assemble complete lease blocks. ExxonMobil suggests that larger lease blocks will be more cost effective and will streamline the resource development process.

GATE Petroleum Company expresses support for including all 26 OCS planning areas in the development of the DPP. Excluding these areas would be premature in the absence of environmental analysis. GATE states that opening the Atlantic OCS and Eastern Gulf of Mexico would represent more than 20 times the 2012 level of annual Federal offshore oil production and over 94 times the 2012 level of annual Federal offshore natural gas production. GATE estimates that domestic energy development is vital to economic growth and that offshore oil and gas development could support more than 440,000 jobs and $191 billion in cumulative government revenue. In particular, GATE states that it is vital that the United States maintain and accelerate opportunities to develop offshore oil and gas in the resource-rich Beaufort and Chukchi Seas in the Arctic.

Hercules Offshore, Inc., a provider of offshore contract drilling and lift boat services, supports the safe and responsible expansion of U.S. domestic oil and gas production in both offshore and onshore areas. The commenter states that further seismic studies are not necessary, as current seismic data is sufficient to support opening of the Atlantic, specifically, the Mid-Atlantic, in the 2017–2022 Program. Expanding offshore development will help meet the current and future demands for energy, as well as meet the future needs of the newly approved liquefied natural gas export terminals. Expanding additional areas for production will boost local economies in coastal areas and help minimize the risk of energy crises in the future. The commenter suggests that the industry's new regulations and requirements that are focused on safety and the environment will be applied to areas of the Atlantic that are opened for leasing in the 2017–2022 Program.

Interstate Oil and Gas Compact Commission supports the inclusion of all 26 OCS planning areas in the development of the DPP in order to prevent premature exclusion of any planning areas without the benefit of a full environmental analysis to support decision-making. The Commission notes that new offshore discoveries could take up to 15 years to reach market, meaning that leases that become available in 2017 may not result in production until 2032. It asserts that reasonable restrictions can be imposed on exploration and development activities that would ensure protection of these environments. The Commission cites the requirement of lessees in the Beaufort Sea lease areas to develop oil-spill response plans to ensure protection of areas of special biological and cultural sensitivity.

Louisiana Mid-Continent Oil and Gas Association strongly recommends that the Five-Year Program provide leasing opportunities in not only traditional OCS areas in the Western, Central,

and Eastern Gulf of Mexico, but also the expansion into other OCS regions currently off-limits to energy production such as the Mid-Atlantic and South Atlantic, Pacific, and the rest of the Eastern Gulf. Such expansion would help meet America's ever-growing energy needs with domestic energy, reducing U.S. reliance on energy from other regions of the world where conflict can impact energy markets. It also would produce high-paying jobs, and significantly boost royalties paid to the Federal treasury. Significant sales could be realized by local businesses supporting the energy industry. The offshore oil and gas industry in the Gulf of Mexico has proven to provide long-lasting and undisputable economic and energy security benefits not only to Louisiana, but also to the entire Nation. Oil and gas companies have demonstrated their deep commitment to safety and environmental protection throughout the history of the industry, and have recently further strengthened safety and environmental protection programs. With expansion of the lease program, the Association also recommends updates to the revenue-sharing formula in the Gulf of Mexico Energy Security Act of2006 that would fairly compensate long-standing energy states like Louisiana, whose coasts generate a substantial portion of OCS revenues, for the impacts they have experienced and investments they have made to support the industry that, in turn, generates billions of dollars for the Federal Government.

Louisiana Oil & Gas Association supports the inclusion of all 26 OCS planning areas in the 2017–2022 DPP. Continued access to offshore energy development in the Gulf of Mexico will benefit the residents and businesses in the region by generating job opportunities across the region and the United States.

New Mexico Energy Forum believes the Nation has the opportunity to continue to be a leader if BOEM adds currently unavailable offshore areas, such as the Atlantic, Gulf of Mexico, and Alaska to the upcoming 2017–2022 Program, and that these additions would further boost the Nation's economic and energy security as well as create much needed tax revenue.

Noble Energy, Inc., supports a broad and comprehensive Five-Year Program, including areas that are already open to leasing as well as the Mid-Atlantic and South Atlantic Planning Areas. In addition, Noble urges BOEM to initiate scoping and contingent leasing for the Eastern Gulf of Mexico if the current moratorium is lifted prior to its 2022 statutory expiration. The commenter states that safe and responsible exploration and production activities are a key priority and asserts that increased access to oil and gas leasing areas will result in greater energy security and employment opportunity.

Shell Offshore, Inc., urges BOEM to follow the OCS Lands Act in developing the new Five-Year Program. The commenter suggests that the most potential exists in unexplored frontier areas. Shell expresses concern that other countries like Canada, Cuba, Bahamas, Mexico, and South America will continue to take advantage of these frontier areas if the United States does not create a similar ease of access. In order to realize the potential of the Beaufort and Chukchi Seas, Shell suggests the Five-Year DPP include area-wide leasing in the U.S. Arctic, longer primary lease terms, and suspending of primary lease terms to reflect permitting restrictions and environmental constraints such as sea ice. Shell recommends a benefits and risk evaluation of OCS development be conducted and points out that denial of access could also result in risks to job growth, economic development, and alternative energy sources. Shell strongly urges BOEM to consider provisions that allow the lease term to be suspended or put on

hold during the times that the leases are inaccessible for operations. This would provide greater confidence for companies to bid on leases. In response to the request for specific comments concerning fair market value, Shell opposes alternative auction arrangements, supports the current bidding systems, and supports the current tract sizes and revenue sharing similar to that used for new areas in the Gulf of Mexico. Shell notes that larger tract sizes could be a barrier to entry on follow-up leasing by providing the lessee an ability to prevent future access by other companies. Moreover, Shell is unable to demonstrate that exploration would not occur without larger tract sizes since its leasing experience in frontier areas has proven otherwise. Shell suggests that the "guidelines principles" from the 2012–2017 Proposed Program document go beyond statutory language.

South Carolina Energy Forum states that more than ever, America must pursue a comprehensive strategy of domestic energy production to achieve energy independence. The addition of the Mid-Atlantic and South Atlantic Planning Areas in the 2017–2022 Program will help America toward energy independence and create jobs. If revenue sharing were allowed, addition of the Mid-Atlantic and South Atlantic Planning Areas would also generate revenue for critical infrastructure and land reclamation projects. Because the seismic data is several decades old, the commenter encourages the issuance of permits for the collection of new seismic survey data in the Atlantic. Modern seismic surveys are the safest way to explore for oil and natural gas offshore, with little impact on marine mammals.

Statoil USA E & P Inc. asserts that expanded access to responsible development of offshore oil and natural gas resources is vitally important to the U.S. energy security and economic prosperity. Statoil supports a Five-Year Program that not only comprises all areas currently open for leasing in the Gulf of Mexico and offshore Alaska, but also allows for leasing in new areas where the data utilized in the assessment of the resources is insufficient, particularly in the Mid-Atlantic and South Atlantic. Statoil also supports inclusion of the Eastern Gulf of Mexico in both the scoping for the EIS and the lease sale schedule. Statoil suggests that BOEM include an Atlantic sale in the fourth or fifth year of the program in order to provide enough time for the shooting, acquisition and evaluation of seismic surveys. Regarding national interest, Statoil states increasing the development of offshore oil and natural gas resources and transportation infrastructure creates the potential for significant job growth and economic development across the country. Regarding fair market value, Statoil says that in order for the OCS to remain competitive, BOEM should consider fiscal terms that would allow competition in a global market and offers three suggestions for the frontier areas, including Alaska, Mid-Atlantic, South Atlantic, and Eastern and deepwater Gulf of Mexico: (1) BOEM should consider lease terms greater than the current 10-year maximum in order to provide adequate time to explore and produce in a safe, environmentally and economically responsible manner; (2) BOEM should consider including an "automatic Suspension of Operations" stipulation to the lease terms; and (3) BOEM should increase the size of leases offered in frontier areas to at least 9 miles by 9 miles instead of the current 3 miles by 3 miles, to be more consistent with current leases in Canada and Mexico.

Stone Energy Corporation supports a Five-Year Program that includes all open leasing areas in the Gulf of Mexico and offshore Alaska as well as the Mid-Atlantic, South Atlantic, Eastern Gulf of Mexico, and other new leasing areas where the potential for resources is currently unknown. Contingencies can be included in lease schedules to allow for environmental impact assessment.

The commenter suggests that opening offshore areas would make the United States a global energy leader. Domestically, opening planning areas could create jobs and result in a robust economy. Enhanced industry and government standards and regulations and a strong safety culture within industry will allow for oil and gas leasing areas to be developed safely while protecting the environment. In addition, industry experience in the Gulf of Mexico demonstrates the ability of industry to safely co-exist with commercial and recreational fishing, shipping, tourism and military activity. Stone cites this experience as the basis for issuing permits for the collection of new Atlantic seismic data.

A.2.6 Non-energy Industry and Associations

AACRE Properties supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS to the 2017–2022 Program, citing the economic and employment benefits Atlantic states would gain. With the improvements made since the 2010 *Deepwater Horizon* disaster, AACRE is confident that industry will utilize the best practices, standards and regulations to safely develop these offshore resources. AACRE urges BOEM to promptly issue permits to collect current seismic data to better determine the scale of the untapped resource.

Alliance for Economic Development for Georgetown County, South Carolina, urges BOEM to include all of the Atlantic planning areas in the next Five-Year Program and to consider the Port of Georgetown as a primary option for servicing the related OCS development. The proposed timeframe should be "at the earliest practicable time" as required by the OCS Lands Act. The Alliance believes that offshore resources, particularly in the Atlantic, are the key to realization of U.S. energy self-sufficiency. The Alliance believes that the Port of Georgetown is well-positioned to serve, and to benefit from, offshore development in the Atlantic. An economic impact study performed for the Port in 2010 found that every increase of 500,000 tons annually can be expected to yield the following benefits for the local economy: 42 new jobs in the area, $1.3 million annually in new local household income and $4.4 million in total annual local economic output. The Alliance believes that the Port of Georgetown would be a good fit as an energy support base for East Coast OCS development for a number of reasons, including its central interior location that is sheltered from most storms, available workforce, and low-cost, locally-produced electricity. On the basis of the information available to date, it appears that the risks of OCS development, if properly conducted, are remote and manageable, and that existing Federal and state regulatory processes are more than adequate to provide the necessary protection. Revenues from OCS development could be used to ensure that these protections are maintained and strengthened as may be necessary.

American Chemistry Council supports a Five-Year Program that includes all areas currently open for leasing in the Gulf of Mexico and offshore Alaska and also allows for leasing in new areas, particularly in the Mid-Atlantic and South Atlantic. The Council also supports inclusion of the Eastern Gulf of Mexico in the scoping for the PEIS and the lease sale schedule. In part, they base their support for an expanded Five-Year Program on the premise that natural gas supply constraints, especially in the OCS, could inhibit the chemical industry's continued expansion. To respond to increases in demand for natural gas in many sectors of the economy, the Council asserts that access to domestic natural gas supplies must grow too. The United States risks losing jobs, leasing revenue, and technology to other countries if it continues to block OCS development.

Arkansas Chamber of Commerce, Associated Industries of Arkansas, Indiana Chamber of Commerce, and Colorado Business Rountable urge BOEM to include all 26 OCS planning areas in the development of the DPP and to refrain from prematurely excluding regions from leasing consideration in the absence of critical environmental analysis. A great number of jobs and substantial government revenue would be supported by the development of the abundant oil and natural gas resources available in the OCS, including in planning areas that are currently either completely or largely prohibited from development. Resource development in the U.S. Arctic would also significantly bolster the Nation's influence in a strategically critical area. A 6.3 percent unemployment rate, turmoil overseas, high gasoline prices, and a continued steady stream of crude oil imports all demonstrate the need for access to new domestic energy resources.

Associated Industries of Florida supports keeping the 2017–2022 Program very broad by considering areas that are currently being leased, explored, and developed and also considering the addition of new areas with reasonable potential for future resource development, including areas currently under congressional moratorium in the Eastern Gulf of Mexico, and areas of the Atlantic and Pacific. They encourage diversification of the U.S. energy portfolio through exploration of new areas, which they assert would allow the United States to replace the resources currently being produced offshore with additional resources in the future. A robust Five-Year Program will advance the U.S. economy and energy security, and could bring jobs and economic gain to Florida. Due to improved regulations governing offshore energy development and industry adoption of best practices and new technology, Associated Industries of Florida is confident that additional exploration and development will be done in an environmentally responsible way.

Bristol Bay Economic Development Corporation urges that the North Aleutian Basin Planning Area be excluded from the 2017–2022 Program and permanently withdrawn from future leasing programs. The North Aleutian Basin Planning Area is the heart of the most productive fisheries in the United States. This area supports the world's largest wild salmon run as well as Pacific halibut, herring, and crab fisheries that provide tens of thousands of jobs throughout Alaska and along the Pacific Coast and maintain the subsistence way of life of many Alaska Native communities and tribes. The cumulative impacts of offshore drilling would jeopardize these valuable fisheries and the renewable economy the fisheries provide for the region.

Crosby Tugs, LLC, a Louisiana-based tug boat company, supports the inclusion of additional OCS regions, and encourages BOEM to lift the current moratorium in the Eastern Gulf of Mexico prior to its expiration in 2022. Crosby Tugs argues that renewable energy is impractical and too expensive, so the United States should increase development of OCS regions to create more jobs, increase Federal revenue, and better situate the United States to achieve energy independence. Finally, Crosby Tugs notes that BOEM and BSEE are better equipped to regulate the offshore drilling industry since the 2010 *Deepwater Horizon* oil spill.

Fish Basket Coalition, an alliance of Alaska Native, commercial fishing, conservation, and local community interests concerned about potential offshore drilling in the North Aleutian Basin Planning Area, urges USDOI to permanently withdraw the North Aleutian Basin Planning Area from all future leasing programs. The North Aleutian Basin Planning Area, which includes Bristol Bay and adjacent waters of the Bering Sea, is the Nation's seafood stronghold,

accounting for 40 percent of U.S. domestic fishery production. These fisheries support traditional, subsistence-based coastal communities as well as fishing families and businesses across Alaska and beyond. Among the array of important fisheries in the region, such as king crab, herring, halibut, and groundfish, Bristol Bay also sustains the largest wild sockeye salmon run on Earth. Because of the ecological, cultural and economic importance of this area, the Coalition believes that offshore oil and gas drilling presents risks not worth taking.

Fisheries Survival Fund asks BOEM to work with the scallop fishery to identify and resolve potential conflicts in a timely and collaborative manner, consistent with the best scientific and commercial information available if future offshore oil and gas leasing is considered in the North and Mid-Atlantic Planning Areas. The Atlantic OCS is an area that is biologically and economically important to the scallop fishery. Lucrative Atlantic scallop beds are located in discrete areas from Georges Bank through the Delmarva. BOEM has a legal obligation under the OCS Lands Act, as amended by the Energy Policy Act of 2005, to protect existing "reasonable uses," such as commercial fishing, and consider areas for fishing and navigational purposes. Current posted applications in the Mid-Atlantic Planning Area for seismic surveying do appear to overlap scallop rotational "access areas," which are key to the scallop fishery's long-term success. The Fund strongly recommends that BOEM consult with the New England and Mid-Atlantic Fishery Management Councils and NMFS personnel per the Memorandum of Understanding on Coordination and Collaboration Regarding Outer Continental Shelf Energy Development and Environmental Stewardship between the U.S. Departments of the Interior and Commerce. Should leasing activity ever occur in areas of historic scallop fishing and abundance, BOEM must include full, fair, and complete mitigation measures after thorough input from affected communities at the earliest possible stages of project development.

Florida Engineering Society asks BOEM to keep the 2017–2022 Program broad and consider areas that are not currently being leased, explored and developed. The Nation’s energy policy has relied on the resources of the Gulf of Mexico and Alaska and it is time to replenish these resources by exploring other areas. BOEM, the Administration, and industry have made considerable enhancements to regulations that govern offshore energy development, and industry best practices and technologies focused on the areas of spill prevention, containment, and recovery. Congressional, state, and local leaders, as well as the public, support expanding oil and natural gas development because offshore energy development will create more jobs, provide Federal and local government revenue, and enhance energy security.

Florida Retail Federation supports keeping the 2017–2022 Program very broad and including areas that are currently being leased, explored, and developed, as well as including new areas with reasonable potential for future resource development, including areas currently under congressional moratorium in the Eastern Gulf of Mexico and areas in the Atlantic and Pacific. The Federation supports diversifying the U.S. energy portfolio to include new areas for exploration so that the Nation can replace the resources being produced offshore now with additional resources in the future and to ensure domestic energy supplies to counter the negative impacts associated with instability in other countries. Increased oil and natural gas production is a boost to the U.S. economy and is a significant contributor to American and Floridian job creation, shrinking trade deficit, and increased government revenues. Despite the growth in onshore development, the energy picture must have a long-term view that includes a robust offshore leasing and development plan. The Government has made changes to the regulations

that govern offshore energy development to enhance safety, and the industry has also enhanced its best practices and technologies focused on the areas of spill prevention, containment, and recovery. The Federation is confident that these changes will allow offshore exploration and development to proceed in an environmentally responsible way and asserts that no drilling be done within sight of Florida's coastline to gain statewide support.

Florida State Hispanic Chamber of Commerce encourages BOEM to include all offshore areas including all currently excluded areas in the Atlantic, Eastern Gulf of Mexico and Alaska, in the 2017–2022 Program. The Chamber states that a high percentage of their membership represents the long-term unemployed. Their membership sees the potential of offshore development to create high paying jobs as well as an opportunity for the United States to become less dependent on foreign energy sources.

Florida Transportation Builders Association states that BOEM should consider a robust and broad 2017–2022 Program that includes areas that are currently included as well as the addition of new areas with reasonable potential for future resource development, including the Eastern Gulf of Mexico, Atlantic, and Pacific. The Nation's energy policy has relied on the resources of the Gulf of Mexico and Alaska and it is time to replenish these resources by exploring other areas. Considerable enhancements to offshore energy development regulations and industry best practices and technologies have made offshore energy exploration and development safer with regard to spill prevention, containment, and recovery. Congressional, state, and local leaders as well as the public, support expanding oil and natural gas development because offshore energy development will create more jobs, provide Federal and local government revenue, and enhance energy security.

Floridians for Better Transportation supports keeping the 2017–2022 Program very broad to include areas that are currently being leased, explored, and developed and also new areas with reasonable potential for future resource development, including areas currently under congressional moratorium in the Eastern Gulf of Mexico, and areas in the Atlantic and Pacific. The commenter supports diversifying the energy portfolio to include new areas for exploration so that the Nation can replace the resources being produced offshore now with additional resources in the future, and ensure domestic energy supplies to counter the negative impacts associated with instability in other countries. Increased oil and natural gas production is a boost to the U.S. economy and is a significant contributor to American and Floridian job creation, shrinking trade deficit, and increased government revenues. Despite the growth in onshore development, the energy picture must have a long-term view that includes a robust offshore leasing and development plan. The Government has made changes to the regulations that govern offshore energy development to enhance safety, and the industry has also enhanced its best practices and technologies focused on the areas of spill prevention, containment, and recovery.

Georgia Chamber of Commerce supports including all of the Atlantic OCS planning areas in the DPP. Excluding these planning areas will deny citizens and businesses in neighboring Atlantic coast states the opportunity to realize significant economic and societal benefits. Newer surveys will likely increase the Mid-Atlantic and South Atlantic OCS resource estimates and the economic and energy supply benefits that their development is projected to generate. Including these areas is critical to maintaining industry interest in obtaining updated resource data. These

planning areas should not be excluded from consideration before completion of rigorous environmental study.

Georgetown County, South Carolina, Chamber of Commerce supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS to the upcoming 2017–2022 Program. The commenter cites economic concerns and energy security as a basis for its support. The commenter also encourages quick issuance of permits for the collection of new seismic survey data in the Atlantic.

Greater Beaumont, Texas, and Mobile Area and Houma-Terrebonne, Louisiana, Chambers of Commerce strongly support inclusion of all 26 OCS planning areas in the development of the DPP. The commenters assert that all regions should be considered for leasing at the outset in the absence of critical environmental analysis.

Hampton Roads, Virginia, Chamber of Commerce expresses support for offshore oil and gas exploration off the coast of Virginia with the associated royalty payments being returned to the Commonwealth. The Chamber supports offshore oil and gas exploration 50 miles off the coast of Virginia with the caveat that it is conducted in concert with the concerns and requirements of the Department of Defense and the operations of NASA's Wallops Island launch operations. Additionally, the Chamber advocates that these explorations and drillings be conducted in the most environmentally sensitive manner in order to protect marine and coastal ecosystems.

Industrial Energy Consumers of America supports expansion of U.S. domestic oil and gas supplies as well as production of coal and renewable energy. The commenter notes that the demand for natural gas will increase due to increased investments in manufacturing. Development of oil and gas in the Atlantic will bring needed employment to the area, secure domestic energy needs, reduce energy prices, and increase government revenue. The commenter suggests that seismic surveying off the Atlantic coast would give energy producers better knowledge of where potential resources might be located.

Institute for 21st Century Energy, an affiliate of the U.S. Chamber of Commerce, asks that the entire OCS be considered for leasing and that BOEM continue to include areas in Alaska and the Gulf of Mexico currently available for leasing. The commenter asserts that including all planning areas would generate hundreds of thousands of jobs and hundreds of billions of dollars in economic activity for the entire country, continue the trend of reshaping the geopolitical balance towards free markets and democratic states, and significantly reduce the risk to U.S. energy security.

Ironworker Management Progressive Action Cooperative Trust supports the inclusion of all 26 OCS planning areas in the development of the 2017–2022 DPP in order to prevent exclusion of any planning areas without full environmental analysis. The commenter supports development of the Atlantic OCS region, Eastern Gulf of Mexico Planning Area, and Beaufort and Chukchi Seas, and states that resource development in the U.S. Arctic would create jobs and benefit the national economy.

Kentucky Association of Manufacturers urges BOEM to include all 26 OCS planning areas in the 2017–2022 DPP and to refrain from prematurely excluding regions from leasing consideration in the absence of critical environmental analysis. The expansion of affordable

energy opportunities in the United States will ensure the long-term viability of manufacturing in the nation.

National Association of Manufacturers supports expanded access to the OCS and urges the inclusion of all areas currently open to leasing and areas within the Mid-Atlantic, South Atlantic, Eastern Gulf of Mexico, and offshore California in the 2017–2022 Program. Energy resources in these areas can and should be developed responsibly. Modern seismic surveys, which are critical to understanding the size and scope of resources, have lagged in most of the areas within the Mid-Atlantic and South Atlantic, Eastern Gulf of Mexico, and offshore California. The lag has occurred because companies are unlikely to apply for permits to perform seismic research in areas not currently open to leasing or included in a Five-Year Program. The lack of seismic information has resulted in a policy dilemma whereby this country is making offshore leasing decisions without accurate information. The Association asserts that manufacturers would benefit from a steady, secure stream of energy and would create the products and technologies used to evaluate, explore, extract, refine, and transport oil and gas. The economic impacts on the supply chain and customer chain would impact virtually every state in the United States. Exploration and development of promising areas offshore can substantially lower the Nation's energy vulnerability with minimal environmental impact.

North American Submarine Cable Association, in order to safeguard national security and economic interests, urges BOEM to adopt measures to protect existing and planned submarine cable systems, which comprise the core of U.S. international communications and Internet infrastructure and have been identified by the U.S. Government as critical infrastructure, and to address the unique legal protections afforded to such systems as integral parts of BOEM's development of a new Five-Year Program. In developing its next Five-Year Program, BOEM should expressly account for existing and planned submarine cable systems in the OCS, the Federal agencies regulating such systems, their national security and economic importance, and the unique treaty and statutory protections for such systems. In its RFI, BOEM has neglected to identify submarine cable infrastructure as a critical marine activity requiring coordination with any oil and gas exploration or exploitation on the OCS. To ensure protection of submarine cables, the Association urges BOEM to implement a number of actions in its planning activities and documents for its next Five-Year Program, including, among other actions, withdrawing lease blocks with categorical exclusion zones, establishing coordination mechanisms with agencies that regulate submarine cables, and continued engagement with the Federal advisory committee advising the Federal Communications Commission on submarine cable protection.

North Carolina Chamber of Commerce urges BOEM to include all Atlantic OCS planning areas in the DPP. Because existing resource estimates for the Atlantic are based on 30-year old seismic surveys, the Chamber asserts that the inclusion of the Mid-Atlantic and South Atlantic in the DPP is critical to maintaining industry interest in obtaining updated resource data. This interest would set the way for more economical and environmentally effective exploration in the Atlantic OCS planning areas. Further, excluding the Atlantic OCS areas from the DPP would deny citizens and businesses in Atlantic coast states and others from economic and societal benefits. Domestic economic conditions, recent international events, and continued crude oil imports underscore the necessity for Federal actions that encourage, rather than prohibit, domestic energy activity.

North Carolina Farm Bureau urges inclusion of all Atlantic OCS planning areas in the DPP. Excluding North, Mid-Atlantic, and South Atlantic Planning Areas from the DPP would deny the citizens and businesses in North Carolina and other states an opportunity to realize significant economic and societal benefits for many years to come. Excluding these planning areas prior to a rigorous environmental review is neither necessary nor appropriate.

North Carolina Manufacturers Alliance supports including all of the Atlantic OCS planning areas in the DPP. These planning areas should not be excluded from consideration before completion of rigorous environmental study. The existing resource estimates for the Atlantic OCS are based on seismic surveys conducted more than 30 years ago, but newer surveys will likely increase the Mid-Atlantic and South Atlantic OCS resource estimates and the economic and energy supply benefits that their development is projected to generate. Including these areas in the DPP is critical to maintaining industry interest in obtaining updated resource data. The Association believes that excluding these planning areas from the DPP will deny citizens and businesses in neighboring Atlantic coast states the opportunity to realize significant economic and societal benefits. The OCS oil and gas resources also are a key component to the goal of achieving energy self-sufficiency.

Ohio Chamber of Commerce supports including all 26 OCS planning areas in the development of the DPP. Excluding these areas would be premature in the absence of environmental analysis. Much of the untapped resources are located in planning areas that are currently either completely or largely prohibited from development. The Chamber believes that expanding domestic production will reduce the U.S. dependence on foreign oil and natural gas and significantly reduce the assets sent abroad each year. In addition, increasing production would generate more new investment and new jobs.

Palmetto Agribusiness Council requests the inclusion of the Atlantic OCS planning areas, including off South Carolina, in the 2017–2022 DPP. The inclusion of the Atlantic OCS planning areas would contribute to national energy supply stability as well as increase state revenues. Businesses, consumers and agriculture would benefit from a greater supply of domestically produced energy, which would strengthen America's energy security and keep energy costs stable.

Pennsylvania Motor Truck Association supports including all 26 OCS planning areas in the development of the DPP. Proceeding otherwise would severely hamper opportunities to take advantage of domestic energy reserves needed to support the citizens and businesses of Pennsylvania and the United States. The development of domestic energy reserves is particularly important to the trucking industry because fuel availability and cost is extremely vital for this industry. The Association advocates for new access to previously unleased areas in order to ensure the Nation’s long term energy needs are met. New access to the Atlantic and Eastern Gulf of Mexico as well as access to the Central and Western Gulf of Mexico and offshore Alaska will bolster domestic energy production, create tens of thousands of jobs, generate billions in new Federal revenues, and reduce gasoline, diesel, and natural gas prices for American energy consumers.

Pharma Safe Industrial Services expresses support for a Five-Year Program that includes all areas currently open for leasing in the Gulf of Mexico and offshore Alaska, as well as leasing in

new areas, particularly in the Mid-Atlantic and South Atlantic. Additionally, Pharma Safe supports inclusion of the Eastern Gulf of Mexico in both scoping for the EIS and the lease sale schedule. The United States risks losing jobs, revenue, and technology to other countries if it continues to block development of the Nation's own resources. Pharma Safe comments that offshore drilling is safer now than it was four years ago because industry and the Government have: (1) enhanced spill prevention and containment and response, (2) revised existing standards and regulations and created new ones, and (3) worked hard to foster a strong industry safety culture. Pharma Safe urges BOEM to swiftly issue permits for the collection of new Atlantic seismic data because modern seismic surveys are the best way to safely explore for oil and natural gas offshore.

Resource Development Council urges BOEM to include all 26 OCS planning areas in the development of the 2017–2022 Program and to refrain from excluding any region from leasing consideration before conducting a thorough environmental analysis. Developing vast offshore oil deposits in Alaska's Arctic is vital to stemming the throughput decline in TAPS, which has been a critical component of America's energy infrastructure for 37 years. TAPS is now operating at less than one-quarter its original capacity and will face serious operational challenges without additional supply. The Council believes that developing oil and gas resources in the Chukchi and Beaufort Seas would bolster America's influence in the strategically important Arctic and advance energy and economic interests in the region. It would also lead to the establishment of an Arctic port and a robust emergency response capability in the region that would not be economically feasible without the presence of the offshore industry. Any new Five-Year Program must include revenue sharing from the OCS with local communities in Alaska and elsewhere to help address local impacts. Early consultation and conflict avoidance mechanisms should also be included. Any leasing plan should require state-of-the-art oil spill response and consider mitigation measures to minimize impacts to other resource industries, traditional lifestyles, and the environment. Because industry requires regulatory certainty before making major investment decisions, it is important that BOEM release its Arctic-specific regulations as soon as possible.

South Carolina African American Chamber of Commerce supports inclusion of the Atlantic states in the 2017–2022 Program. The commenter notes that oil and gas development would increase job and business ownership opportunities as well as economic security for African Americans. The commenter provides information regarding the rate of unemployment in South Carolina among African Americans and notes that many of the low-income communities near coastal regions would benefit from economic development opportunities provided by offshore resource development.

South Carolina Chamber of Commerce urges inclusion of all Atlantic OCS planning areas in the DPP. After noting that existing resource estimates are based on seismic surveys conducted more than 30 years ago, the Chamber asserts that inclusion of the Mid-Atlantic and South Atlantic in the DPP is critical to maintaining industry interest in obtaining updated resource data, which would pave the way for more economically and environmentally effective and efficient exploration in a large part of the Atlantic OCS. The Chamber states that prematurely excluding North, Mid-Atlantic, and South Atlantic Planning Areas from the DPP would deny citizens and businesses in Atlantic coast and other states from a major opportunity to realize significant economic and societal benefits for many years to come. Domestic economic conditions, recent

international events, and continued crude oil imports underscore the necessity for Federal actions that encourage, rather than prohibit, domestic energy activity.

South Carolina Farm Bureau Federation requests that BOEM include areas of the Mid-Atlantic and South Atlantic Planning Areas in the 2017–2022 Program. Agribusiness in South Carolina will benefit from energy security and controlled costs from a strengthened domestic energy supply.

South Carolina Manufacturers Alliance believes that BOEM should include the Atlantic OCS in the 2017–2022 Program. Manufacturers are dependent on affordable energy, and having access to U.S. untapped energy resources off the coasts would be a tremendous economic boon to South Carolina and also go a long way toward securing America's energy independence.

South Carolina Trucking Association, Inc. strongly urges BOEM to include all Atlantic OCS planning areas in the DPP. Prematurely excluding the North, Mid-Atlantic, and South Atlantic Planning Areas from the DPP prior to any environmental analysis would cost citizens and businesses in the Atlantic coast states the opportunity to realize economic gain and societal benefits that are provided by the exploration and development of offshore resources. The United States cannot achieve or maintain energy independence without access to the nation's abundant natural resources.

Tennessee Farm Bureau Federation supports the inclusion of all OCS planning areas in the development of the 2017–2022 Program. Members of the Federation rely on access to affordable energy to transport and manufacture inputs involved in food production. The United States should increase domestic oil production to reduce dependence on foreign sources of fuel.

Virginia Chamber of Commerce strongly supports OCS oil and gas development in the Atlantic, specifically the development of a new lease sale off Virginia's coast in the 2017–2022 Program. The Chamber states that an energy policy that includes the full utilization of U.S. domestic resources is needed to meet the growing population and business community needs. Developing the Atlantic's energy potential could substantially increase domestic energy production, create jobs in Virginia and nationwide, and add millions to Virginia's economy. Despite past tragedies that have delayed Atlantic OCS development, the Chamber expresses confidence that Atlantic OCS development can be undertaken safely.

Virginia Hispanic Chamber of Commerce strongly supports offshore oil and gas exploration. The benefits of oil and gas exploration are assets to both the Nation and the Hispanic community. Offshore drilling will increase the domestic energy supply and bring increased energy independence to the United States. Increased domestic energy supplies also will lower gas prices, which will be a significant benefit for those in the lower tiers of the economy. Many jobs will also be created through offshore drilling that will benefit the Hispanic workforce and the workforce of the region as a whole.

Westwind Helicopters, a provider of offshore transportation to the oil and gas industry, supports additional lease sales in the Gulf of Mexico.

A.2.7 State-level Elected Officials

Alabama State House Speaker Hubbard expresses strong support for including all 26 OCS planning areas in the development of the DPP, especially all areas along the Gulf of Mexico. Continued and expanded access to all areas of the Gulf of Mexico will generate billions for the economy and support hundreds of thousands of jobs.

Alabama State Senator Whatley supports including all 26 OCS planning areas in the development of the DPP. The experience in the Gulf of Mexico demonstrates how significant offshore energy development is by providing revenue and creating jobs. Expanding access to all areas of the Gulf of Mexico will help supply Americans with reliable crude oil, petroleum products, and natural gas.

Alaska State Representative Millett urges BOEM to add currently unavailable offshore areas, such as in the Atlantic, Gulf of Mexico and Alaska to the upcoming 2017–2022 Program. Expanding the Nation's oil and gas sources will enhance the economy and energy security for the country. Representative Millett is confident that industry will continue and build on the best practices, standards, and regulations which are in place to safely develop offshore oil and natural gas resources. In a second letter, the Representative comments that aside from being the largest untapped resource basin in North America, energy exploration in the Chukchi and Beaufort Seas will advance scientific understanding of the Arctic and advance geopolitical interests in the region.

Alaska State Representative Sadler recommends that BOEM include offshore leasing in the waters bordering Alaska, Gulf of Mexico, and Atlantic Ocean. The Representative believes that experience with oil development demonstrates the various benefits of providing expanded opportunities for OCS leasing in these areas, including job creation and revenue generation. In Alaska, oil development is the foundation of private economy, and oil revenue funds have provided services to citizens in the state. The commenter introduced and passed House Joint Resolution 26, supporting Alaska OCS development and calling for Alaska or other coastal states to receive the same revenue-sharing policies as some Gulf of Mexico states receive.

Alaska State Senator Dyson states that the resources available in the OCS will help North America gain energy independence from the Middle East. The Alaska economy depends on natural resources and the OCS area could be a significant contributor. The Senator notes that over 30 wells have been drilled in the Chukchi and Beaufort Seas over 20-plus years with no adverse effects.

Alaska State Senator Giessel urges BOEM to add currently unavailable offshore areas, such as Alaska, Atlantic, and Gulf of Mexico to the upcoming 2017–2022 Program. These additions would further boost the Nation's economic and energy security as well as create much needed tax revenue. The Senator states that Alaska has experienced the continued benefit of increased jobs and revenue from oil and natural gas development, and believes that every state with these natural resources should have the opportunity to benefit from the same economic gain. Alaska, with its refined application and permitting process, is an example that oil and natural gas can be developed in a way that protects both people and its ecosystems. The Senator is confident that

energy companies and other states will utilize the same best practices, standards, and regulations that are in place to safely develop offshore oil and natural gas resources.

Alaska State Senator McGuire strongly supports including all 26 OCS planning areas in the development of the DPP. Proceeding otherwise would prematurely exclude regions from leasing consideration at the outset in the absence of critical environmental analysis. The U.S. OCS contains approximately 90 billion barrels of oil and over 404 trillion cubic feet of natural gas. Many of these resources, however, are located in planning areas that are currently either completely or largely prohibited from development. Off Alaska, it is vital that the United States maintain and accelerate opportunities to develop offshore oil and gas, particularly in the resource-rich Beaufort and Chukchi Seas. Development of these areas would create thousands of jobs and billions in government revenue. In addition to boosting U.S. economic growth, Alaskan offshore development will help extend the longevity of TAPS.

Alaska State Senator Meyer supports adding the Atlantic, Gulf of Mexico and Alaska to the upcoming 2017–2022 Program. The Senator states that the additions would further boost the Nation's economic and energy security as well as create much needed tax revenue. Responsible development will ensure protection of the natural environment. The Senator is confident that the industry is using the best safety practices, standards and regulations to develop offshore oil and natural gas resources.

Arkansas State Representative Altes supports including all 26 OCS planning areas in the development of the DPP and to refrain from prematurely excluding regions from leasing consideration in the absence of critical environmental analysis. The Atlantic, Eastern Gulf of Mexico, and Beaufort and Chukchi Seas contain significant amounts of oil and natural gas that have not been utilized. The Representative notes that new domestic energy resources will help with unemployment, high gasoline prices, and turmoil overseas.

Florida State Representative McBurney supports including all 26 OCS planning areas in the development of the DPP. The Atlantic, Eastern Gulf of Mexico, and Arctic contain significant amounts of oil and natural gas that have not been utilized. The Representative cites 6.3 percent unemployment, high gasoline prices, and continued crude oil importing as reasons to increase domestic energy production.

Idaho State Senator Winder supports adding all areas not under moratorium in the development of the 2017–2022 DPP. This development is very important to the economic potential of the United States and affects all Americans whether or not they live in a coastal state. It could potentially provide nearly 500,000 jobs and cumulative government revenue of around $400 billion. Domestic energy development has always played a central role in the Nation's recovery from significant economic crises and has the potential of reshaping global geopolitics. In the absence of critical environmental, strategic, or other applicable and pertinent analyses, the DPP should not prematurely exclude regions from leasing consideration and conservation.

Indiana State Representative Friend, member of the House Environmental Affairs Committee, supports opening up planning areas in the Atlantic, Gulf of Mexico and Alaska in the 2017–2022 Program. The Representative states that national energy policy needs to find a balance between environmental and energy resources. Offshore resources could create thousands of jobs, generate revenue for infrastructure projects, and provide downward pressure on energy prices.

Further, corporations are using the best practices, standards and regulations in place to safely develop offshore oil and natural gas resources.

Indiana State Representative Koch, Chairman of the House Utilities and Energy Committee, supports opening up planning areas in the Atlantic, Gulf of Mexico and Alaska in the 2017–2022 Program. The Chairman states that national energy policy needs to find a balance between environmental and energy resources. Offshore resources could create thousands of jobs, generate revenue for infrastructure projects, and provide downward pressure on energy prices. Further, corporations are using the best practices, standards and regulations in place to safely develop offshore oil and natural gas resources.

Indiana State Senator Boots, member of the Senate Environmental Affairs Committee, supports including Atlantic, Gulf of Mexico and Alaska areas of the OCS in the development of the 2017–2022 DPP. Offshore resources could create thousands of jobs, generate revenue for infrastructure projects, and provide downward pressure on energy prices. The Senator is confident that industry will utilize the best practices, standards and regulations to safely develop these offshore resources.

Indiana State Senator Crider, member of the Senate Agriculture and Natural Resources Committee, supports opening up planning areas in the Atlantic, Gulf of Mexico and Alaska in the 2017–2022 Program. Offshore resources could create thousands of jobs, generate revenue for infrastructure projects, and provide downward pressure on energy prices. The Senator is confident that offshore development is safer than before and that corporations will utilize the best practices, standards, and regulations in place to safely develop offshore resources.

Indiana State Senator Leising, member of the Senate Environmental Affairs Committee, supports opening up planning areas in the Atlantic, Gulf of Mexico and Alaska in the 2017–2022 Program. The Senator states that national energy policy needs to find a balance between environmental and energy resources. Offshore resources could create thousands of jobs, generate revenue for infrastructure projects, and provide downward pressure on energy prices. The Senator is confident that the industry is using the best safety practices, standards and regulations to develop offshore oil and natural gas resources.

Indiana State Senator Merritt, Jr. supports opening areas of the Atlantic, Gulf of Mexico, and Alaska in the development of the 2017–2022 DPP because it will create thousands of jobs; generate revenue for infrastructure projects; and reduce energy prices. The Senator comments that opening the Atlantic to allow seismic studies is long overdue.

Iowa State Senator Anderson supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS in the upcoming 2017–2022 Program. The Senator notes that several states have taken advantage of the energy resources to create jobs and grow their economies, as the energy sources lead to manufacturing jobs and more domestic production. Bringing energy independence to the United States will lower fuel prices to consumers, agriculture and manufacturing industry, and inject more money into the U.S. economy.

Iowa State Senator Chelgren encourages BOEM to include the Mid-Atlantic and South Atlantic areas and the Gulf of Mexico in the 2017–2022 Program. Inclusion of these areas will keep energy prices low and allow independence from foreign oil sources like OPEC. The

manufacturing and agriculture industries of Iowa depend on fuel and energy. The lower costs for fuel brought on by investing in the exploration of energy resources will benefit the Nation's energy future. Further, the inclusion of these areas would bring manufacturing jobs and needed business to Iowa.

Iowa State Senator Guth asks that BOEM consider adding additional areas in the Mid-Atlantic and Gulf of Mexico to the 2017–2022 Program. Utilizing these areas will help to keep energy prices affordable for farmers in Iowa. Agriculture is the backbone of Iowa's economy and it relies heavily on affordable energy prices. The Senator believes continued investment in domestic energy will reward all states with low priced domestically produced energy. If the Mid-Atlantic and Gulf of Mexico areas are added and developed, jobs from manufacturing to agriculture will be created all over the country, including in Iowa. Adding these areas to the Five-Year Program will also limit the Nation's increasing dependence on foreign oil.

Iowa State Senator Kapucian supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS to the upcoming 2017–2022 Program. The Senator states that low energy prices have played an important role in Iowa's economy and domestic energy production provides thousands of jobs.

Michigan State Representative Hooker urges BOEM to include all 26 OCS planning areas in the development of the DPP and to refrain from prematurely excluding regions from leasing consideration in the absence of critical environmental analysis. A great number of jobs and substantial government revenue would be supported by the development of the abundant oil and natural gas resources available in the OCS, including in planning areas that are currently either completely or largely prohibited from development. Resource development in the U.S. Arctic would also significantly bolster the Nation's influence in a strategically critical area. A 6.3 percent unemployment rate, turmoil overseas, high gasoline prices, and a continued steady stream of crude oil imports all demonstrate the need for access to new domestic energy resources.

Mississippi State Senator Burton supports including all 26 OCS planning areas in the development of the DPP. The experience in the Gulf of Mexico demonstrates how significant offshore energy development can be to generating revenue and creating jobs. Continuing and expanding access to all areas of the Gulf of Mexico will help supply Americans with reliable crude oil, petroleum products, and natural gas.

Missouri State Senator Brown, Chairman of the Senate Committee on Veterans' Affairs and Health, supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS to the upcoming 2017–2022 Program because it will boost the nation's economic and energy security. Offshore resources could create thousands of jobs and generate revenue for infrastructure projects if revenue sharing were allowed. The Chairman urges the Government to quickly issue permits for the collection of new seismic survey data in the Atlantic and is confident that industry will utilize the best practices, standards and regulations to safely develop these offshore resources.

Missouri State Senator Kraus supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS to the upcoming 2017–2022 Program. Expanding oil and gas development in these areas will boost national economic and energy security. The addition would create

thousands of jobs and generate revenue for critical infrastructure and land reclamation projects. The Senator supports the quick issuance of permits for the collection of new seismic survey data in the Atlantic.

Missouri State Senator Wallingford supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS to the upcoming 2017–2022 Program because it will boost the Nation's economic and energy security. Offshore resources could create thousands of jobs and generate revenue for infrastructure projects if revenue sharing were allowed. The Senator urges the government to quickly issue permits for the collection of new seismic survey data in the Atlantic and is confident that industry will utilize the best practices, standards and regulations to safely develop these offshore resources.

Montana State Representative Ankney urges BOEM to include currently unavailable offshore areas, such as in the Atlantic, Gulf of Mexico, and Alaska in the upcoming 2017–2022 Program. Representative Ankney states that the Nation's energy renaissance has put millions of Americans to work, generated billions of dollars in revenue for the Government, and put downward pressure on prices for consumers. Opening new areas to exploration, like the Atlantic and Eastern Gulf of Mexico, would send a signal to the markets and to the world that America's oil and natural gas renaissance is here to stay. Greater domestic offshore oil and natural gas production will create jobs, grow our economy and increase American energy security.

Nevada State Senator Gustavson supports the addition of Mid-Atlantic and South Atlantic areas of the OCS to the upcoming 2017–2022 Program to boost Nevada's and the Nation's economic and energy security. Development of offshore resources could create thousands of well-paying jobs and generate revenue for critical infrastructure projects if revenue sharing were allowed. Citizens also would benefit from the value that additional oil and natural gas resources offer, such as downward pressure on energy prices and the generation of new jobs from manufacturing, services, and other support positions. Currently-estimated volumes of oil and natural gas resources in the Atlantic OCS are significant; however, they may be a gross underestimation due to decades old seismic data. The Senator encourages BOEM to quickly issue permits for the collection of new seismic survey data in the Atlantic and expresses confidence that corporations will utilize the best practices, standards and regulations in place to safely develop offshore oil and natural gas resources.

North Carolina State House Speaker Tillis urges BOEM to include all OCS planning areas in the DPP because it is important to the economy of North Carolina and would continue bringing jobs and economic growth to the state. The Speaker argues that BOEM's inclusion of the Mid-Atlantic and South Atlantic in the DPP is critical to maintaining industry interest, which would ultimately lead to more economically and environmentally effective exploration in a large portion off North Carolina and surrounding coastlines. The Speaker also states that in denying the Atlantic OCS planning areas, citizens and businesses in states along the Atlantic coast would lose out on an opportunity for economic growth and societal benefits that would bring economic development for years to come. Denying these planning areas at this early stage, without the benefit of analysis from environmental review, is neither necessary nor appropriate. Finally, the Speaker states that the capacity of the United States to achieve and maintain energy independence will require access to the Nation's abundant natural resources, with oil and gas resources in new areas playing a vital role in reaching that goal.

North Carolina State Representative Conrad supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS to the upcoming 2017–2022 Program to boost North Carolina's and the Nation's economic and energy security. Developing offshore resources could create thousands of well-paying jobs and generate revenue for critical infrastructure projects if revenue sharing were allowed. Citizens would also benefit from the value that additional oil and natural gas resources offer, such as downward pressure on energy prices and the generation of new jobs from manufacturing, services, and other support positions. Currently-estimated volumes of oil and natural gas resources in the Atlantic OCS are significant; however, they may be underestimated due to old seismic data. The Representative encourages the government to issue permits for the collection of new seismic survey data in the Atlantic. The commenter believes that offshore development is safer now than ever before and is confident that corporations will use the best practices, standards, and regulations in place to safely develop offshore oil and natural gas resources.

North Carolina State Representative Hager urges inclusion of all Atlantic OCS planning areas in the DPP. Because existing resource estimates for the Atlantic are based on 30-year old seismic surveys, the Representative asserts that the inclusion of the Mid-Atlantic and South Atlantic in the DPP is critical to maintaining industry interest in obtaining updated resource data. This interest would set the way for more economical and environmentally effective exploration in the Atlantic OCS planning areas. Further, excluding the Atlantic OCS areas from the DPP would deny citizens and businesses in Atlantic coast states and others from economic and societal benefits. Domestic economic conditions, recent international events, and continued crude oil imports underscore the necessity for Federal actions that encourage, rather than prohibit, domestic energy activity.

North Carolina State Senator Berger requests that all of North Carolina's 64 million federally managed OCS acres be included in every step of the 2017–2022 Program development process. The Senator notes that full utilization of domestic energy resources is critical to the Nation’s security and economy. The Senator notes that North Carolinians of all political backgrounds support increased production of domestic hydrocarbons.

North Carolina State Senator Rucho and Representative Rager, Co-Chairs of the Joint Legislative Commission on Energy Policy, urge BOEM to include North Carolina's OCS in all phases of planning, analysis, assessment and other considerations for the next Five-Year Program. The Co-Chairs note that of the ten lease sales in the Atlantic OCS, five were in the Mid-Atlantic Planning Area, of which North Carolina is a part. The commenters ask that once new targets are identified in the next round of proposed G&G exploration, the oil and gas industry be allowed to lease and explore North Carolina's Federal OCS acreage. Offshore production provides vital economic benefits to the Nation and to North Carolina. The commenters note both political parties and the majority of citizens support offshore energy development off North Carolina.

North Dakota State Senator O’Connell supports the addition of the Mid-Atlantic and South Atlantic areas of the OCS in the 2017–2022 DPP because it will create thousands of jobs; generate revenue for infrastructure projects; and reduce energy prices. The Senator asks that BOEM quickly issue permits for the collection of new seismic survey data in the Atlantic and is

confident that industry will utilize the best practices, standards and regulations to safely develop these offshore resources.

North Dakota State Senator Schneider would appreciate BOEM considering the addition of currently unavailable offshore areas including Atlantic, Gulf of Mexico and Alaska, in the upcoming 2017–2022 Program. The Senator notes that cooperation between the private sector and Federal and state governments can create a balance between promoting energy independence and protecting the environment. The development of natural resources will have a significant impact on regional economies.

Ohio State Representative Stinziano urges BOEM to add currently unavailable offshore areas, such as the Atlantic, Gulf of Mexico, and Alaska to the upcoming 2017–2022 Program. These inclusions would further improve the Nation's economic and energy security as well as produce much needed tax revenue. The Representative states that Ohio has seen an increase in jobs and revenue from oil and natural gas development, and believes that every state with these natural resources should have the chance to prosper from the same economic gain when appropriate. The Representative also expresses confidence that companies will utilize first rate practices, standards, and regulations to safely develop offshore oil and natural gas resources.

Pennsylvania State Senator Solobay expresses strong support for including all 26 OCS planning areas in the development of the DPP. Proceeding otherwise would prematurely exclude regions from leasing consideration at the outset in the absence of critical environmental analysis. Based on the latest Federal estimate, the U.S. OCS contains approximately 90 billion barrels of oil and over 404 trillion cubic feet of natural gas. Many of these resources, however, are located in planning areas that are currently either completely or largely prohibited from development. The estimated volume of oil and natural gas held in the Atlantic OCS represents more than 20 times the 2012 level of annual Federal offshore oil production and over 94 times the 2012 level of annual Federal offshore natural gas production. In addition to the domestic energy supply boost these resources could provide, reports project that their development could ultimately support more than 440,000 jobs and $191 billion in cumulative government revenue. The Arctic holds an estimated 23.6 billion barrels of oil and 104 trillion cubic feet of natural gas, the development of which would create 54,700 jobs and $193 billion in government revenue.

South Carolina State Representative Crawford, member of the House Agriculture Committee and the Sub-Committee on Environmental Affairs, supports the inclusion of the South and Mid-Atlantic OCS in the 2017–2022 Program. The Representative notes offshore energy development support from a variety of organizations including the South Carolina Chamber of Commerce, Palmetto Agribusiness Council, Coastal Conservation League, and South Carolina Manufacturers Alliance. Expanding the planning areas could create thousands of jobs, generate revenue, and create less reliance on foreign fuel sources. The Representative states that new and enhanced safety protocols have been developed by regulators and industry to include spill prevention, containment and response.

South Carolina State Representatives Forrester and Clemmons and State Senator Martin support including new areas for offshore leasing. A robust Five-Year Program must be a key component of President Obama's "all-of-the-above" energy strategy and will assist in advancing the U.S. economy and energy security. The commenters state that the Atlantic OCS needs to

remain under consideration to ensure that companies will have incentives to conduct seismic surveys and collect needed seismic data. Regulations that govern offshore energy development have enhanced safety, and industry has enhanced best practices and technologies that focus on spill prevention, containment, and recovery.

South Carolina State Representative George supports the addition of the South Atlantic OCS to the 2017–2022 Program. The Representative notes that offshore exploration of natural gas and oil could bring new economic development to the Atlantic region, including lower energy prices, increase in jobs, and energy independence. The Representative adds that the South Carolina House of Representatives has passed solar energy legislation and a resolution authorizing further wind energy risibility research with support from business and conservation communities.

South Carolina State Representative Hardee supports including the Mid-Atlantic and South Atlantic OCS in the upcoming 2017–2022 Program. Expanding the planning areas will create jobs, slow inflation, indirectly lower crime rates and ultimately make America more secure. The Representative states that Mid-Atlantic and South Atlantic states should be allowed to share revenue similar to the agreement that is in place for states bordering the Gulf of Mexico. Further, the commenter states that hosts of oil and natural gas development should receive a share in government collected revenue and believes that modern seismic surveys are the safest way to explore for offshore energy.

South Carolina State Senator Campbell urges BOEM to include all Atlantic OCS planning areas in the DPP. Because existing resource estimates for the Atlantic are based on 30-year old seismic surveys, the commenter asserts that the inclusion of the Mid-Atlantic and South Atlantic in the DPP is critical to maintaining industry interest in obtaining updated resource data. This interest would set the way for more economical and environmentally effective exploration in the Atlantic OCS planning areas. Further, excluding the Atlantic OCS areas from the DPP would deny citizens and businesses in Atlantic coast states and others from economic and societal benefits.

South Carolina State Senator Hembree states that including the Mid-Atlantic and South Atlantic OCS in the 2017–2022 Program could create an energy boom for South Carolina's economy and could yield great benefits for the entire region. South Carolina's state and local leadership have taken the initiative and begun to study the possibility of energy offshore South Carolina by creating a bi-partisan panel of experts to examine the issue of offshore energy development. Senator Hembree notes offshore energy development support from a variety of organizations including South Carolina Chamber of Commerce, Palmetto Agribusiness Council, Coastal Conservation League and South Carolina Manufacturers Alliance. The South Carolina General Assembly has passed solar and clean energy legislation. The Senator states that the new and enhanced safety protocol developed by regulators and industry, along with seismic surveys, will allow for tourism and energy industries to coexist.

Texas State Representative Raney supports including all 26 OCS planning areas in the development of the 2017–2022 DPP. The Representative states that the experience in the Gulf of Mexico demonstrates how significant offshore energy development can be to generating revenue

and creating jobs. Continuing and expanding access to all areas of the Gulf of Mexico will help supply Americans with reliable crude oil, petroleum products, and natural gas.

Texas State Representative Riddle supports including all 26 OCS planning areas in the development of the 2017–2022 DPP. The Representative says that the experience in the Gulf of Mexico demonstrates how significant offshore energy development can be to generating revenue and creating jobs. Continuing and expanding access to all areas of the Gulf of Mexico will help supply Americans with reliable crude oil, petroleum products, and natural gas.

Wyoming State Representative Larsen, assigned to the House Minerals, Business & Economic Development Committee, states that it is critical to include all 26 OCS planning areas in the development of the DPP. Doing so would avoid fluctuations in the oil and gas markets and help maintain long-term stability for the oil and gas industry that accesses U.S. lands regulated by the Government. As demonstrated by the development of tight shale oil and gas resources in the continental United States, development of oil and gas resources can establish a stable market for the consumer and investor.

Wyoming State Senator Bebout and Representative Stubson convey their support for including all 26 OCS planning areas in the development of the DPP as part of the 2017–2022 Program. Domestic energy development has played a central role in the emergence from the most significant economic crisis since the Great Depression, and the ongoing renaissance is transforming communities across the United States as well as reshaping the global geopolitical landscape. However, a 6.3 percent unemployment rate, turmoil overseas, high gasoline prices, and a continued steady stream of crude oil imports all demonstrate the need for access to new domestic energy resources.

Wyoming State Senator Perkins supports including all 26 OCS planning areas in the development of the DPP, specifically adding areas not currently included in the program and/or under moratoria. The Senator notes that by not requesting inclusion of all OCS planning areas, BOEM will be unable to ensure that all options for leasing, conservation or other designated purposes will be considered. Offshore resources could create thousands of jobs, generate billions in government revenue.

A.2.8 Members of Congress

Arkansas Senator Pryor urges BOEM to create a broad and robust Five Year Program, which will allow for consideration for all areas with reasonable potential for resources, so new information and data can be gathered. Offshore energy production contributes to job creation, enhancement of the Nation's energy security, and provides both Federal and local government revenue.

California Congressional Delegation members urge BOEM to exclude offshore oil and gas lease sales in the Northern, Central, and Southern California Planning Areas from the 2017–2022 DPP. Californians have historically opposed new offshore drilling due to the threat that oil spills, leaks, and air and water pollution can have on public health, marine resources, and the recreational and tourism industries. Because the majority of land that already hold OCS leases are not producing oil and gas, the commenters suggest that BOEM instead ensure that energy

companies that hold these leases are diligently developing the already leased land. BOEM should continue to develop clean, renewable sources of offshore energy that will protect the integrity of California's coastline.

Florida Senator Nelson expresses strong opposition to oil and gas drilling and seismic testing off the Atlantic Coast of Florida. The Senator cites impacts to Florida coastlines, fishing, tourism, and NASA operations. The commenter recommends that the BOEM aggressively encourage the development of the millions of acres already leased before offering more acres under the new program. The Senator also recommends that, before offering up new areas for oil and gas production, BOEM finalize the rule updating safety standards for blowout preventers and other well controls.

Florida Senator Nelson and 12 Representatives urge BOEM to make clear that it will maintain statutory protections for the Eastern Gulf of Mexico Planning Area from offshore oil and gas drilling and notes that the moratorium for the Eastern Gulf of Mexico is in place until 2022 per the Gulf of Mexico Energy Security Act of 2006. In addition to expressing concern for the impacts of the *Deepwater Horizon* oil spill, the commenters state that the area is protected to preserve mission-critical military activities. The commenters urge BOEM to encourage the development of the existing offshore leases before offering more. The 2012–2017 Program allows more than 75 percent of offshore oil and gas resources available for development but only less than a quarter of the leases are active.

Louisiana Senator Landrieu, Warner of Virginia, Begich of Alaska, and Manchin of West Virginia ask that BOEM keep the 2017–2022 Program very broad and include areas that the Administration and industry have indicated will provide new information and data to help inform decisions. BOEM should move forward with a Five-Year Program that continues to lease currently open areas but will allow consideration of exploration for all areas with potential resource development in the future. Offshore energy development will provide equitable revenue to states through revenue sharing and royalty payments, which will provide for coastal protection and needed infrastructure investments.

Louisiana Senator Vitter, Wicker of Mississippi, Sessions of Alabama, and Scott of South Carolina, express support for including the Atlantic coast, significant acreage in the Eastern Gulf of Mexico, areas off the coast of Southern California, and multiple areas off the Alaska shoreline in the new program. The Senators cite studies that indicate increased jobs and economic benefits if these areas are opened to oil and gas development.

Massachusetts Senators Markey and Warren, Menendez and Booker of New Jersey, Mikulski and Cardin of Maryland, Blumenthal of Connecticut, and Reed and Whitehouse of Rhode Island urge BOEM to continue to protect Federal waters off the Atlantic coast from offshore oil and gas drilling in an effort to protect the fishing, tourism, recreation, and other economies that generate revenue for East coast states. The Senators note that the current Five-Year Program allows more than 75 percent of offshore oil and gas resources available for development. This balance should remain so as to continue the protection of ecosystems such as Georges Bank. Lastly, the Senators note that because there are millions of acres of offshore leases in the Gulf that have not been developed, additional development in the Atlantic coast is not needed.

Missouri Representative Long supports addition of the Mid-Atlantic and South Atlantic areas of the OCS to the 2017–2022 Program, citing a possible boost to national economic and energy security. The commenter also supports issuance of permits for the collection of new seismic survey data in the Atlantic, asserting that modern seismic surveys are a way to safely explore for oil and natural gas offshore with little-to-no impact on marine mammal populations.

New Jersey Senators Menendez and Booker and Congressman Pallone Jr. strongly oppose the inclusion of any Atlantic planning areas in the 2017–2022 DPP. Citing the economic and environmental devastation that occurred on the Gulf shoreline, the commenters state that offshore drilling efforts would threaten New Jersey's workforce, coastal resources, and communities. New Jersey's coast faced environmental contamination from Hurricane Sandy; however, the commenters fear that an oil spill would be more catastrophic for the environment and economy. Energy development off the Atlantic coast should focus on renewable energy production, such as wind energy.

Oregon and Washington Congressional Delegation Members urge BOEM to not include any offshore oil and gas lease sales in the Washington/Oregon Planning Area in the 2017–2022 DPP citing concerns for the sensitive ecosystems that support sustainable fishing and tourism industries and the economy of the region. The commenters note that local laws and policies have opposed offshore drilling in the Pacific Northwest and that the estimated oil and gas resource base of the region is ranked 16th out of 22 OCS planning areas. The commenters request that BOEM maintain their focus on wave, tidal, and wind methods for generating energy from the ocean.

South Carolina Representative Rice urges BOEM to continue lease sales in the Gulf of Mexico, and also to allow new areas for consideration, such as the Mid-Atlantic, South Atlantic, and the Arctic. The Congressman states that expanding offshore energy exploration and development is a shared goal of bipartisan colleagues in the House of Representatives, Senate, and American public. Enhancing energy security would revitalize the economy by creating over 35,000 jobs in South Carolina by 2035. Further, consumers will benefit with lower energy prices. The commenter asks that hoteliers, restaurateurs, and other small business owners be allowed to participate in the Five-Year Program development process.

Virginia Senator Kaine expresses support for including leasing of OCS areas off the coast of Virginia in the 2017–2022 Program. The Senator emphasizes the importance of BOEM's recent decision to allow seismic surveying operations in the Atlantic Ocean consistent with measures to limit the risks to marine mammals. The Senator notes the advancements in drilling technology and safety oversight by industry and the Government.

Eighteen Members of Congress ask that BOEM not include any lease sales in the North Aleutian Basin, Beaufort Sea or Chukchi Sea Planning Areas. The commenters note that the 2012–2017 Program recognized the environmental sensitivities and economic importance of the Pacific and Atlantic Oceans and state that continued protection of these areas is warranted in the 2017–2022 Program. These protections should be expanded to the planning areas in the Arctic Ocean. Industry has attempted to develop oil and gas in the Arctic Ocean and failed due to the harsh conditions of the area. New rules have not been issued to help prevent some of the failures that occurred, and therefore, new activities cannot occur until effective processes and oil spill

response has been demonstrated. Commenters state that because of these issues, current lease sales should be postponed or cancelled.

Thirty-six Members of Congress request that all planning areas in the Atlantic be excluded from the 2017–2022 Program. The commenters believe that the circumstances that informed the exclusion of the Atlantic planning areas under the existing Five-Year Program remain unchanged. Further, allowing oil and gas development in the Atlantic will be inconsistent with the ongoing efforts by Federal, state, and local governments to improve the health of Atlantic environmental resources and ensuring the economic vitality of coastal areas of the Atlantic. A major oil spill would undermine the efforts to help communities that have worked to rebuild after Hurricane Sandy destruction. The commenters encourage the development of wind energy resources in the Atlantic as it will generate revenue, create jobs and provide sustainable energy without the risks that come with oil and gas activities. Additionally, the commenters note that tidal and marine hydrokinetic power could be an environmentally safer offshore energy source. Lastly, the commenters suggest that analysis of drilling in the Atlantic should be holistic and should include an analysis of the potential effects on neighboring planning areas and the ocean ecosystem.

One hundred sixty-four Members of Congress recommend BOEM proceed with a Five-Year Program that establishes a rigorous lease sale schedule in the Gulf of Mexico. These Members also suggest expanding development areas to include the Mid-Atlantic, South Atlantic, and Arctic areas. The commenters cite increased jobs and positive impacts on energy security as rationale.

A.2.9 Tribes and Tribal Organizations

Bristol Bay Native Association urges the removal of the North Aleutian Basin from consideration in the 2017–2022 Program and requests that Congress permanently protect Bristol Bay from offshore oil and gas leasing. The Association attached a resolution that was authorized by its Board of Directors on September 17, 2010, outlining the details of its request to Congress to permanently protect Bristol Bay by removing the North Aleutian Basin from the Five-Year Program. The Association welcomes dialogue to assist BOEM in its determination to permanently protect Bristol Bay.

Bristol Bay Native Corporation encourages BOEM to include the Chukchi and Beaufort Seas Planning Areas in the 2017–2022 Program; but, requests that the North Aleutian Basin Planning Area not be included. The Chukchi and Beaufort Seas Planning Areas are the locations of ongoing presale activities and have substantial oil and gas potential. Protecting the North Aleutian Basin Planning Area will support BOEM's goal of protecting areas that have environmentally sensitive habitats. The North Aleutian Basin area also has important social and cultural assets, such as subsistence hunting and fishing. Further, the area supports the fisheries of Bristol Bay's long-term sustainable economy. The potential harm to resources outweighs any potential benefits that lease sales may bring to the North Aleutian Basin Planning Area.

Crow Nation, Montana, asks BOEM to include the Mid-Atlantic and South Atlantic areas in the 2017–2022 Program. The United States has the opportunity to continue to be a global leader in oil and natural gas production if BOEM adds currently unavailable offshore areas, such as in the

Atlantic, Gulf of Mexico, and Alaska to the upcoming 2017–2022 Program. Domestic development of oil and natural gas will fuel America's economic recovery, creating jobs and revenue.

Nunamta Aulukestai urges the removal of the North Aleutian Basin from consideration in the 2017–2022 Program and permanent protection for the area from future leasing. The North Aleutian Basin Planning Area, which includes Bristol Bay, overlaps important fisheries that are of national significance and form the backbone of various Native villages' and tribes' local economies. Nunamta Aulukestai attached a list of western Alaskan tribes and regional Native organizations that have passed resolutions in support of permanent protection for the North Aleutian Basin.

Sivuqaq, Inc. states that they are only now becoming interested in exploring their natural resources for economic development. The tribe explains that its concerns (i.e., fear of the potential adverse impacts on their subsistence way of life), which led it to take legal action to stop the Navarin Basin Lease Sale in the late 1980s, remain the same today and influence their strategic planning to address economic, environmental, and climatic challenges. However, the tribe expresses an interest in making their St. Lawrence Island available as a natural platform or, alternatively, a staging area because the Island is unexplored for oil and gas.

A.2.10 General Public

General Comments from Individuals Not Specific to OCS Planning Areas

Approximately 499,900 submissions were received from individuals, of which approximately 499,456 were submitted as part of form letter campaigns. Approximately 214,156 form letter submissions from individuals express general support for the 2017–2022 Program while approximately 285,300 form letter submissions from individuals express general opposition. Of the unique submissions received from individuals, numerous provide general comments with regard to the Five-Year Program and impacts on the environment. Although most of those individuals oppose the DPP due to potential negative environmental impacts, as described in greater detail in the following paragraphs, a few individuals note that environmental concerns are overstated due to the small amount of area required for development and the minimal toxicity of the mercury found in drilling fluid. An individual also makes note of the stringent environmental standards in place in the United States, compared to some foreign production where environmental standards are far weaker.

Among the general concerns for the environment are comments on the potential damaging effects on marine mammals, particularly with regard to the use of seismic testing. Several individuals, however, argue that mitigation efforts and existing BOEM standards account for the risk of seismic testing, and in fact, the increase in marine mammal populations indicates that seismic testing has a negligible impact on marine mammals. In terms of marine life more generally, an individual asserts that decommissioned oil and gas production platforms could benefit the local ecosystem, as well as fishing and tourism industries, by serving as the foundations for artificial reefs. This individual argues that because commercial fishing has coexisted with oil and gas development, the development process does not harm marine life.

Some individuals express concern about the consequences the expansion of OCS leasing will have on climate change, specifically consequences due to the resulting carbon emissions from increasing fossil fuel usage and production. Many individuals note the risks of continuing to expand oil and gas development, citing the negative implications for sea level rise, ocean acidification, and temperature increase.

Individuals also address concerns about oil spills including potential damage to ecosystems, marine life, tourist economies, fishing industries, and human health. Several individuals ask for a formal risk assessment of the effects of a major spill on coastal communities and marine life, citing the damaging effects of past spills and relative frequency of the events as justification for an analysis. In contrast, one individual asserts that, to date, no significant oil spill during OCS exploration has occurred, despite the drilling of over 14,000 exploration and appraisal wells. The individual goes on to note that less than one percent of all oil released into North America's oceans comes from oil spills, with the rest due to natural seeps and human runoff. The individual also argues that OCS production has a much lower risk of spills than transporting oil via tankers, citing historical incidents as evidence.

Many individuals cite the economic benefits of increasing domestic energy production, including increased Federal revenue, creation of jobs, decreased dependence on foreign oil, and lower energy prices. Others note the importance of weighing the risks versus the benefits in terms of the economy, environment, and society, when making a decision about expansion of OCS oil and gas development.

Some individuals address the effects of expanded OCS development on U.S. energy markets. Many express support for the program due to the economic and diplomatic benefits of expanded U.S. oil production. Regarding alternatives to OCS oil and gas development, the majority of individuals argue that renewable energy development is a viable alternative, noting the potential benefits of developing renewable energy for the economy, environment, and job markets. In response to the request for comments on the impact of liquefied natural gas and other exports, one individual notes that BOEM must consider the rapid increase of U.S. natural gas production in the development of the 2017–2022 Program.

A university staff member argues that BOEM should consider the potential costs and benefits of delaying leasing until there is more information about issues, including the magnitude of risk of catastrophic spills, valuation of social and environmental resources, and rate of development of spill prevention and remediation technologies, all of which affect impact analyses of the proposed Five-Year Program, particularly since the decision to develop OCS regions is essentially irreversible. The commenter also notes that different regions of the United States experience different costs and benefits.

Regarding regulations and safety, several individuals note that existing standards ensure the safety of offshore oil and gas development. An individual notes that the availability of search and rescue equipment in place for oil development operation could benefit fishermen and whalers. The individual also notes that new technological developments have helped remove the risk of human error over time. The individual recommends that regulatory agencies streamline the permitting and litigation process to ensure timely implementation.

Some individuals discuss revenue sharing, with the majority supporting revenue sharing for state and local communities. A few suggest that coastal states share in OCS revenue and maintain review rights with regard to development off of their coasts.

Many individuals argue for increased public input and involvement compared with previous iterations of this process. One individual notes the need for public comment to improve the efficiency of OCS permitting and the Endangered Species Act consultation processes. Other general issues addressed include concern about the lack of scientific data; need for a thorough economic and environmental impact analyses prior to implementation; and need for compensation for the social cost of carbon.

Comments from Individuals Specific to Planning Areas

Several individuals provide comments on environmental risks specific to the Alaska, Atlantic, Gulf of Mexico, and Pacific planning areas. Regarding environmental resources, many individuals are concerned about the unique environmental risks of developing Alaska OCS planning areas. Individuals also express concern regarding the risks to marine and coastal ecosystems from development of Atlantic and Pacific OCS regions.

Comments offered with regard to the regulations and safety in the planning areas include concern about the lack of Arctic-specific standards and the unique harshness of the weather conditions in the Arctic, both of which could affect the safety of development in the Alaska Arctic. In support of safety and stability for platforms in Alaska, another individual cites the stability of several platforms in the Gulf of Mexico during Hurricane Katrina.

Many individuals express concern about the increasing risk of oil spills with further OCS development. One individual notes that the uniquely unpredictable and harsh Arctic conditions would significantly hinder clean-up efforts from an oil spill in the Alaska OCS. Another addresses the risk of oil spills in the Pacific planning areas, citing a 99 percent risk of a spill between 50 and 999 barrels, and a 54 percent probability of a spill over 1,000 barrels, when considering existing drilling and undeveloped leases in the Santa Barbara area. This individual also argues that the Pacific's variable currents would greatly impede an effective response to potential oil spills. An individual expresses concern about the Pacific OCS's closeness to shore compared to the Atlantic, Arctic, and Gulf of Mexico, noting that this leads to a heightened risk of oil spills reaching shore and causing more damage, despite spill response efforts. Several individuals reference the 2010 *Deepwater Horizon* oil spill as evidence of the riskiness of offshore oil development in the Alaska and Atlantic OCS planning areas. The argument also is raised in that Atlantic states do not have adequate capabilities to respond to a potential oil spill, exacerbating the effects of a spill. Regarding the Gulf of Mexico, a university staffer states that BOEM must leverage and expand on existing monitoring efforts, including operational plans for development and implementation of Gulf-wide ecosystem monitoring and observing.

Concerning deferrals, exclusions, and mitigations in the Alaska OCS planning areas, an individual notes the risk to the wildlife and wilderness resources of the Beaufort Sea area if leasing is permitted. However, another asserts that Alaska OCS development has never resulted in the death of an endangered species.

An individual argues that expanded Alaska OCS development risks the viability of cultural and subsistence activities of Native Alaskan communities.

Numerous individuals address the benefits of oil and gas development in the Alaska, Atlantic, and Gulf of Mexico OCS planning areas. Several benefits of expanded development are cited, including decreased dependence on foreign oil, improved regional and national economies, creation of jobs, and lower fuel prices. The majority of individuals commenting on the potential benefits of oil and gas development in the Alaska OCS discuss greater tax revenue for Alaskan communities, significant job creation, and a more secure U.S. energy supply. Additionally, multiple individuals note the strengthening of TAPS as a potential benefit specific to the Alaska OCS planning areas. Individuals note the potential Federal, state, and local economic gains that can be realized from increasing development in the Atlantic and Gulf of Mexico OCS regions. Other individuals argue that OCS development will benefit oil companies rather than the general public.

Comments regarding regional or national energy needs and markets include an individual who argues that the Alaskan OCS planning areas contain significant untapped resources. Another asserts that the development of Alaska OCS resources would have little impact on consumer prices or foreign energy dependence. An individual argues that Atlantic OCS development would impede U.S. efforts to shift consumption to cleaner energy sources. Concerning state-level laws, goals, and policies, an individual argues that Alaska OCS development encourages use of a finite resource, and states should continue to develop renewable energy sources to achieve energy independence.

Some commenters urge BOEM to limit activities in specific areas. An individual urges BOEM to permanently withdraw the North Aleutian Basin from OCS development and another individual argues for re-establishing a moratorium on lease sales in the Atlantic OCS.

Regarding seismic permitting, some individuals urge BOEM to issue permits for the collection of new seismic data for the Atlantic, while others argue that new seismic surveys would lead to development of more fossil fuels, with a negative impact on the global environment. An individual argues that Atlantic OCS development would benefit regional and national economies, but implementation first requires more accurate information on available reserves. This argument is echoed by an individual and a university staffer who express concern about reliance on 30-year old seismic data.

Several individuals comment on expanding OCS development in the Alaska, Atlantic, Gulf of Mexico, and Pacific planning areas. Individuals argue for the need to expand lease sales in the Alaska OCS region during the 2017–2022 planning period, as well as the need to reconsider Alaska OCS development after the Ninth Circuit Court's remand of a Chukchi Sea lease sale. An individual opposes development specifically in the Pacific OCS, urging BOEM to reference the California Coastal Commission's staff reports for evidence.

Comments on Assuring Receipt of Fair Market Value for OCS Lands

An individual urges BOEM to re-examine the nonviable class process, citing recent Sale 231 where of the 320 high bids accepted, 270 were determined to be nonviable. Historically, only about seven percent of nonviable tracts go into production. Another individual states that the

lease values should reflect the long-term benefits to be gained from gradual and responsible development of OCS regions, rather than current market prices. A university staff member argues that BOEM should consider environmental and social externalities not accounted for in the bidding process, such as effects on marine ecosystems, air quality, property values, and recreation. The staff member states that the current process and lease values do not effectively incentivize companies to wait for safer drilling technology before beginning development.

Appendix B: Economic Analysis Methodology

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Appendix B. Economic Analysis Methodology

B.1 NET SOCIAL VALUE ANALYSIS METHODOLOGY

The Net Social Value (NSV) analysis conducted for the Draft Proposed Program (DPP) analysis is based on an evaluation of all resources estimated to exist in each planning area. The analysis considers both the value of these resources and the private, environmental, and social costs necessary to explore for, develop, produce, and transport these resources. The purpose of the analysis is to provide the Secretary with a quantitative metric to compare between planning areas based on available resources and the relative private, environmental, and social costs of extracting those resources. Figure B-1 summarizes the components of the NSV analysis.

Figure B-1: Components of the DPP Net Social Value Analysis

Unleased UERR in the entire Planning Area	X	Assumed Oil and Gas Price Levels	=	Gross Revenue
Gross Revenue	—	Private Finding and Production Costs	=	Net Economic Value (NEV)
NEV	—	Environmental and Social Costs of Program Proposal	=	Net Social Value (NSV)

Key: UERR=Undiscovered Economically Recoverable Resources.

The NSV of OCS oil and gas resources is calculated by subtracting both the private and environmental and social costs of exploration, development, production, and transportation from the gross revenue of all undiscovered economically recoverable resources (UERR) in each planning area. The estimates of benefits and costs presented in the NSV analysis were obtained using the same basic methods as those used for the analyses performed in the previous OCS oil and gas leasing programs. The timing assumptions, described in the next paragraph, are the same as those used in the 2010–2015 DPP analysis.

The NSV for the 2017–2022 DPP analysis is calculated through a scenario in which all currently available resources are leased during the initial year of the new program (2017). This scenario avoids a circuitous logic whereby the analysis would prematurely presume the size, timing, and location decisions that are to be based, in part, on that same analysis, and so, cannot be made until that analysis is complete. This approach is consistent with the Court's opinion in *California II* (see Section 2.7) that it was reasonable to use a methodology that avoided that circuitous logic for the ranking of planning areas required by the OCS Lands Act at this stage of the planning process. In this scenario, the resources are discovered and produced at an orderly and expeditious rate typical of each planning area, assuming no special constraints that might result from a Secretarial decision on size, timing, and location of lease sales. Each region has specific timing assumptions assigned to it, based on characteristics in that region (e.g., development and production in the Alaska planning areas is expected to start later than production from GOM planning areas). Other than considering regional characteristics, there are

no binding constraints on the pace of exploration and production. Therefore, it is assumed that as many rigs are available as necessary for drilling and there are no worker shortages.

When the next round of analyses is prepared for the Proposed Program, the net social benefits analysis will exclude all planning areas and portions of planning areas not being considered for the proposed program and will only include economic benefit and cost estimates associated with those resources anticipated to be discovered and produced as a result of the new program (as opposed to total available resources). The different resource assumptions used at each stage of the program are illustrated in Figure 5-2. Further, the Proposed Program analysis will include an estimate of consumer surplus benefits for each program area and will subtract environmental and social costs associated with the energy market substitutes should a new program not be employed.

The NSV analysis is approached from a national perspective, which provides the Secretary with a clear picture of the overall balance of benefits and costs tied to the total resources available in each planning area. In addition to this national approach to costs and benefits, another aspect of social value involves comparison of the benefits of incremental employment, labor income, and other such factors associated with OCS oil and gas exploration and development activity. This approach is more appropriate when considering impacts from the local or regional perspective and is used in the equitable sharing of developmental benefits and environmental risks analysis covered in Chapter 7, Equitable Sharing.

B.1.1 NSV Step 1: Gross Revenue

The NSV analysis begins with the calculation of the gross revenue from the production of all unleased, economically recoverable OCS oil and natural gas resources in each of the 26 OCS planning areas. Gross revenue equals the production of each resource multiplied by the assumed price level (see Figure B-1).

B.1.1.1 Resource Assumptions

The DPP assumes that all unleased UERR on the OCS as of July 2017 are leased in the first year of the program and produced throughout the life of the program. The total UERR used for the NSV calculation are shown in Table 5-1 in Section 5.2.7, Estimates of Hydrocarbon Resources.

B.1.1.2 Price Level Assumptions

Leasing from the 2017–2022 Program will stimulate exploration, development, and production activity for decades, over which time oil and natural gas prices could fluctuate drastically. Historical oil price volatility has shown that unanticipated market and political events, new technologies, weather, geopolitical unrest, or economic changes 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 NSV analysis would render it difficult to separate out the effects of assumed price changes and their timing from the resource and cost differences in program areas on the measures of NSV. Given the extreme uncertainty surrounding oil and natural gas prices over the life of leases sold during this program, the program analysis includes resource and net

benefits evaluated at each level of three level sets of real price scenarios shown in Table B-1. These price scenarios are consistent with BOEM's 2011 National Assessment analysis (BOEM 2011).

Three different sets of flat price cases allow the decision maker to more clearly identify the extent to which net benefits vary under a wide range of general price levels, independent of other input assumptions such as the timing of activities. A real discount rate of 3 percent is used, as recommended by the Office of Management and Budget in the proposed program analysis to aggregate the 40 years of effects at a society-wide rate of time preference (U.S. Office of Management and Budget 2003).

Table B-1: Price Scenarios

Price Scenario	Oil (per bbl)	Natural Gas (per mcf)
Low	$60	$4.27
Mid	$110	$7.83
High	$160	$11.39

Key: bbl=barrel of oil, mcf=thousand cubic feet of natural gas.

For the 2017–2022 DPP analysis, BOEM retains the same price scenarios used for the 2012–2017 Program because the 2011 National Assessment forms the basis for the resource assumptions and uses these prices. Given the major changes in energy-equivalent prices for natural gas and oil in recent years, the ratio of the price of natural gas to oil for the same heat content equivalency factor (British thermal units [Btu]) will likely be reduced for the Proposed Program and Proposed Final Program analysis. The current factor of gas being valued at 40 percent of the value of oil will likely be reduced to 30 percent of the value for the 2016 National Assessment and the Proposed Program and Proposed Final Program analyses. For example, the oil price of $60 per barrel of oil (bbl) in this DPP is associated with a gas price of $4.27 per thousand cubic feet of natural gas (mcf), while the same oil price is associated with a natural gas price of $3.20 per mcf in the remaining 2017–2022 Program documents.

The NSV calculation is conducted at three different price scenarios to show the wide range in available resources and impacts. While it is relatively easy to remove lease sales from the Program schedule if prices and industry interest fall, the reverse is true if soaring prices indicate a need for a more aggressive schedule. The Secretary cannot add lease sales to a five-year schedule once it is in place, regardless of changing conditions, without following the same multi-step, time-consuming process. Therefore, the current analysis includes low and high price scenarios with a $100-per-barrel range as well as a mid-point price scenario (of $110 per barrel) that is near market prices at the time of the analysis.

The relationship among price levels, economically recoverable resource estimates, and activity levels is not linear. This is clearly displayed in Table 5-1 in Section 5.2.7, Estimates of Hydrocarbon Resources. That table shows the ranking by mid-price case, but clearly the ranking would be different if ranked by low or high prices.

B.1.2 NSV Step 2: Net Economic Value

After BOEM estimates the resources' gross revenue, the second stage in the NSV analysis is to calculate the NEV. The NEV equals the discounted gross revenue from the produced oil and natural gas minus the discounted costs of exploring, developing, producing, and transporting the oil and natural gas to the market—the costs required to realize the economic value of the resources. The NEV can be considered as the present value of the expected economic rent collected from development of the UERR. The Federal government, as lessor, collects most of the NEV as transfer payments in the form of cash bonuses, rentals, royalties, and taxes. The lessees, as private firms, retain the remainder as economic profits that may be distributed to shareholders or reinvested in exploration and development projects. The NEV therefore can be equated to the sum of the present values of government revenue and a measure of after-tax profits.

The NEV for undiscovered resources in unleased portions of each planning area is calculated by assuming hypothetical schedules of activities covering exploration, development, production, and transportation of the UERR. BOEM's NEV estimates for each program area use the same schedules of exploration, development, and production activities that are used in the environmental and social cost analysis. As discussed, the schedule of activities assumes that all resources are leased in the first year and explored, developed, and produced as quickly as possible realizing the basic constraints of the particular region. The activities are expressed in aggregated terms, such as exploration wells drilled, platforms installed, and resources produced. Costs specified for the activities are consistent with the costs used for estimating the UERR. Costs are scaled for the different price cases using a cost-price "elasticity factor."[1]

Based on the calculated government share and general estimates of foreign shareholder proportions in foreign companies, we use only 95 percent of our estimate of NEV to measure the domestic portion of NEV from a program area.[2] Table 5-2 in Section 5.3.3 Net Social Value Calculation shows the domestic NEV estimates in the three columns under the Net Economic Value column header.

B.1.3 NSV Step 3: Net Social Value

The final stage in the NSV analysis subtracts external costs from a planning area's NEV. Beyond the private costs already captured in the NEV estimates, society incurs environmental and social costs from the activities and facilities associated with OCS oil and natural gas exploration, development, and production. The NSV equals the NEV less the present value of environmental and social costs anticipated from the planning area. Environmental and social costs arise from air quality degradation, oil spills, visual and ecological disturbance, and pre-emption of other land uses during the exploration, development, production, and transportation of OCS oil and natural gas resources. Table 5-2 in Section 5.3.3 presents BOEM's estimates for

[1] Elasticity is a measure of responsiveness. In this case, the cost-price elasticity measures the responsiveness of offshore oil development costs to changes in oil prices. The cost-price elasticity was defined based on internal analyses that found that a statistically significant relationship exists between crude oil price and an index of upstream capital cost. These analyses were based in part on indices developed by IHS-CERA, Inc., and were applied to all cost components.
[2] This reduction is described in BOEM 2012b.

the environmental and social costs associated with the development of the UERR in the OCS planning areas.

The BOEM uses the revised Offshore Environmental Cost Model (OECM) to estimate both the environmental and social costs that would result from OCS activities (Industrial Economics, Inc. et al. 2012). The OECM was revised in 2012 and is currently undergoing several small updates that will be incorporated in the Proposed Program and Proposed Final Program analyses. The OECM models the impact of typical activities associated with OCS production and small oil spills occurring on the OCS. The model uses economic inputs, resource estimates, and exploration and development scenarios as the basis for its calculations. It is not designed to represent impacts from catastrophic events[3] or impacts on unique resources such as endangered species[4] as these impacts are subject to greater uncertainty and are not as easily monetized.

The OECM calculates the environmental and social costs using the same OCS exploration and development activities used in the NEV analysis. Costs are computed for each of the following categories from activities associated with exploration, development, production, and transportation that might occur with new OCS production:

- environmental costs (air quality and ecology) and
- social costs (recreation, property values, subsistence harvests, and commercial fishing).

The OECM estimates air emissions for nine different pollutants (oxides of nitrogen [NO_x], sulfur oxides [SO_x], particulate matter with a diameter of 10 micrograms and 2.5 micrograms [PM_{10} and $PM_{2.5}$, respectively], carbon monoxide [CO], volatile organic compounds [VOCs], carbon dioxide [CO_2], methane [CH_4], and nitrous oxide [N_2O]). The OECM only applies a monetary value to the first six (the "criteria pollutants," as identified by the U.S. Environmental Protection Agency through the National Ambient Air Quality Standards). However, given the importance of recognizing greenhouse gas emissions, the emissions from methane, nitrous oxide, and carbon dioxide are included in the discussion of non-monetized impacts.

As noted above, NSV is calculated by subtracting environmental and social costs from NEV. The NSV estimates are shown in Table B-3 in the final three columns under the Net Social Value column heading. A more detailed explanation of BOEM's NSV methodology can be found in the *Economic Analysis Methodology* (BOEM 2012b), as well as in the OECM documentation (Industrial Economics, Inc. et al. 2012). A revised version of the *Economic Analysis Methodology* will be prepared for the Proposed Program and Proposed Final Program.

[3] 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 NSV analysis. In 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 risk and impact of catastrophic oil spills are not considered in the NSV analysis. Catastrophic oil spills are discussed and considered in Chapter 6 and in the supporting paper *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (BOEM 2014b).

[4] Impacts on unique resources such as endangered species are discussed in Chapter 6 and will be discussed in more detail in the PEIS prepared in conjunction with the Proposed Program. Further, these impacts will be subject to mitigation measures at later stages in the development process.

When BOEM considers the environmental and social costs of a program area in the OCS Program analyses subsequent to the DPP analysis (i.e., the Proposed Program and Proposed Final Program analyses), we calculate the *incremental* environmental and social costs. These are the costs of producing the resources on the OCS, less the environmental and social costs of the most likely energy market substitutes for these resources. A decision not to hold a sale in any or all of the program areas means no new leasing would take place in those areas for at least five years and domestic oil and natural gas supply would be reduced. This supply reduction would cause only a small change in hydrocarbon prices so there would be little change in the quantity of oil and natural gas demanded. In addition to a small amount of reduced consumption, to fulfill demand in the absence of OCS activity or with reduced OCS activity, there would be increases in energy imports, onshore production, and fuel switching (e.g., oil to natural gas, oil to coal, etc.). This is an important trade-off in the decision of whether or not to include an area in the Proposed Program and Proposed Final Program decision. However, the DPP analysis focuses on the ranking of all planning areas assuming that all UERR are leased and produced, and, therefore, it is not fitting to calculate the energy market substitutions and associated environmental and social costs. The *incremental* (net) environmental and social costs will be calculated in the Proposed Program and Proposed Final Program analyses. The incremental environmental and social costs calculated for the program areas in the 2012–2017 Program show that considering the reduced consumption and the environmental and social costs of relying on the substitute sources of energy in the absence of a new OCS Program, the costs without the program are equal to or greater than these costs from producing area resources under the Proposed Final Program.[5]

To conduct the NSV analysis for the DPP and the subsequent analysis for the Proposed Program and Proposed Final Program, BOEM performs the analyses up to the point at which the resources mix with other sources of oil and natural gas. Thus, the "downstream" social and environmental costs of processing and refining OCS Program oil and gas are excluded. This approach was upheld by the U.S. Court of Appeals for the District of Columbia Circuit in *Center for Biological Diversity (CBD) v. United States Department of the Interior*, where the court ruled that "the text of OCSLA does not require Interior to consider the impact of *consuming* oil and gas extracted under an offshore Leasing Program" (U.S. Court of Appeals 2009, at 484 [emphasis added]). The opinion further states "as the statutory language and our precedent show, Interior's obligations under OCSLA extend to assessing the relative impacts of production and extraction of oil and gas on the localized areas in and around where the drilling and extraction occurred. Interior need not consider the impacts of the *consumption* of oil and gas after it has been extracted from the OCS." (*Id.*., at 485 (emphasis added). Therefore, USDOI is not required to address the impacts resulting from the consumption of oil and natural gas once it has been extracted from the OCS.

B.1.3.1 Non-monetized Impacts

There are other types of environmental and social costs and benefits that are not included in the OECM or monetized in the NSV analysis. The NSV analysis captures the important costs and benefits associated with new OCS leasing that can be reliably quantified and estimated. However, there are other potential impacts that cannot be monetized, which are discussed below.

[5] This is shown in Table 4 on page 20 of the *Economic Analysis Methodology* (BOEM 2012b).

B.1.3.2 Non-monetized Costs

Passive Use Values

In general, the NSV analysis includes cost estimates of many types of use values, but does not include some values that would be associated as nonuse or passive use values. Evidence of nonuse values can be found in the trade-offs people make to protect or enhance environmental resources that they do not use. Nonuse or passive use values exist with any type of energy production, whether OCS oil and gas extraction, tanker imports, or even renewable energy production.

Within the NSV analysis, certain nonuse or passive-use values are not quantitatively captured. The various types of nonuse values are described as option value, bequest value, existence value, and altruistic value. These nonuse values are further described below:

- Option value exists when an individual's current value includes the desire to preserve the opportunity to use a resource in the future. Option value can also refer to the value of any information gained as a result of delaying an activity.
- Bequest value refers the value an individual places on an environmental resource available for his or her children and grandchildren to experience. It is based on the desire to make a current sacrifice to increase the well-being of one's descendants.
- Existence value means that an individual's utility or well-being may be increased by the knowledge of the existence of an environmental resource, even though the individual has no current or potential direct use of the resource.
- Altruistic value occurs out of one individual's concern for another.

A large body of literature discusses studies of these values. However, the extent to which these estimates are transferrable to the BOEM OCS Leasing Program context on a nationwide scale is probably quite limited. These values must be developed using stated preference techniques and the results from such analyses are often highly dependent on the resource and specific context (which would include resource conditions, possible improvements or degradation as a result of policy changes, payment vehicles, etc.). If one were interested in evaluating the extent to which households or individuals hold nonuse values (or a bequest value in particular) as important for OCS oil and gas resources, original empirical research would need to be conducted. This is because an approach like benefits transfer, in which results from existing studies can be applied to new studies when time and/or money are limiting factors, would not be suitable given the importance of the specific context needed to ascertain meaningful stated preference results. Total economic value studies (which include nonuse values) are time consuming and expensive to conduct. These types of studies are most appropriate in situations where the resources under consideration are unique, where a set of defined changes to the resource can be easily identified, and where the resource(s) are not typically bought and sold in markets. It is not clear this is the case for OCS resources. OCS oil and gas resources are not unique, but fungible, and are readily bought and sold in markets.

While these values are not quantitatively incorporated in the NSV analysis, one aspect of passive use values, option value, is discussed largely qualitatively in Chapter 8, Fair Market Value.

Within the discussion of uncertainty and option value, BOEM quantitatively considers price uncertainty with the hurdle price analysis.

Catastrophic Oil Spills

Given the difficulties in determining expected costs of a catastrophic oil spill because of the very unlikely nature of its occurrence, the estimated impacts are not included in the NSV analysis. Catastrophic oil spills are discussed in more detail in Section 6.4.1, Catastrophic Oil Spills and in the supporting paper *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (BOEM 2014b).

Greenhouse Gas Emissions

The OECM estimates the monetary value of possible damages from emissions for six different air pollutants including the Environmental Protection Agency (EPA) "criteria" pollutants (NO_x, SO_x, PM_{10}, $PM_{2.5}$, CO, and VOCs) but that model does not estimate a monetary value of damages from emissions for greenhouse gases: carbon dioxide, methane, and nitrous oxide. Nevertheless, the model does calculate the physical level of greenhouse gas emissions that would be emitted; as for criteria pollutants, the greenhouse gas is calculated based on the exploration and development assumptions used in the other aspects of the NSV analysis. Table B-2 shows the estimated emissions associated with the exploration and development of OCS resources as tons of carbon dioxide equivalent CO_2e.

Table B-2: Greenhouse Gas Emissions

Millions of Tons of CO_2 Equivalent (CO_2, CH_4, N_2O)			
Planning Area	**Low**	**Mid**	**High**
Central Gulf of Mexico	208.6	226.1	233.4
Western Gulf of Mexico	190.1	204.9	208.2
Eastern Gulf of Mexico	46.9	53.1	54.9
Southern California	33.6	41.8	50.9
Beaufort Sea	21.6	30.3	38.5
Chukchi Sea	12.2	26.1	30.8
Mid-Atlantic	18.8	23.5	25.1
Central California	16.1	20.8	27.4
North Atlantic	12.8	13.7	15.2
Northern California	9.6	12.3	19.0
Cook Inlet	2.9	6.7	6.8
Washington/Oregon	3.8	5.4	7.1
North Aleutian Basin	2.7	4.0	4.3
Gulf of Alaska	4.1	4.2	4.3
South Atlantic	1.6	1.9	2.3

Key: CH_4=methane, CO_2=carbon dioxide, and N_2O=nitrous oxide.

Table B-2 gives the OECM's estimates of scenario-based emissions of these three greenhouse gases, where both methane and nitrous oxide emissions were converted to tons of CO_2e using the

EPA's Greenhouse Gas Equivalencies Calculator (EPA 2014) of 25 times for methane and 298 times for nitrous oxide.[6]

The U.S. Government's Interagency Working Group on the Social Cost of Carbon has developed an estimate of the economic costs associated with an increase on carbon dioxide emissions, i.e., the social cost of carbon. The social cost of carbon is designed as a comprehensive estimate of the climate change impacts on net agricultural productivity, human health, and property damages from increased flood risk. As noted by the U.S. Government's Interagency Working Group on the Social Cost of Carbon, "any assessment will suffer from uncertainty, speculation, and lack of information about: (1) future emissions of greenhouse gases, (2) the effects of past and future emissions on the climate system, (3) the impact of changes in climate on the physical and biological environment, and (4) the translation of these environmental impacts into economic damages" (IWGSCC 2013). USDOI does not yet have a policy in place concerning the monetization of the social cost of carbon, therefore, BOEM is not monetizing the impacts from greenhouse gas emissions in the DPP analysis, but is analyzing greenhouse gas emissions in a quantitatively and qualitatively manner.

B.1.3.3 Non-monetized Benefits

The OECM does not monetize certain benefits from OCS oil and gas activities because a credible assessment of monetized impacts cannot be made owing to a lack of available data and inability to associate any monetized impacts specifically with new OCS leasing and production. Several categories of these non-monetized benefits, including recreational fishing and diving, potential reduction of natural oil seepage, national energy security, and the U.S. trade deficit, can only be evaluated qualitatively and are discussed below.

Recreational Fishing and Diving

Oil and gas platforms provide navigational assistance for recreational and commercial fishing and diving boats. In the GOM, where the seafloor consists mostly of soft mud and silt, artificial reefs and platforms can provide additional hard-substrate areas for a variety of benthic species such as barnacles, corals, and sponges (Lindquist et al. 2005). These platforms and artificial reefs can serve as fish hiding spots or as grounds for increased predation. They also support important nursery environments for certain types of fish and may increase the abundance, density, and diversity of the composition of fish species around platforms as compared to natural reef sites (Stanley and Wilson 2000).

Gulf Coast states have recognized the potential importance of such aquatic structures to marine species and local activities. The artificial reef programs in these states, as part of the Rigs-to-Reefs program, have facilitated the permitting, navigational requirements, and liability transfer for decommissioned and reefed rigs in Federal and state waters. The reduction in pressure on natural surrounding reefs and the impact on local industries, and to a certain extent, the greater

[6] The CO_2e conversion factors reflect differences in the Global Warming Potential (GWP) of individual greenhouse gases. The GWP for a specific greenhouse gas is predominantly a function of the average time the gas remains in the atmosphere and how strongly it absorbs energy. CO_2 is used as the benchmark for comparison. For example, in the case of methane which has a 100-year GWP factor of 25, methane emissions will cause 25 times as much warming as an equivalent mass of CO_2 emissions over that same 100-year period.

economy, illustrate the potential environmental and social benefits artificial reefs can provide. Assuming that OCS leasing continues in the GOM from this OCS Leasing Program the number of platforms present is expected to increase, which would provide increased gathering areas for commercial and recreational fishermen and would steer reefing activities towards artificial reef locations that tend to decrease navigational and commercial fishing burdens while increasing the attractiveness of sites for recreational and commercial use.

While these benefits exist in the GOM planning areas, the impact on, or other similar benefits to, other planning areas are yet to be determined.

Natural Oil Seepage

Naturally occurring oil seeps are a natural source of hydrocarbon gas (methane) and liquid (oil and tar) in the environment. Natural seeps are fed by pools of oil and natural gas that form under sedimentary rock layers of the Earth's crust. Oil and gas is pushed to the surface by pressure from the resulting rock layers and these seeps occur on land and in marine environments. Some of the greatest hydrocarbon marine seepage areas throughout the world are located off the coasts of the United States, most notably in the Pacific (Santa Barbara Channel) and the Gulf of Mexico (Macdonald et al. 1993).

Man-made processes involving oil and gas exploration and development may potentially reduce the amount of hydrocarbons naturally seeping into the environment by reducing the reservoir pressure beneath natural seeps (Hornafius et al. 1999).

National Energy Security

Over the past 50 years, U.S. oil and gas demand, supply, and prices have increasingly shaped U.S. national energy policy concerns and national security issues. As crude oil is used as a source of energy for many goods, services, and economic activities throughout the U.S. economy, supply disruptions and increases in energy prices affect nearly all U.S. consumers.

Concerns over energy security stem from the importance that crude oil and more recently, natural gas, have on the functionality of U.S. economic markets and the energy supply disruptions that can frequently occur due to the characteristics and behavior of the global crude oil supply market. The externalities associated with oil supply disruptions—economic losses in GDP and economic activity—have been shown to be greater for imported oil than domestically produced oil. Increased domestic oil production can boost the share of stable supplies in the world market while increased oil imports, often from unstable regions, can have the opposite effect (Brown and Huntington 2010). Increased oil and gas production from the OCS can help mitigate the impact of supply disruptions and spikes in oil prices on the U.S. economy, thereby assuaging economic downturns as well as the amount of U.S. dollars sent overseas to purchase crude oil. Section 4.1, Energy Needs, provides additional discussion on national energy security benefits from OCS activity.

U.S. Trade Deficit

In recent years, a growing percentage of the U.S. trade deficit has been related to energy expenditures. As crude oil is an essential part of many goods, services, and economic activities,

sustained high-energy prices can alter the composition of the U.S. trade deficit (Jackson 2011). Increases in energy expenditures represent an increase in overseas payments to foreign producers for imported oil and a transfer of wealth from the U.S. to foreign oil producers. Large expenditures on crude oil imports in the face of recent high-energy prices can stifle economic activity and slow down domestic economic growth, as well as impact the rate of U.S. inflation and reduce the real discretionary incomes of U.S. consumers (Jackson 2011). Domestic production of oil from the OCS reduces the amount of oil that must be imported from abroad, and because oil demand tends to be inelastic, thereby curtails the effect that high energy expenditures may have on the U.S trade deficit. Section 4.1, Energy Needs, includes a more detailed discussion on the importance of domestic oil and gas production on the U.S. trade deficit.

B.2 COMPARISONS OF THE NSV FOR THE 2017–2022 DPP AND OTHER ANALYSES

While the same basic methodology was used for this DPP analysis and the analysis conducted for the previous, 2010–2015 DPP, a few notable differences are present. First, the previous DPP analysis was conducted using a 7 percent discount rate, and this analysis now uses a 3 percent discount rate. The switch to the 3 percent discount rate was first made in the 2012–2017 Proposed Final Program analysis (and corresponding *Economic Analysis Methodology* (BOEM 2012b), and was adopted to be consistent with guidance from the U.S. Office of Management and Budget Circular A-4 on the social rate of time preference (U.S. Office of Management and Budget 2003).

Another difference is that the 2017–2022 DPP analysis uses the 2011 National Assessment (BOEM 2012a) and the update to the Atlantic region (BOEM 2014a) as the basis for its resource estimates. The new resource assessments were revised from the 2006 assessment used for the 2010–2015 DPP to reflect changes in resource estimation technology, available information, and changes in leased acreage that have occurred since the most recent lease sales and lease relinquishments in each area. Accompanying the change in resource estimates, this current DPP analysis also uses revised price pairs. The current DPP analysis uses a revised set of natural gas prices from those used in the 2010–2015 DPP analysis to reflect the reduced market value of natural gas.

Additional changes exist between the previous DPP and this analysis given revisions to internal BOEM models. Most notably, the OECM underwent major changes following the 2010–2015 DPP. These revisions were completed in 2012. A full documentation of the model is available (Industrial Economics, Inc. et al. 2012).

Another change for the 2017–2022 DPP analysis is the presentation of only the program environmental and social costs and not the incremental (net) costs (which would subtract the environmental and social costs of the most likely program substitutes in the absence of a new OCS program). As discussed, given the nature of the NSV evaluation at the DPP stage, comparing total UERR from the OCS to other specific energy markets would not provide any useful information.

B.3 FAIR MARKET VALUE ANALYSIS: WEB2 METHODOLOGY

As described in Section 8.1.2, BOEM assesses the timeliness of offering program areas at the Program stage through the use of a hurdle price analysis. The hurdle price is equated with the price below which delaying exploration for the largest potential undiscovered field in the sale area is more valuable than immediate exploration.[7] BOEM uses the programming model called WEB2 (When Exploration Begins, version 2) to calculate the hurdle prices associated with each planning area. This appendix provides additional information on the methodology behind WEB2 and the approach used to calculate the hurdle prices.

The first step in calculating hurdle prices is to identify the largest field size in every planning area. The largest field size, all else being equal, tends to have the highest net value per equivalent barrel of resources and thus would be the most profitable in a sale and provide the lowest hurdle price. The reason for focusing on just the largest field is that the decision criterion using the hurdle price is intended to be conservative, to avoid the risk of withholding, on economic grounds, an area that might have at least one field that ought to be developed immediately.

The largest field size in every planning area is derived from the 2011 National Assessment estimates at the mean probability (BOEM 2011). In general, the Assessment addresses undiscovered resources in a framework of field size and probability. The field size framework is provided by the USGS field size classes, which enables grouping fields. For example, there might be two fields in a range of 2–4 million BOE (MMBOE); three fields in the next class covering 4–6 MMBOE; and so on. There will be one "largest field" class which typically has a lone field in it, and no class of a larger size has any fields. It is that largest field size (assumed to be the average resources per field) that was the basis for the hurdle price analysis.

Once the largest field size is set, the WEB2 model requires estimates of costs associated with that field. Cost inputs for the WEB2 model came from the commercial Que$tor cost modeling system and from data collected by BOEM for the socioeconomic analysis of the Five-Year Program (i.e., the economic impact model MAG-PLAN). The Que$tor software allows BOEM to calculate the expected costs of developments, specifically for the size of the largest geologic field in the planning area. For example, the costs for the Central GOM shallow water area are designed specifically for a 1.5 BBOE production facility. The initial lease period limits and other fiscal terms are assumed to continue at current settings.

An additional input into the WEB2 model is the estimated price forecast. The price model in WEB2 represents the range of possible future prices by a specific algorithm that models a so-called mean-reverting stochastic process. In other words, the change in price from one time to the next is random, and the probability of a step up or down reflects a tendency for movement toward the mean level. The price trend growth rate is consistent with that from internal BOEM price forecasts and is 0.32 percent annual growth for oil and 2.11 percent annual growth for natural gas. A BOE annual price growth trend is calculated specifically for each planning area to reflect the natural gas-oil ratio in the region.

[7] All else being equal, the largest field tends to have the highest net value per equivalent barrel of resources, making it the least likely field to benefit from a delay in being offered for lease.

WEB2 computes the social value of immediate leasing, and delays of one, two, three, four, and five years. For the 2017–2022 DPP analysis, BOEM considered immediate leasing to be 2017, a one-year delay to be 2018, and so forth, ending with a five-year delay being 2022, after the end of the 2017–2022 Program. If the social value of delaying leasing until the next program (2022–2027) is higher than leasing at any time during this current period, the area should not be considered in this program. To calculate the hurdle price, the WEB2 is run iteratively for various start prices until a start price is found at which exploration before 2022 is no longer the socially optimal option. This price then becomes the hurdle price, the price at which waiting for leasing is optimal when compared to leasing immediately.

The lease operator was modeled as having flexibility to time the investment in exploration, and separately, any investment in development. Each such decision is based on the contrast of the expected current value of the project with exploring or developing versus waiting. The operator must, of course, make any decision to explore or develop during the initial period. If it would be optimal to wait until the end, the operator must decide then to act or let the lease expire. Because WEB2 includes a random price diffusion process and accounts for the operator's options to explore or wait and/or develop a discovery or wait, it can be called a "real options" model.

To further explain the calculation of oil and natural gas prices from BOE hurdle prices, consider the deep water Central GOM in Table 8-1. In the deep water Central GOM for example, the natural gas-oil ratio means on average the resources in the field consist of 72 percent oil and 28 percent natural gas. The BOE hurdle price is $27. Given the gas-oil ratio of the field, a barrel of oil is worth approximately 1.2 times[8] the value of an average BOE from this field (of which 72 percent is oil and 28 percent is natural gas). Thus, the oil hurdle price is $32.40/bbl ($27 multiplied by 1.2). To calculate the corresponding natural gas price, the oil price is adjusted for the heat content of natural gas (on a thermal basis, 5.62 mcf of natural gas provides the same heat content as a barrel of oil) and then for the natural gas discount value factor (40 percent). The corresponding natural gas price is $2.31/mcf (($32.40 / 5.62) * 0.4). As long as oil and natural gas prices are above these prices, WEB2 evaluation indicates that a minimum of one undiscovered geologic field in this area is ready for immediate leasing sometime within the 2017–2022 Program.

Due to doubts about Arctic natural gas reaching a market, the hurdle price for the Chukchi Sea, North Aleutian Basin, and Beaufort Sea Planning Areas was determined using only the oil portion of BOE that will be sold. Cost assumptions were for a development that will be able to handle both the oil and natural gas volumes, but the natural gas is treated like produced water and not transported to market to be sold. Similarly, only the price growth for oil is considered in trend of oil prices for the Arctic planning areas. However, should higher prices such as those considered in the high price scenario in Chapter 5 be realized, natural gas price may exceed its transport cost, and may eventually be sold under the program.

[8] The value of one average BOE from this planning area is the oil portion plus 40 percent of the gas portion of the field multiplied by the price of a BOE. Only 40 percent of the gas portion is included to account for the fact that natural gas is valued at roughly 40 percent of oil. In this example, the value of an average BOE is 0.833 (0.722 + (0.278 * 0.4)). Therefore, a BOE of only oil is worth approximately 1.2 times the value of an average BOE (1 / 0.833)

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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.